Supplement A

Method

Further general exclusion criteria:

Overall exclusion criteria included being younger than 18 or older than 65 years, speaking/understanding German at a level below "very good", hair/skin conditions that make EEG preparation impossible, uncorrected visual/hearing impairment, motor problems of the hands that make fast keystrokes impossible, neurological diseases (e.g., brain tumor, severe migraine, multiple sclerosis, concussion), use of neuroleptics (last 3 months) or tranquilizers (last 3 weeks), or current psychotropic medication. Current or LT diagnosis of post-traumatic stress disorder.

Display parameters, viewing angle, complete task sequence, and randomization details:

Participants were seated in a dimly lit, electrically shielded room at a viewing distance of approximately 24 inches from a 19-inch monitor with a resolution of 1920 x 1080 pixels and a refresh rate of 120 Hz (visual angle $\alpha = 4.5°$). They performed an arrowhead version of the Eriksen flanker task, embedded as the second component within a longer series of tasks: (i) resting measurement, (ii) arrowhead Eriksen flanker task, (iii) passive picture viewing task, (iv) no-threat, predictable threat, unpredictable threat (NPU) task, (v) fear conditioning paradigm. The flanker task comprised five blocks of 80 trials (400 total), with an equal number of congruent and incongruent trials pseudo-randomly presented. The set of arrows was approximately 6.2° in width and 1.0° in height.

Extraction and Trial-matching Details for Computing Magnitude-squared Coherence:

Outcome values of Magnitude-squared Coherence (MSC) reflect a unitless normalized quantity with values between zero (signals are uncorrelated) and one (signals are linearly dependent). The extraction of coherence values for the theta range was performed by using the same layers with corresponding frequency ranges as for the power (3.97–7.24 Hz). After extracting those coherence values from the electrode pairs (FCz-F5 and FCz-F6), they were averaged for each individual to estimate the mean coherence between midfrontal and dorsolateral prefrontal regions across both hemispheres, as no lateralization effects were anticipated. A response-locked time window from 0–500 ms post-response was used to average the coherence values.

To rule out the influence of varying numbers of trials on the coherence measures—an effect previously reported (Cohen et al., 2009)—we controlled the data for the number of trials per participant. For that purpose, we randomly selected 20 error and correct trials per person to compute standardized coherence values. Conversely, this excluded all 30 participants with fewer than 20 error trials from this coherence analysis. Only theta coherence was used for the correlation and as a potential predictor in the multiple regression analyses. However, the comparison of coherence values across groups is presented in Supplement C, where the analysis of these values in theta and delta frequency ranges is reported.

Sensitivity Analysis

To determine the minimal effect sizes our main analyses could detect, we conducted sensitivity power analyses in G*Power 3.1 (Faul et al., 2007, 2009) with $\alpha = .05$ and power $(1 - \beta) = .80$ (Cohen, 2013). For the mixed ANOVAs, we used the 'ANOVA: Repeated measures, within-between interaction' procedure with $N = 310$, two measurements (correct vs. incorrect responses), an assumed correlation among repeated measures of $r = .50$, and a nonsphericity correction of $\varepsilon = 1$. For the two-group model (HC vs. INT; $\lambda = 7.90$, critical $F(1, 308) = 3.87$), the minimal detectable effect size for the Group × Response Type interaction was $f = 0.080$. For the three-group model (HC, ANX, ANX & MDD; $\lambda = 9.73$, critical $F(2, 307) = 3.03$), it was $f = 0.089$. For the multiple regression models predicting error rate and PES, we used the 'Linear multiple regression: Fixed model, R^2 deviation from zero' procedure with $N = 282$ (fewer participants due to missing data for theta coherence) and six candidate predictors ($\lambda = 13.94$, critical $F(6, 275) = 2.13$), yielding a minimal detectable effect size of $f^2 = 0.049$. As the final models retained only four (error rate) and three (PES) predictors, this estimate is conservative. Overall, the ANOVAs were sensitive to small interaction effects, and the regression models to small-to-medium effects (Cohen, 2013).

Supplement B

Results

Table 2.2

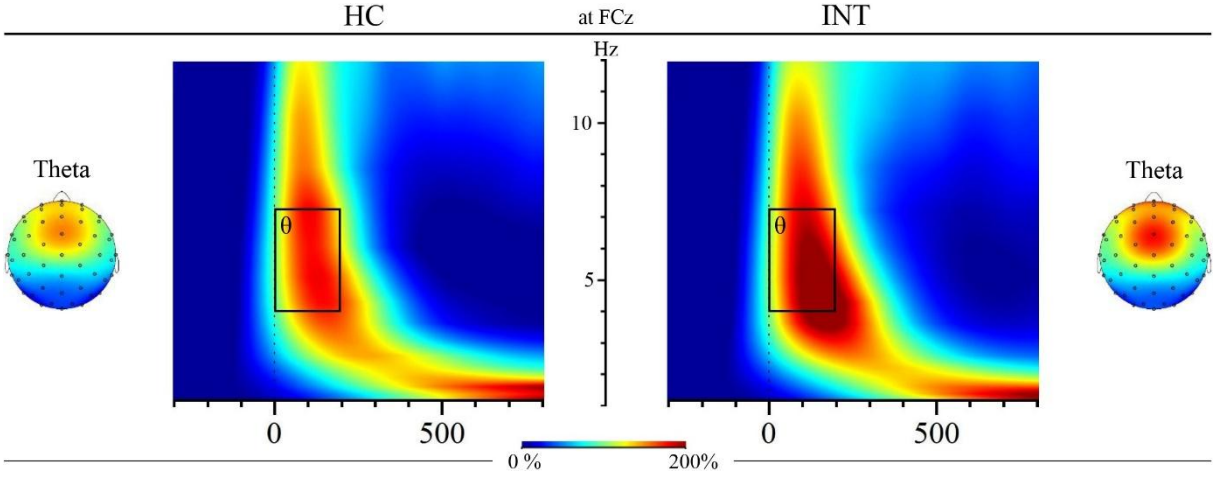
Results of the independent-samples t-tests for error rate and PES, and the mixed-effects ANOVA (2 x 2) for reaction time across the two main categorical groups (HC vs. INT).

	t / F	df	g / η_p^2	p
Error Rate				
Group	-0.61	308	-.07	.543
PES[a]				
Group	-0.16	308	-.02	.877
PES[b]				
Group	-0.22	308	-.03	.830
Reaction Time				
Response	998.73	1, 308	.76	**<.001**
Group	4.19	1, 308	.01	**.042**
Response × Group	1.43	1, 308	<.01	.232

Note. *Response* means response type, i.e., incorrect or correct; PES[a] = Post-Error Slowing, robust version; PES[b] = congruency-corrected robust version. *p*s < .05 are printed in bold.

Figure 1.3

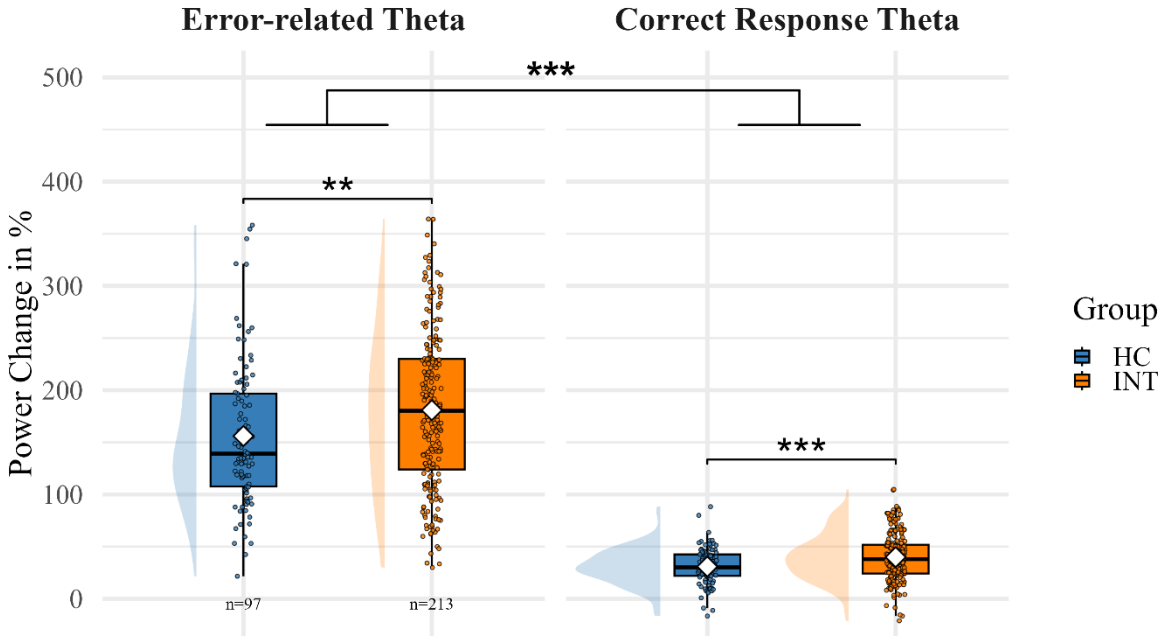
Time-Frequency heatmaps of error-related theta power across the HC and the INT group at the channel FCz.



Note. On the x-axis, the time span from -300 to 800 ms and on the y-axis, the frequency range from 1 to 12 Hz are shown. '0' on the x-axis marks the time point of error commission. Power ranges from 0% change (dark blue) relative to the -300 to 0 ms baseline to 200% increase (dark red). Topographic plots are shown on the left and right sides, directly next to corresponding subplots for Theta (3.97–7.24 Hz). They show the averaged topographical activation of Theta (0-200 ms) after error commission.

Figure 1.4

Boxplots of response-related theta power at FCz across the HC and the INT groups.



Note. Response type is shown above the panels, and mean power change relative to baseline (-300 to 0 ms) in % at the FCz channel is shown on the y-axis. Boxplots depict the median, interquartile range, and whiskers; individual data points are overlaid. White squares indicate group means. For all groups, theta power is significantly increased after errors compared to after correct responses. The response effect and the group difference in theta after correct responses ($p < .001$) are marked by]*** and the group difference in theta following errors ($p < .01$) by]**. Analysis: mixed-effects ANCOVA, with response (error/correct) as within-subject factor, group (HC/INT) as between-subject factor.

Table 3.2

Results of t-tests for separate group comparisons between the HC group and the INT group, and between the HC group and the ANX and the ANX & MDD groups for error-related theta power.

	HC		**INT// ANX/ANX & MDD**		**Group Comparison**		
	M	***SE***	***M***	***SE***	***g***	**df**	***p***
Theta Power							
HC	156.00	7.45					
vs. INT			180.77	5.03	-0.31	308	**.006**
HC	156.00	7.45					
vs. ANX			182.11	5.94	-0.31	307	**.019 °**
vs. ANX & MDD			177.34	9.48	-0.20	307	.216 °

Note. HC = healthy controls; INT = patients with internalizing disorders; ANX = patients with OCA disorders without comorbid depression; ANX & MDD = patients with OCA disorders

with comorbid depression. Theta power is given as percentage of change in relation to baseline (-300–0 ms). *p*s < .05 are printed in bold. ° *p*-values are Sidak-corrected for 3 post-hoc comparisons.

Table 3.3

Results of t-tests for separate group comparisons between the HC group and the INT group, and between the HC group and the ANX and the ANX & MDD groups for theta power following correct responses.

	HC		**INT// ANX/ANX & MDD**		**Group Comparison**		
	M	***SE***	***M***	***SE***	***g***	**df**	***p***
Theta Power							
HC	30.83	2.15					
vs. INT			39.87	1.45	-0.40	308	**<.001**
HC	30.83	2.13					
vs. ANX			41.75	1.70	-0.46	307	**<.001** °
vs. ANX & MDD			35.10	2.71	-0.14	307	.521 °

Note. HC = healthy controls; INT = patients with internalizing disorders; ANX = patients with OCA disorders without comorbid depression; ANX & MDD = patients with OCA disorders with comorbid depression. Theta power is given as percentage of change in relation to baseline (-300–0 ms). *p*s < .05 are printed in bold. ° *p*-values are Sidak-corrected for 3 post-hoc comparisons.

Table 3.4

Results of the control analysis, i.e., separate mixed-effects ANCOVAs testing the effects of age and gender on theta power across the two main categorical groups (HC vs. INT).

	F	**df**	η_p^2	***p***
Theta Power *(with age)*				
Response	175.93	1, 307	.36	**<.001**
Group	12.17	1, 307	.04	**<.001**
Age	7.44	1, 307	.04	**<.001**
Response × Group	2.93	1, 307	<.01	.088
Response × Age	14.67	1, 307	.05	**<.001**
Theta Power *(with gender)*				
Response	614.97	1, 306	.67	**<.001**
Group	12.23	1, 306	.04	**<.001**
Gender	0.18	1, 306	<.01	.670
Response × Group	3.00	1, 306	.01	.084
Response × Gender	0.20	1, 306	<.01	.652
Theta Power *(with medication)*				
Response	339.87	1, 306	.53	**<.001**

Group	11.01	1, 306	.04	**.001**
Medication	0.12	2, 306	<.01	.888
Response × Group	2.40	1, 306	<.01	.122
Response × Medication	0.27	2, 306	<.01	.767

Note. Response refers to the response type (i.e., incorrect or correct). For the model including gender as a factor, one participant who identified as "diverse" was excluded due to an insufficient cell size, resulting in fewer degrees of freedom compared to the age model. *p*s < .05 are printed in bold.

Table 3.5

Results of the control analysis, i.e., separate mixed-effects ANCOVAs testing the effects of age, gender, and medication on theta power across the HC and the two anxiety subgroups (ANX and ANX & MDD).

	F	**df**	η_p^2	***p***
Theta Power *(with age)*				
Response	178.70	1, 306	.37	**<.001**
Group	6.26	2, 306	.04	**.002**
Age	11.06	1, 306	.04	**<.001**
Response × Group	1.62	2, 306	.01	.199
Response × Age	14.93	1, 306	.05	**<.001**
Theta Power *(with gender)*				
Response	642.48	1, 305	.68	**<.001**
Group	6.57	2, 305	.04	**.002**
Gender	0.20	1, 305	<.01	.653
Response × Group	1.51	2, 305	.01	.223
Response × Gender	0.20	1, 305	<.01	.655
Theta Power *(with medication)*				
Response	376.63	1, 305	.55	**<.001**
Group	6.10	2, 305	.04	**.003**
Medication	0.26	2, 305	<.01	.770
Response × Group	1.20	2, 305	<.01	.304
Response × Medication	0.25	2, 305	<.01	.779

Note. Response refers to the response type (i.e., incorrect or correct). For the model including gender as a factor, one participant who identified as "diverse" was excluded due to an insufficient cell size, resulting in fewer degrees of freedom compared to the age model. *p*s < .05 are printed in bold.

Table 4

Results of the LMM for theta power.

Predictor/Effect	***b***	**SE**	**df**	***t***	***p***
Response Type (Error)	135.96	4.12	304.00	32.98	**<.001**
OCI-R	-0.04	3.86	603.30	-0.01	0.992
PSWQ	1.34	4.31	603.30	0.31	0.757

BDI-II	2.02	4.18	603.30	0.48	0.628
Age	0.15	3.09	603.30	0.05	0.961
Response × OCI-R	4.99	5.22	304.00	0.96	0.340
Response × PSWQ	2.67	5.82	304.00	0.46	0.647
Response × BDI-II	-6.21	5.64	304.00	-1.10	0.271
Response × Age	-15.05	4.17	304.00	-3.61	**<.001**

Note. *b* = unstandardized regression coefficient; SE = standard error; df = degrees of freedom; *t* = t-value; *p* = p-value. *p*s < .05 are printed in bold.

Table 5

Pivot Spearman-Rho correlation matrix for measures associated with incorrect trials.

		Questionnaires			Behavioral Measures		Neural Measures	
		OCI-R	PSWQ	BDI-II	Error Rate	PES	Theta Power	Theta Coh.
Questionnaires	OCI-R		*r* = **.64** *p* < **.001** *n* = 309	*r* = **.59** *p* < **.001** *n* = 309	*r* = -.06 *p* = .998 *n* = 309	*r* = .05 *p* = .999 *n* = 309	*r* = .11 *p* = .627 *n* = 309	*r* = -.01 *p* = .999 *n* = 282
	PSWQ			*r* = **.70** *p* < **.001** *n* = 310	*r* = -.01 *p* = .999 *n* = 310	*r* = .13 *p* = .321 *n* = 310	*r* = .07 *p* = .991 *n* = 310	*r* = -.05 *p* = .999 *n* = 283
	BDI-II				*r* = .02 *p* = .999 *n* = 310	*r* = .08 *p* = .977 *n* = 310	*r* = .05 *p* = .999 *n* = 310	*r* = -.09 *p* = .961 *n* = 283
Behavioral	Error Rate					*r* = -.08 *p* = .986 *n* = 310	*r* < -.01 *p* = .999 *n* = 310	*r* = -.13 *p* = .538 *n* = 283
	PES						*r* = .05 *p* = .999 *n* = 310	*r* = -.07 *p* = .994 *n* = 283
Neural	Theta Power							*r* = .05 *p* = .999 *n* = 283
	Theta Coh.							

Note. Cells in red mark **positive** correlations from *r* = .10 on; cells in blue mark **negative** correlations from *r* = -.10 on. Significant correlations are displayed in bold. P-values are Sidak-corrected for 21 comparisons.

Table 6

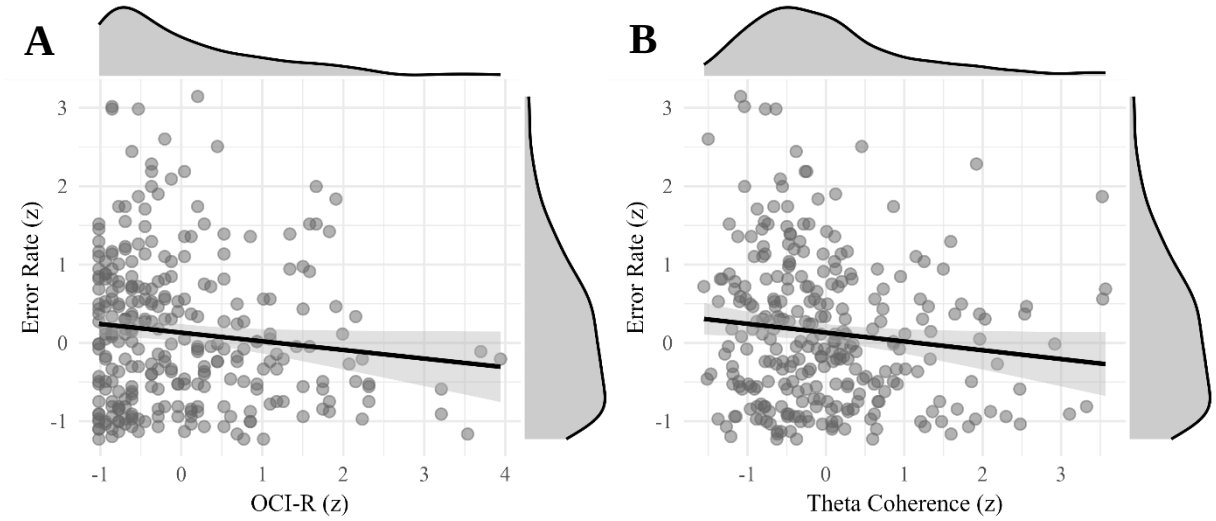
Results of the MLRs for error rate and PES.

Dependent Variable	Selection Method	Predictor	*b*	*p*	Adj. R^2	*F*	*p* (Model)
Error Rate	Backward Elimination	OCI-R	-0.16	**.023**	.027	2.96	**.020**
		Theta Coh.	-0.11	**.044**			
		PES	-0.08	.149			
		PSWQ	0.10	.155			
PES	Backward Elimination	PSWQ	0.12	**.038**	.021	3.02	**.030**
		Theta Coh.	-0.09	.119			
		Error Rate	-0.10	.122			

Note. Adj. R^2 = Adjusted R-squared; Adj. R^2, *F*-Value, and *p* (Model) refer to the overall model fit; b = unstandardized regression coefficient. *p*s < .05 are printed in bold.

Figure 4.1

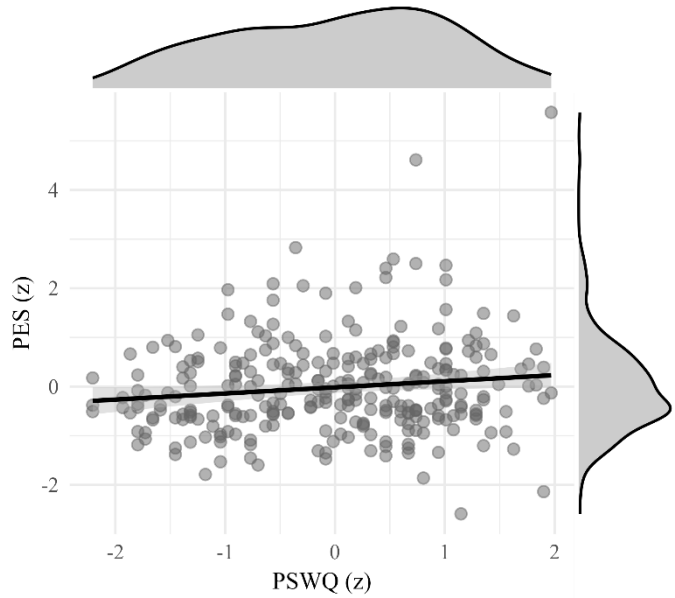
Scatterplots and marginal density plots of the significant MLR predictors for the error rate.



Note. **A.** Bivariate association between OCI-R and error rate (DV). **B.** Bivariate association between prefrontal error-related theta coherence and error rate.
Scatterplots depict the unadjusted relationship between each predictor and standardized error rate (z), with linear regression lines and 95% confidence bands. Marginal density plots show the univariate distribution of each variable. *N* = 310. OCI-R = Obsessive-Compulsive Inventory-Revised.

Figure 4.2

Scatterplot and marginal density plot of the significant MLR predictor for PES.



Note. Bivariate association between prefrontal PSWQ and PES. The scatterplot depicts the unadjusted relationship between the predictor and standardized PES (z), with a linear regression line and 95% confidence band. The marginal density plot shows the univariate distribution of each variable. N = 310. PSWQ = Penn State Worry Questionnaire.

Supplement C

Further Preregistered Analyses:

Delta Power:

Table 7

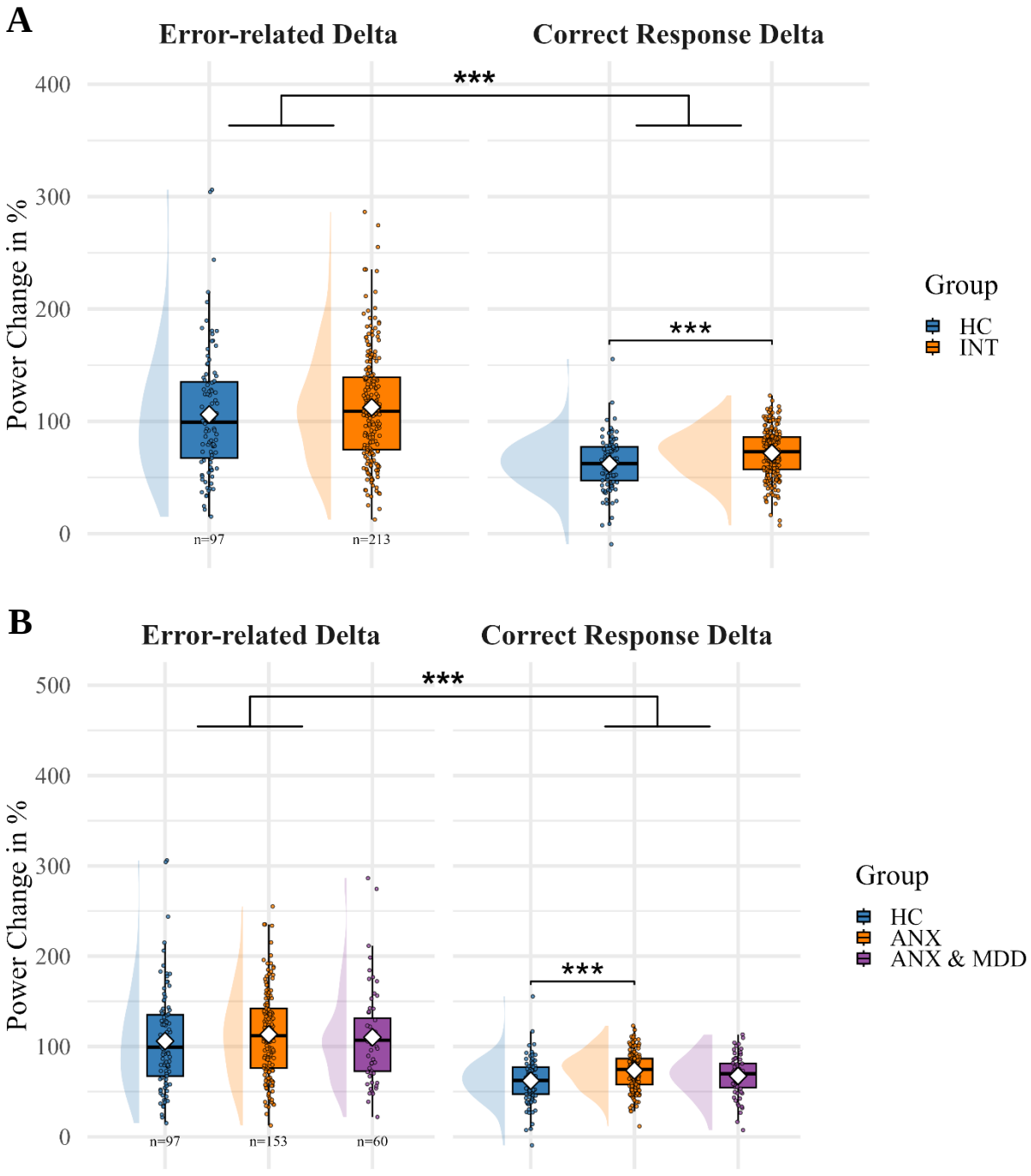
Results of the mixed-effects ANOVAs (2 x 2/ 2 x 3) for delta power across the two main categorical groups (HC vs. INT) and across the two anxiety subgroups (ANX and ANX & MDD).

	F	**df**	$\boldsymbol{\eta_p^2}$	***p***
Delta Power *(HC vs. INT)*				
Response	181.66	1, 308	.37	**<.001**
Group	4.86	1, 308	.02	**.028**
Response × Group	0.26	1, 308	<.01	.614
Delta Power *(HC vs. ANX/MDD)*				
Response	181.51	1, 307	.37	**<.001**
Group	2.94	2, 307	.02	.054
Response × Group	0.19	2, 307	<.01	.824

Note. Response refers to the response type (i.e., incorrect or correct). *p*s < .05 are printed in bold.

Figure 5

Boxplots of response-related delta power at FCz across the HC and the INT groups, as well as across the HC, ANX, and ANX & MDD groups.



Note. Response type is shown above the panels, and mean power change relative to baseline (-300 to 0 ms) in % at the FCz channel is shown on the y-axis. Boxplots depict the median, interquartile range, and whiskers; individual data points are overlaid. White squares indicate group means. For all groups, delta power is significantly increased after errors compared to after correct responses. The response effect and the group difference in delta after correct responses ($p < .001$) are marked by]***. **A.** Analysis: mixed-effects ANCOVA, with response (error/correct) as within-subject factor, group (HC/INT) as between-subject factor. **B.** Analysis:

mixed-effects ANCOVA, with response (error/correct) as within-subject factor, group (HC/ANX/ANX & MDD) as between-subject factor.

Theta Coherence:

Table 8

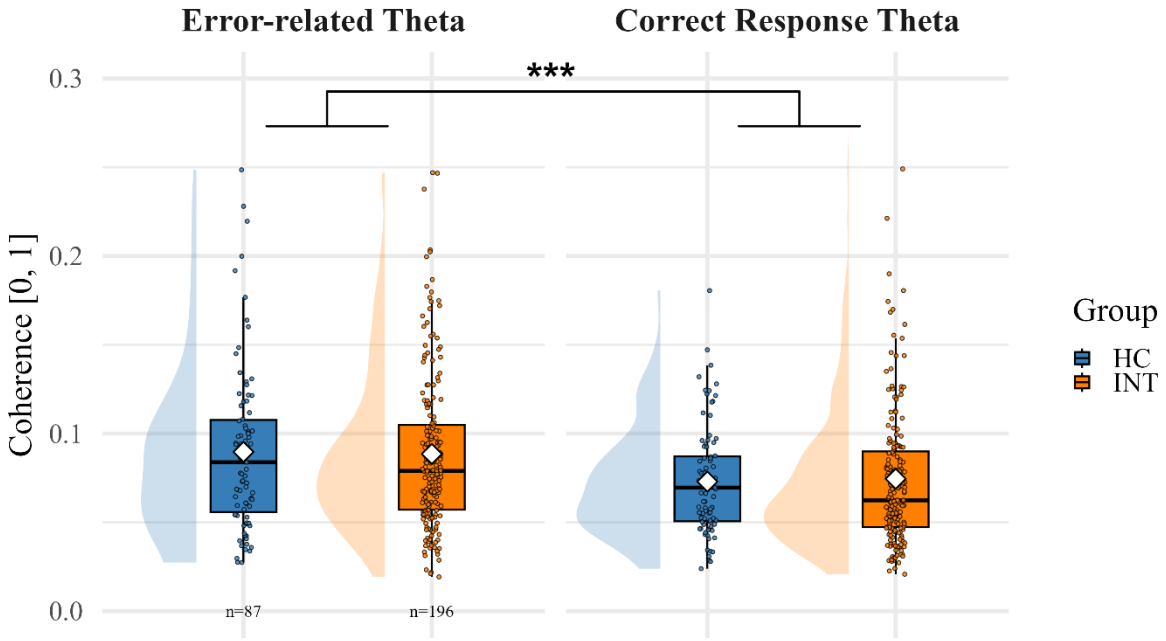
Results of the mixed-effects ANOVA (2 x 2) for prefrontal theta coherence across the two main categorical groups (HC vs. INT).

	F	**df**	η_p^2	***p***
Theta Coh. *(HC vs. INT)*				
Response	20.48	1, 281	.07	**<.001**
Group	<0.01	1, 281	<.01	.960
Response × Group	0.16	1, 281	<.01	.690

Note. *Response* refers to the response type (i.e., incorrect or correct). *p*s < .05 are printed in bold.

Figure 6

Boxplots of prefrontal response-related theta coherence (FCz ↔ F5/F6) at FCz across the HC and the INT groups.



Note. Response type is shown above the panels, and mean power change relative to baseline (-300 to 0 ms) in % at the FCz channel is shown on the y-axis. Boxplots depict the median, interquartile range, and whiskers; individual data points are overlaid. White squares indicate group means. For all groups, theta coherence is significantly increased after errors compared to after correct responses. The response effect (p < .001) is marked by]***. Analysis: mixed-effects ANCOVA, with response (error/correct) as within-subject factor, group (HC/INT) as between-subject factor.

Delta Coherence:

Table 9

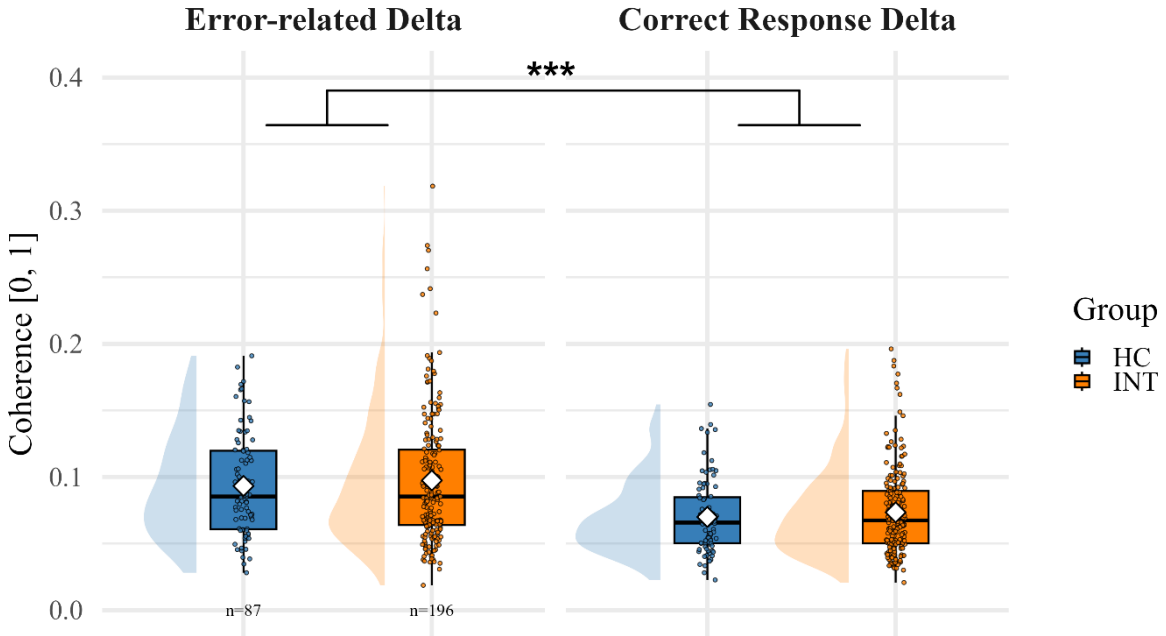
Results of the mixed-effects ANOVA (2 x 2) for prefrontal delta coherence across the two main categorical groups (HC vs. INT).

	F	df	η_p^2	*p*
Delta Coh. *(HC vs. INT)*				
Response	56.60	1, 281	.17	**<.001**
Group	0.90	1, 281	<.01	.342
Response × Group	0.01	1, 281	<.01	.911

Note. Response refers to the response type (i.e., incorrect or correct). *p*s < .05 are printed in bold.

Figure 7

Boxplots of prefrontal response-related delta coherence (FCz ↔ F5/F6) at FCz across the HC and the INT groups.



Note. Response type is shown above the panels, and mean power change relative to baseline (-300 to 0 ms) in % at the FCz channel is shown on the y-axis. Boxplots depict the median, interquartile range, and whiskers; individual data points are overlaid. White squares indicate group means. For all groups, delta coherence is significantly increased after errors compared to after correct responses. The response effect (p < .001) is marked by]***. Analysis: mixed-effects ANCOVA, with response (error/correct) as within-subject factor, group (HC/INT) as between-subject factor.

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