

Examining the internal and  
external validity of  
Neurobehavioral Disorder  
associated with Prenatal Alcohol  
Exposure (ND-PAE) in a  
prospective clinical sample.

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# Presenter Disclosure

- Presenter's Name: James Sanders
- I **do not** have an affiliation with commercial entities.
- This program **has not** received any financial or in-kind support from any commercial or other organization.

# Diagnosis of FASD

- Diagnosis of FASD needed to access services
- Multidisciplinary clinical assessment costly

# ND-PAE

- Neurobehavioural Disorder associated with Prenatal Alcohol Exposure (ND-PAE)
- Section III of DSM-5 as a Condition for Further Study
- Little empirical research on ND-PAE criteria

# ND-PAE Criteria

- A. More than minimal exposure during gestation...
- B. Impaired neurocognitive functioning (1 of 5 symptoms)
- C. Impaired self-regulation (1 of 3 symptoms)
- D. Impaired adaptive functioning (2 of 4 symptoms)
- E. Onset in childhood
- F. Causes clinically significant distress or impairment
- G. Not better explained by other medical or environmental factors
- <https://doi-org.ezproxy.uleth.ca/10.1176/appi.books.9780890425596>

# ND-PAE research

- Kable et al. (2018)
  - Evaluated internal validity of ND-PAE criteria
  - Retrospective data from 56 children age 3-10 in a math intervention study
  - Tested -1.5 SD and -1.0 SD as criterion for impairment
  - Tested 1 symptom and 2 symptoms from Adaptive Functioning domain
  - Most of the domains demonstrated internal validity
  - Cutoff of 2 for Adaptive Functioning domain deemed too strict

# Evaluating ND-PAE

- Sanders, Hudson Breen, Netelenbos (2017)
  - Retrospective analysis of on 82 clinic patients
  - Clinic files reviewed cutoff of -2SD
  - FASD and ND-PAE moderately correlated (Cramer  $V [82] = 0.44, p < 0.01$ )
  - ND-PAE possessed inflated specificity but low sensitivity
  - ND-PAE criteria too strict

# Gaps in ND-PAE research

- Based on retrospective data
- Disconnect between norm-referenced testing and descriptive psychiatry (DSM)
  - Some domains are better measured through norm-referenced testing (i.e. IQ), while others are better measured through clinical description (i.e. mood/behavioral regulation)



# Current Study

- 36 pediatric clients ages 7-15 (mean 10.6(2.4))
- 58.3% female (n=21)
- 69.4% diagnosed with FASD (n=25)
- DSM-5 Criterion for Clinical Significance: “the disturbance causes clinically significant distress or impairment in social, occupational, or other important areas of functioning”
- ND-PAE symptoms identified collectively by the clinic team led by the psychologist until consensus was reached

# Results

- 41.7% of sample (n=15) met ND-PAE
- FASD & ND-PAE were correlated (*Cramer's V*=.56) but ND-PAE conservative

		ND-PAE		
		No	Yes	Total
FASD	No	11	0	11
	Yes	10	15	25
	Total	21	15	36

# Results

- Superdomains
  - Neurocognitive Function 88.9% (n=32) (1 in 5)
  - Self-Regulation 80.6% (n=29) (1 in 3)
  - Adaptive Function 41.7% (n=15) (2 in 4)\*
    - \*One of which must be #1 or #2
- Symptoms (most & least common)
  - Attention 80.6% (n=29) & EF 80.6% (n=29)
  - Daily Living Skills 16.7% (n=6) & IQ 19.4% (n=7)

Correlation matrix	IQ	Executive Function	Learning	Memory	Visual-Spatial Reasoning	Mood/Behavioral Regulation	Attention Deficit	Impulse Control	Communication	Social Comm. & Interaction	Daily Living Skills	Motor Skills
IQ	<b>1.000</b>											
Executive Function	0.241	<b>1.000</b>										
Learning	0.273	0.297	<b>1.000</b>									
Memory	0.546	0.199	0.239	<b>1.000</b>								
Visual-Spatial Reasoning	0.436	0.326	0.316	0.298	<b>1.000</b>							
Mood/Behavioral Regulation	0.040	0.104	0.096	-0.081	0.337	<b>1.000</b>						
Attention Deficit	0.241	-0.064	0.012	-0.099	0.174	0.104	<b>1.000</b>					
Impulse Control	0.040	0.104	0.096	-0.081	-0.034	0.416	0.392	<b>1.000</b>				
Communication	0.519	0.184	0.461	0.275	0.339	0.159	0.324	0.273	<b>1.000</b>			
Social comm. and Interaction	0.581	0.131	0.257	0.239	0.296	0.250	0.415	0.366	0.668	<b>1.000</b>		
Daily Living Skills	0.722	0.220	0.378	0.474	0.351	0.102	0.220	0.255	0.473	0.529	<b>1.000</b>	
Motor Skills	0.439	0.273	0.257	0.239	0.051	0.135	0.131	0.250	0.103	0.429	0.227	<b>1.000</b>

# Results

- Principal components analysis
  - Varimax rotation KMO test of sampling adequacy = .61, Bartlett's test of sphericity significant ( $\chi^2(36) = 150.02, p < .05$ )

	Component			
	1	2	3	4
IQ	0.869			
Executive Function			0.636	
Learning			0.503	
Memory	0.695			
Visual-Spatial Reasoning			0.670	
Mood/Behavioral Regulation		0.505	0.635	
Attention		0.728		
Impulse Control		0.767		
Communication	0.651			
Social comm. & Interaction	0.618	0.567		
Daily Living Skills	0.771			
Motor Skills				0.846

# Components

## 1. Adaptive Behavior & Independent Living Skills

- IQ, Memory, Communication, Social Communication & Interaction, Daily Living Skills

## 2. ADHD

- Attention, Impulse Control, (Mood/Behavioral & Social)

# Components

## 3. Executive Functioning and Learning

- EF, Learning, Visual-Spatial Reasoning, Mood/Behavioral Regulation

## 4. Motor Skills

- Motor



# Discussion

- This ND-PAE study appears to be the first:
  - prospective study
  - to use a descriptive psychiatry approach
- ND-PAE criteria strict
- General consistency in correlations between symptom domains

# Discussion

- Re-conceptualization of ND-PAE
  1. Adaptive Behavior & Independent Living Skills
  2. ADHD
  3. Executive Functioning and Learning
  4. Motor Skills
- This re-conceptualization and other empirical-based approaches invite more research

# References

Kable, J. A., & Coles, C. D. (2018). Evidence Supporting the Internal Validity of the Proposed ND-PAE Disorder. *Child Psychiatry & Human Development, 49*(2), 163-175.

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