

# PRENATAL ALCOHOL EXPOSURE AND CHARACTERISTICS OF TEMPERAMENT IN INFANCY AND EARLY CHILDHOOD



Pienaar, M.<sup>1</sup>, Jacobson, S.W.<sup>2</sup>, Molteno, C.<sup>1</sup>, Van Niekerk, M.J.<sup>1</sup>, September, M.<sup>1</sup>, Jacobson, J.L.<sup>2</sup>.

<sup>1</sup>University of Cape Town, <sup>2</sup> Wayne State University, Detroit, MI.

## ABSTRACT

Prenatal alcohol exposure is associated with cognitive and neurobehavioural dysfunction, but characteristics of temperament have not been widely documented in exposed children. The objectives of the study were firstly to assess prenatal alcohol exposure in relation to infant and childhood temperament. The second objective was to assess the influence of socio-demographic variables on infant and childhood temperament and the third was to relate aspects of temperament measured in infancy to those at 5 years.

Prenatal alcohol consumption was assessed in 159 women using a timeline follow-back approach. Child temperament and socio-demographic and psychological correlates of alcohol use were measured in the mothers. Results indicated significant correlations between prenatal alcohol exposure and Emotionality, an aspect of child temperament, at 1 and 5 years of age. Both prenatal alcohol exposure and maternal depression were related to Emotionality at 1 year in a multiple regression analysis. Although both effects fell short of statistical significance due to limited sample size, the data are consistent with an inference that both fetal alcohol exposure and maternal depression independently affect infant Emotionality. Maternal depression in infancy predicted the child's Emotionality at 5 years, over and above the contemporaneous measure of maternal depression at 5 years. Two of the four measured temperament aspects at 1 year correlated with those at 5 years. It was concluded that both prenatal alcohol use and maternal depression related to Emotionality in infancy and only maternal depression during infancy related to Emotionality in childhood.

## METHOD

### Sample

Women attending an antenatal clinic in a low socio-economic area in Cape Town were interviewed using a timeline follow-back approach to determine frequency and amount of drinking on a day-by-day basis. Volume was recorded for each type of beverage consumed, and then converted to absolute alcohol and averaged across pregnancy. Values were calculated for average alcohol per day, average drinks per drinking day, and frequency of drinking at conception and across pregnancy.

## CRITERIA FOR INCLUSION

### Heavy drinkers

Recruited according to alcohol history during first trimester of pregnancy:

Minimum of 14 standard drinks / week or Two or more binges of 5 or more drinks / occasion

### Controls

Next woman initiating antenatal care whose gestational age was within 2 weeks <7 drinks/week and did not binge drink

## Sample Characteristics

	Mean/%	SD
Maternal Characteristics (N=159)		
Age	27.4	6.4
Marital Status		1.7
% Married	31.5	
% Single	41.1	
% Living Together	24.4	
Education		1.1
At or below 7th Grade	23.9	
High School Graduate	12.7	
Some College/ Special Training	0.5	
Alcohol Consumption Across Pregnancy	0.34	0.4
Child Characteristics at 12 Months (N = 159)		
Gender		
%Male	53.5	

%Female	46.5	
Gestational age at birth (weeks)	38.5	2.8
Age (months)	12.3	0.6
WHO Height Percentile	37.9	29.0
WHO Weight Percentile	36.0	30.3
Child Characteristics at 5 Years (N = 102)		
Gender		
%Male	50.5	
%Female	49.5	
Age	5.0	0.2
WHO Height Percentile	30.4	26.8
WHO Weight Percentile	37.8	28.2

## MEASURES

Child temperament was assessed at 1 and 5 years of age with the Emotionality, Activity, and Sociability (EAS) questionnaire. Socio-demographic and psychological correlates of maternal alcohol use were measured in the 1-year sample using the Beck Depression Inventory (re-administered in 5-year sample), and the Non-Verbal Raven Progressive Matrices. Maternal education level and socio-economic status (SES) were established by means of maternal interviews.

## RESULTS

**Table 1: Correlations between prenatal alcohol exposure and child temperament at 1 and 5 years of age.**

Mean Alcohol Consumed across Pregnancy	
Age 1 Year	
Emotionality	.279**
Activity	-.137
Sociability	-.103
Shyness	.085
Age 5 Years	
Emotionality	.272*
Activity	-.181
Sociability	.050
Shyness	.128

\*\*Significant at the 0.01 level

\*Significant at the 0.05 level

**Table 2: Correlations between child temperament at 1 year and socio-demographic factors**

	Emotionality	Activity	Sociability	Shyness
Maternal Depression	.279**	-.014	-.207*	.099
Maternal IQ	-.199*	.265**	.183*	-.127
Maternal Education Level	-.146	.199*	.188*	-.145
SES	-.175	.185*	.072	-.114

\*\*Significant at the 0.01 level

\*Significant at the 0.05 level

**Table 3: Correlations between child temperament at 5 years and socio-demographic factors**

	Emotionality	Activity	Sociability	Shyness
Maternal Depression at 12 months	.414**	-.078	.116	-.016
Maternal Depression at 5 years	.257*	-.027	.029	.070
Maternal IQ	-.270*	-.079	-.133	-.041
Maternal Education Level	-.251*	.129	.060	-.098
SES	-.103	.009	.012	-.047

\*\*Significant at the 0.01 level.

\*Significant at the 0.05 level

**Table 4: Regression analysis**

### Emotionality

	12 months		5 years	
	r	β	r	β
Prenatal alcohol exposure	.279**	.200	.272*	.091
Maternal education	-.146	.131	-.251*	-.036
Maternal Raven score	-.199*	-.177	-.270*	-.178
Maternal depression				
12 months	.279**	.199	.414**	.317*
5 years	-	-	.257*	-.028

\*\*Significant at the 0.01 level

\*Significant at the 0.05 level

**Table 5: Correlations between temperament at 1 and 5 years of age**

	Emotionality 1yr	Activity 1 yr	Sociability 1 yr	Shyness 1 yr
Emotionality 5yr	.361**	-	-	-
Activity 5yr	-	.209	-	-
Sociability 5yr	-	-	.159	-
Shyness 5 yr	-	-	-	.274*

\*\*Significant at the 0.01 level

\*Significant at the 0.05 level

- ▶ Prenatal Alcohol Exposure (PNAE) was positively related to Emotionality at 1 and 5 years.
- ▶ Socio-environmental factors were most strongly associated with Activity, Emotionality and Sociability at 1 year, but at 5 years they were associated with Emotionality only, but particularly strongly so.
- ▶ Regression analyses revealed that at 1 year, Emotionality was as strongly predicted by prenatal alcohol exposure as by maternal depression, although not significantly. The two were most likely too highly related to determine which one was predicting Emotionality at 1 year. Alternatively, with a larger sample both would likely be significantly and independently impacting on Emotionality.
- ▶ Regression analyses revealed that at 5 years, Emotionality was significantly predicted by the mother's level of depression when the child was an infant, over and above maternal depression at 5 years.
- ▶ Two of the four temperament aspects at 1 year correlated with those at 5 years.

## CONCLUSIONS

- ▶ **Prenatal maternal alcohol use related to Emotionality at 1 and 5 years of age.**
- ▶ **The strongest predictors of Emotionality at 1 year were prenatal alcohol exposure and maternal depression. Although neither effect was significant in the multiple regression analysis, in a larger sample each would likely have been found to contribute independently to Emotionality in infancy.**
- ▶ **At 5 years, however, Emotionality was most strongly predicted by the mother's level of depression when the child was an infant, even after controlling for maternal depression at 5 years.**
- ▶ **Some aspects of temperament at 1 year related significantly to those at 5 years of age.**

## ACKNOWLEDGEMENTS

We wish to thank the NIAAA (grant numbers R01-AA09524 and U01-aa014790), the NIH Office of Research on Minority Health, and the Joseph Young, Sr., Fund of Michigan for funding this 5-year follow-up study. The study was conducted in collaboration with the NIAAA Collaborative Initiative on Fetal Alcohol Spectrum Disorders.