

Correlating Trait Disinhibition and Stimulus-Locked Event-Related Potentials in the Go/no-go Task Context



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Introduction

Background

- Disinhibition reflects heritable tendency toward impulse-control (externalizing) problems like aggression or rule-breaking.
- Go/no-go tasks capture behavioral & physiological indices of inhibitory control
- Reduced P3 event-related potential (ERP) brain response to no-go cues tied to externalizing problems and lower inhibitory control
- Growing evidence of relation between N2 and P3 with externalizing behaviors being accounted for by disinhibition
- Unclear whether P3 and N2's link with impulse-control problems reflects the same or distinct processes

Current Study:

- Test uniqueness of no-go N2/P3 connection to externalizing problems.
- Examine if externalizing--no-go N2/P3 link reflects similar or distinct aspects of disinhibition.

Hypotheses:

- Smaller no-go P3 and larger no-go N2 amplitudes → increased externalizing.
- Decreased no-go P3 → a larger (more negative) no-go N2
- The larger no-go N2-externalizing relationship will be accounted for by smaller no-go P3-externalizing relationship
- All accounted for by disinhibition

Method

- 83 adults from the Tallahassee area (49 Female) aged 18 to 43 (M = 20.11, SD = 4.056)
- Externalizing Spectrum Inventory - Brief Form (ESI-BF)**, 160-item self-report assessment measure for trait disinhibition.
 - E.g., “*Things are more fun if a little danger is involved.*”
- Crime and Analogous Behavior Scale (CAB)**, self-report inventory and index for antisocial behaviors, 16-item abbr. version excluding sub. abuse history.
 - E.g., “*Have you taken something not belonging to you worth over \$50?*”
- P3: 300ms-500ms post-stimulus at parietal lobe, Pz electrode site
- N2: 225ms-325ms post-stimulus at frontocentral lobe, FCz electrode site
- Modified go/no-go task with two trial types: (1) frequent go (80%); and (2) infrequent no-go (20%)

Discussion

		Correlations						
		CAB_ASB_plus1_log_n83	GenDis_avg	N2_NG	N2_Go	P3_NG	P3_Go	AgeYears
CAB_ASB_plus1_log_n83	Pearson Correlation	..						
	N	83						
GenDis_avg	Pearson Correlation	.604**	..					
	Sig. (2-tailed)	.000						
	N	83	83					
N2_NG	Pearson Correlation	-.017	.141	..				
	Sig. (2-tailed)	.882	.205					
	N	83	83	83				
N2_Go	Pearson Correlation	.024	.067	.738**	..			
	Sig. (2-tailed)	.831	.545	.000				
	N	83	83	83	83			
P3_NG	Pearson Correlation	-.243*	-.182	.330**	.252*	..		
	Sig. (2-tailed)	.027	.100	.002	.022			
	N	83	83	83	83	83		
P3_Go	Pearson Correlation	-.126	-.135	.123	.147	.681**	..	
	Sig. (2-tailed)	.256	.223	.267	.186	.000		
	N	83	83	83	83	83	83	
AgeYears	Pearson Correlation	.451**	.375**	.214	.099	.026	.081	..
	Sig. (2-tailed)	.000	.000	.052	.371	.814	.469	
	N	83	83	83	83	83	83	83

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

Results

- Smaller no-go P3 → increased externalizing, insignificant no-go N2-externalizing relationship.
- No-go P3 and N2 relationship with externalizing accounted for by disinhibition.
- Residual No-go N2 relationship with externalizing accounted for by no-go P3.

Conclusions

- Disinhibition plays ‘mediating’ role.
- ERPs lack significance with antisocial behavior when accounting for disinhibition.

Future Directions

- Investigate alternative ERPs and disinhibition-accounting role (i.e., Pe, ERN)

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