1. *Characteristics of significant sensor-level responses.*
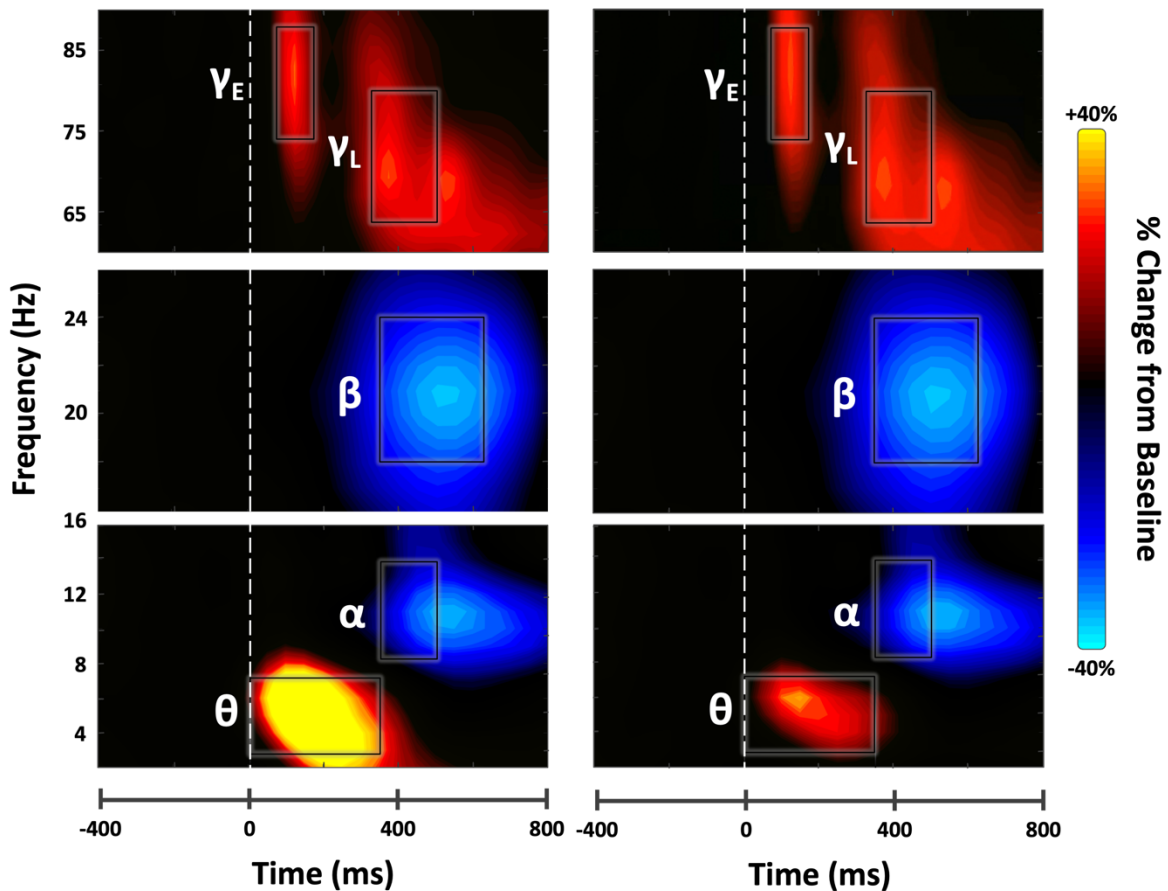

Figure S1: *Time-frequency spectrograms for induced and evoked sensor-level data.* Data are from two occipital sensors (top: M2043, bottom: M1922) and one sensor near the left parietal cortex (middle: M0443) and have been averaged across all participants. Warm colors reflect power increases relative to the baseline, and cool colors represent decreases relative to baseline. (*Left*) Spectrograms showing total power. (*Right*) Spectrograms showing sensor-level data subtracting the stimulus phase-locked components of the responses. Of note, the gamma, beta, and alpha responses do not show changes between the two plots, which suggests these responses were almost entirely induced (i.e., not phase locked to stimulus). Conversely, the theta response was strongly attenuated when the phase-locked component was removed, although it remained significantly different from baseline. Thus, the theta response consists of both induced and evoked (i.e., phase-locked) response components.

2. Inter-trial phase-locking of prefrontal theta responses.

Methods: Since our analyses at the sensor-level revealed that the theta responses had both induced and phase-locked components, inter-trial phase coherence analyses were performed on virtual sensor data extracted from the right prefrontal cortex peak derived from the whole brain statistical analyses. To compute virtual sensors, we applied the sensor weighting matrix derived through the forward computation to the preprocessed signal vector. We next estimated the intertrial phase coherence (ITPC) from the extracted virtual sensors, which reflects the intertrial variability of the phase relationship across trials per participant.

Results: Phase consistency increased over the theta time-frequency window used for imaging and this change was significantly different than phase consistency during the baseline (t(32) = 2.03, p < .001), which indicates that a portion of this prefrontal theta response was likely phase locked. However, note that the increase from baseline to the peak was not quite 20%, which suggests that there was a large non-phase-locked (i.e., induced) component as well.
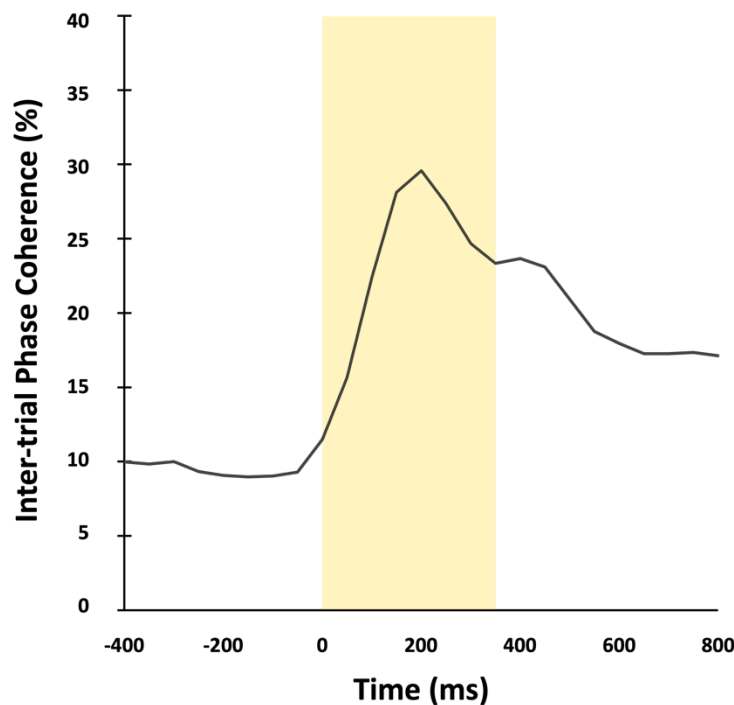

Figure S2: *Inter-trial phase coherence plot for the prefrontal theta response.* Inter-trial phase coherence (ITPC) time series showing the consistency of the phase per unit time across all trials. The time series has been averaged across all participants, within the significant theta frequency window (i.e., 3-7 Hz) identified in the sensor-level analyses. The significant time window of the theta response (i.e., 0-350 ms) is shown in the yellow box. Phase consistency increased by up to 20% during the response time-frequency window, which suggests that a portion of the response was likely phase locked.

3. *Follow-up analyses of the effect of the DHEA-by-sex interaction on gamma oscillatory responses, controlling for age and age-by-sex interaction effects.*

Table S1: Hierarchical Multiple Regression Results for Gamma DHEA-by-Sex Interaction Peaks.

R Inf. Frontal Cortex

Model		b	SE	β	t	R^2	F	ΔR^2	ΔF	95% CI
Step 1	(Constant)	2.10	3.65		0.57	0.023	0.265			(-5.46, 9.66)
	Age	-0.15	0.28	-0.11	-0.52					(-0.73, 0.43)
	Sex	-0.45	0.86	-0.11	-0.53					(-2.23, 1.32)
Step 2	(Constant)	4.30	4.00		1.08	0.089	0.719	0.067	1.613	(-3.99, 12.60)
	Age	-0.39	0.34	-0.29	-1.16					(-1.10, 0.31)
	Sex	-0.23	0.86	-0.06	-0.27					(-2.02, 1.56)
	DHEA	0.02	0.02	0.32	1.27					(-0.01, 0.06)
Step 3	(Constant)	-0.10	4.34		-0.02	0.237	1.633	0.148	4.073 *	(-9.12, 8.92)
	Age	-0.06	0.36	-0.04	-0.16					(-0.80, 0.69)
	Sex	14.15	7.17	3.40	1.97					(-0.76, 29.06)
	DHEA	0.02	0.02	0.35	1.46					(-0.01, 0.06)
	Age x Sex	-1.13	0.56	-3.48	-2.02					(-2.29, 0.03)
Step 4	(Constant)	2.49	3.72		0.67	0.493	3.882 *	0.255	10.06 **	(-5.26, 10.24)
	Age	-0.35	0.31	-0.26	-1.13					(-1.01, 0.30)
	Sex	3.17	6.92	0.76	0.46					(-11.26, 17.61)
	DHEA	0.05	0.02	0.75	3.18 **					(0.02, 0.09)
	Age x Sex	0.00	0.59	0.01	0.01					(-1.22, 1.23)
	DHEA x Sex	-0.10	0.03	-1.07	-3.17 **					(-0.16, -0.03)

L Inf. Frontal Cortex

Model		b	SE	β	t	R^2	F	ΔR^2	ΔF	95% CI
Step 1	(Constant)	-2.64	3.63		-0.73	0.069	0.855			(-10.15, 4.87)
	Age	1.02	0.85	0.24	1.20					(-0.74, 2.78)
	Sex	0.16	0.28	0.12	0.57					(-0.42, 0.74)
Step 2	(Constant)	-3.09	4.11		-0.75	0.072	0.567	0.003	0.062	(-11.62, 5.44)
	Age	0.98	0.89	0.23	1.10					(-0.87, 2.82)
	Sex	0.21	0.35	0.15	0.60					(-0.51, -.93)
	DHEA	0.00	0.02	-0.06	-0.25					(-0.04, 0.03)
Step 3	(Constant)	-6.33	4.67		-1.36	0.149	0.920	0.077	1.909	(-16.04, 3.37)
	Age	11.56	7.71	2.73	1.50					(-4.48, 27.60)
	Sex	0.46	0.39	0.33	1.19					(-0.34, 1.26)
	DHEA	0.00	0.02	-0.05	-0.19					(-0.04, 0.03)
	Age x Sex	-0.83	0.60	-2.51	-1.38					(-2.08, 0.42)
Step 4	(Constant)	-3.14	3.67		-0.86	0.523	4.378 **	0.373	15.64 ***	(-10.80, 4.51)
	Age	-1.95	6.84	-0.46	-0.29					(-16.21, 12.30)
	Sex	0.09	0.31	0.07	0.29					(-0.56, 0.74)
	DHEA	0.03	0.02	0.45	1.94					(0.00, 0.07)
	Age x Sex	0.56	0.58	1.70	0.97					(-0.65, 1.77)
	DHEA x Sex	-0.12	0.03	-1.30	-3.96 ***					(-0.18, -0.06)

*** $p < .001$, ** $p < .01$, * $p < .05$
Sex Coding: Female = 1, Male = 0
b = unstandardized beta coefficient, SE = standard error, β = standardized beta coefficient, t = t-statistic, CI = confidence interval

Table S1: Hierarchical Multiple Regression Results for Gamma DHEA-by-Sex Interaction Peaks (*cont.*)

Model	b	SE	β	t	R^2	F	ΔR^2	ΔF	95% CI
					L Temporal Cortex				
Step 1 (Constant)	-1.70	4.14		-0.41	0.067	0.829			(-10.27, 6.87)
Age	-1.01	0.97	-0.21	-1.04					(-3.02, 1.00)
Sex	0.23	0.32	0.14	0.72					(-0.43, 0.89)
Step 2 (Constant)	-1.51	4.70		-0.32	0.068	0.532	0.000	0.008	(-11.26, 8.23)
Age	-0.99	1.02	-0.21	-0.98					(-3.10, 1.11)
Sex	0.21	0.40	0.13	0.52					(-0.62, 1.03)
DHEA	0.00	0.02	0.02	0.09					(-0.04, 0.04)
Step 3 (Constant)	-3.37	5.51		-0.61	0.087	0.500	0.019	0.446	(-14.82, 8.09)
Age	5.05	9.11	1.05	0.55					(-13.89, 23.99)
Sex	0.35	0.46	0.22	0.77					(-0.60, 1.30)
DHEA	0.00	0.02	0.03	0.12					(-0.04, 0.05)
Age x Sex	-0.47	0.71	-1.26	-0.67					(-1.95, 1.00)
Step 4 (Constant)	-0.33	4.89		-0.07	0.347	2.13 *	0.260	7.984 *	(-10.53, 9.88)
Age	-7.82	9.11	-1.62	-0.86					(-26.82, 11.18)
Sex	0.00	0.41	0.00	0.00					(-0.86, 0.86)
DHEA	0.04	0.02	0.44	1.65					(-0.01, 0.08)
Age x Sex	0.85	0.77	2.26	1.10					(-0.76, 2.47)
DHEA x Sex	-0.11	0.04	-1.09	-2.83 *					(-0.20, -0.03)

*** $p < .001$, ** $p < .01$, * $p < .05$
Sex Coding: Female = 1, Male = 0
b = unstandardized beta coefficient, SE = standard error, β = standardized beta coefficient, t = t-statistic, CI = confidence interval