Fetal Alcohol Syndrome

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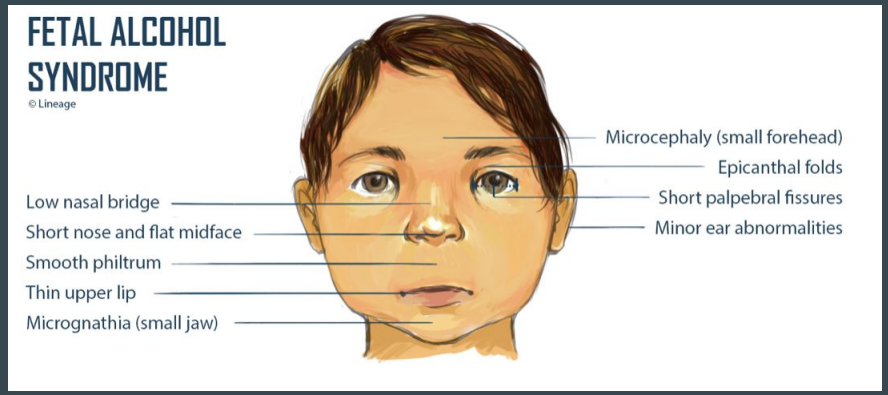
What is Fetal Alcohol Syndrome (FASD)? [1]

- Caused by alcohol consumption by mothers during pregnancy
- Associated with chronic poor cognitive, behavioral, and psychosocial issues
    - Cognitive - executive functioning, visuospatial processing, and MEMORY
- Affects approximately 4% of the pediatric population in North America
- Four main signs and symptoms:
    - Evidence of prenatal or postnatal growth impairments
    - Characteristic facial anomalies
    - Central nervous system (CNS) impairment
    - History of maternal alcohol exposure



Research Questions

1. What are the four key signs and symptoms used to diagnose FASD?
2. What methods were used to determine memory issues in this study?
3. What are the demographics of the participants in this study?
4. What did the results reveal about memory issues and FASD?
5. What conclusions were made after completion of this study?

Purpose of study [2]

- To investigate if significant differences exist in everyday memory between youth with Fetal Alcohol Spectrum (FASD) compared with a non exposed (NE) control group
- Determine if differences exist while controlling for socioeconomic status and other comorbidities

Methodology [2]

- EMQ (Everyday Memory Questionnaire) was used for 105 young kids (9-17 y/o) in the perspective of caregiver
- 41 kids with FASD vs 64 kids without (control)
- Control included participants that were siblings of kid with FASD or volunteered
- Compared using multivariate analysis of variance

Results [2]

- Significantly higher ratings of impairment were found on all composites of the EMQ in the FASD group
- Findings are consistent with past work showing poorer memory function in the pediatric FASD population compared to healthy controls
- Participants with a FASD diagnosis had lower mean IQ scores than the NE control group

Tables [2]

Table 1. Five-Factor Composite Structure of the Everyday Memory Questionnaire.

EMQ Factor	Examples	Factor Calculation
Retrieval Memory	Forgetting recent events, prospective memory	Average of items 6, 7, 8, 14, 15, 18
Task Monitoring	Problems with performance of specific tasks, recognition and recall issues	Average of items 2, 9, 11, 12, 17, 19, 23, 26
Conversational Monitoring	Content of one's own conversation, other's conversation	Average of items 10, 18, 20, 21, 27
Spatial Memory	Getting lost in new or familiar locations, forgetting where things are placed around the house	Average of items 22, 24, 25a, 25b
Memory for Everyday Activities	Forgetting everyday routines	Average of items 1, 4, 5, 7

Table 2. Participant demographic characteristics.

Variables	FASD (n = 41)	NE (n = 64)	p value
Mean age in years (SD)	13.73(2.04)	13.29(1.89)	ns
Maximum age	17.95	17.32	
Minimum age	9.30	9.18	
Gender (%male)	56%	53%	ns
FASD Diagnoses			
• FAS	2	0	
• pFAS	1	0	
• ARND	38	0	
Prenatal Exposures			
• Alcohol	41(100%)	0	
• Cigarettes	20(49%)	0	
• Cocaine	4(10%)	0	
• Marijuana	3(7%)	0	
• Drugs – unspecified	14(34%)	0	
Comorbidities			
• ADHD	26(63%)	0	
• Learning Disabilities	14(34%)	0	
• Sensory Integration Disorder	1(2%)	0	
• Generalized Anxiety Disorder	3(7%)	0	
• Oppositional Defiance Disorder	3(7%)	0	
• Obsessive Compulsive Disorder	1(2%)	0	
• Turner's Syndrome	1(2%)	0	
• Mood Disorder	1(2%)	0	
• Epilepsy	1(2%)	0	
Guardianship			
• Biological parents	6(15%)	52(81%)	
• Adoptive parents	21(51%)	6(9%)	
• Foster parents	10(24%)	5(8%)	
• Grandparents	4(10%)	1(2%)	
Mean SES(SD)	38.10(14.83)	49.86(11.86)	<0.01
Mean Full scale IQ(SD)[a]	87.89(14.19)	114.52(10.81)	<0.001
• IQ Range	56-118	83– 132	

Note. FASD = Fetal Alcohol Spectrum Disorder, FAS = Fetal Alcohol Syndrome, ARND = alcohol related neurobehavioural disorder, ADHD = attention deficit/hyperactivity disorder, NE = nonexposed controls, SES = socioeconomic status, WASI = Wechsler Abbreviated Scale of Intelligence (M = 100, SD = 15). [a]WASI data were available for 63 NE participants and 38 participants in the FASD group.

Table 3. MANOVA and MANCOVA Results for Between-Group Comparisons on Square-Root Total Score and all EMQ Factors.

	Mean (SD)		MANOVA			Adjusted Mean (SD)		MANCOVA[a]		
	FASD	NE	F	p value	Effect Size (partial η^2)	FASD	NE	F	p value	Effect Size (partial η^2)
Task Monitoring	3.75(2.14)	1.26(0.30)	84.64	<0.001	0.45	3.86(2.14)	1.19(0.30)	85.44	<0.001	0.44
Conversational Monitoring	4.42(2.32)	1.64(0.62)	82.71	<0.001	0.45	4.63(2.23)	1.51(0.62)	87.45	<0.001	0.48
Spatial Memory	4.38(2.37)	1.58(0.72)	78.06	<0.001	0.43	4.32(2.34)	1.62(0.73)	77.60	<0.001	0.37
Memory for Everyday Activities	7.29(3.73)	3.77(2.01)	39.49	<0.001	0.28	7.46(3.80)	3.66(2.00)	39.57	<0.001	0.27
Retrieval Memory	4.28(2.35)	2.13(1.34)	35.63	<0.001	0.26	4.54(2.35)	1.96(1.34)	37.97	<0.001	0.31

Note. Higher scores on the EMQ indicate poorer everyday memory. EMQ = Everyday Memory Questionnaire, FASD = Fetal Alcohol Spectrum Disorder, NE = non-exposed controls. [a]MANCOVA was conducted using SES as a covariate.

Interpretation

- Kids diagnosed with FASD scored lower in every group of the EMQ compared to the control group
- Effect size shows that the differences are significant and there's a huge difference in memory retention
- Other drug usage during pregnancy caused even lower of an EMQ score in every subset
- Using SES as covariate didn’t change stats drastically meaning results can be explained by FASD symptoms

Conclusion [2]

- Both environmental and cognitive factors contribute to symptoms of children with FASD
- Insights regarding memory issues that are a part of daily functional challenges faced by children with FASD were provided
    - Higher levels of memory issues in children with FASD
    - Memory issues can lead to problems with skills such as social cognition and adaptive behavior
- Need for intervention research
    - Early intervention is key to management
- Further outside research based off observations of individuals unaware of the child's condition could help to expand the understanding of everyday memory issues in the youth population

Strengths and Weaknesses

- Controls environment variables by using siblings of diagnosed group
- Controls for socioeconomic status by using SES as a covariate and comparing only between level of status
- Doesn't account for biological homes as only 15% diagnosed with FASD and living with biological parent were used in study
- Age was too wide to find if it could be an underlying variable
- Perspective of caregiver can be inaccurate

References

1. Fetal Alcohol Syndrome. Lineage Medical Inc. Medbullets Website. https://step2.medbullets.com/pediatrics/120599/fetal-alcohol-syndrome. Updated: 9/13/2017

2. Yi Wu, Yang Xing, Dan Zou. (2019) Study of the relationship between how ethanol affects learning and memory and the expression of p21 WAF1/CIP1 in the female mouse hippocampus. *Neuroscience Letters* 708, pages 134354.