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Deficits in Executive Function and Academic Performance in Children and Adolescents Exposed to Methamphetamine and other Recreational Drugs

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BACKGROUND

Effects of Prenatal Methamphetamine Exposure

- ❖ Pregnancy complications including low maternal weight gain, increased premature delivery, and neonatal mortality (Eriksson et al., 1981)
- ❖ Abnormalities in emotional development (Billing et al., 1980)
- ❖ Lower IQ (Billing et al., 1985)
- ❖ Physical and Emotional Aggression (Billing et al., 1994).
- ❖ Shorter stature and low weight in females (Cernerud et al., 1996)
- ❖ Increased likelihood to fall behind a grade in school (Cernerud et al., 1996)

OBJECTIVES

Goals of Study

- ❖ To examine the effects of prenatal exposure to methamphetamine and other recreational drugs on psychopathology and executive function in children and adolescents
- ❖ To investigate the degree to which behavior abnormalities in children exposed to drugs prenatally can be attributed to methamphetamine as opposed to other recreational drugs (i.e. alcohol and nicotine)
- ❖ To determine how executive function and behavior problems related to drug exposure change as a function of age

METHODS

Parents and guardians of children ages 5 to 18 were recruited to complete an anonymous online survey administered through REDCap, a secure, web-based application. The survey included a child development questionnaire created to gain information about the prenatal and postnatal environment of the child, as well as the Behavior Rating Inventory of Executive Function (BRIEF), an established scale used to measure executive function in children. Exclusion criteria were children with FAS, severe brain trauma, head injury or any other medical condition that could interfere with cognitive assessments. Subjects were recruited on a voluntary basis and were not offered an incentive for their participation. All analyses were conducted using SPSS, version 16.0 with data expressed as mean (\pm SEM). A significance level of $p < .05$ was considered statistically significant for all tests.

RESULTS

Characteristics of the Biological mother

	Meth -, Alc -	N	Meth-, Alc+	N	Meth+	N
Caucasian	80.5%	326	79.5%	83	81.5%	60
Age at Pregnancy	24.9 (0.35)	321	27.1 (0.76)	79	(0.76)	54
Pregnancy inc (<35K)	62.6%	318	59.7%	77	94.0% ^{A, B}	36
Current income (<35K)	40.6%	320	32.5%	80	44.2%	52
Education of B.M. (College +)	69.4%	330	71.0%	63	17.0% ^{A, B}	52
ADD/ADHD	7.6%	331	12.0%	83	13.3%	60
Exercise During Pregnancy	69.3%	327	65.4%	83	19.4% ^{A, B}	58

Characteristics of the Child

	Meth -, Alc -	N	Meth-, Alc+	N	Meth+	N
Sex (%Female)	40.9%	331	49.5%	83	45.0%	60
Caucasian	81.8%	330	75.6%	82	81.6%	60
Age	10.2 (0.24)	331	10.2 (0.45)	83	8.9 (0.45)	60
Premature Birth	16.0%	327	5.1% ^{A, B}	80	18.2%	60
Living with B.M.	95.7%	331	78.3% ^A	83	28.3% ^{A, B}	60
Avg Psych Diagnoses	0.9 (0.08)	331	1.2 (0.22)	83	1.7 (0.25) ^B	60
ADD/ADHD	21.8%	331	15.7%	83	26.7%	60

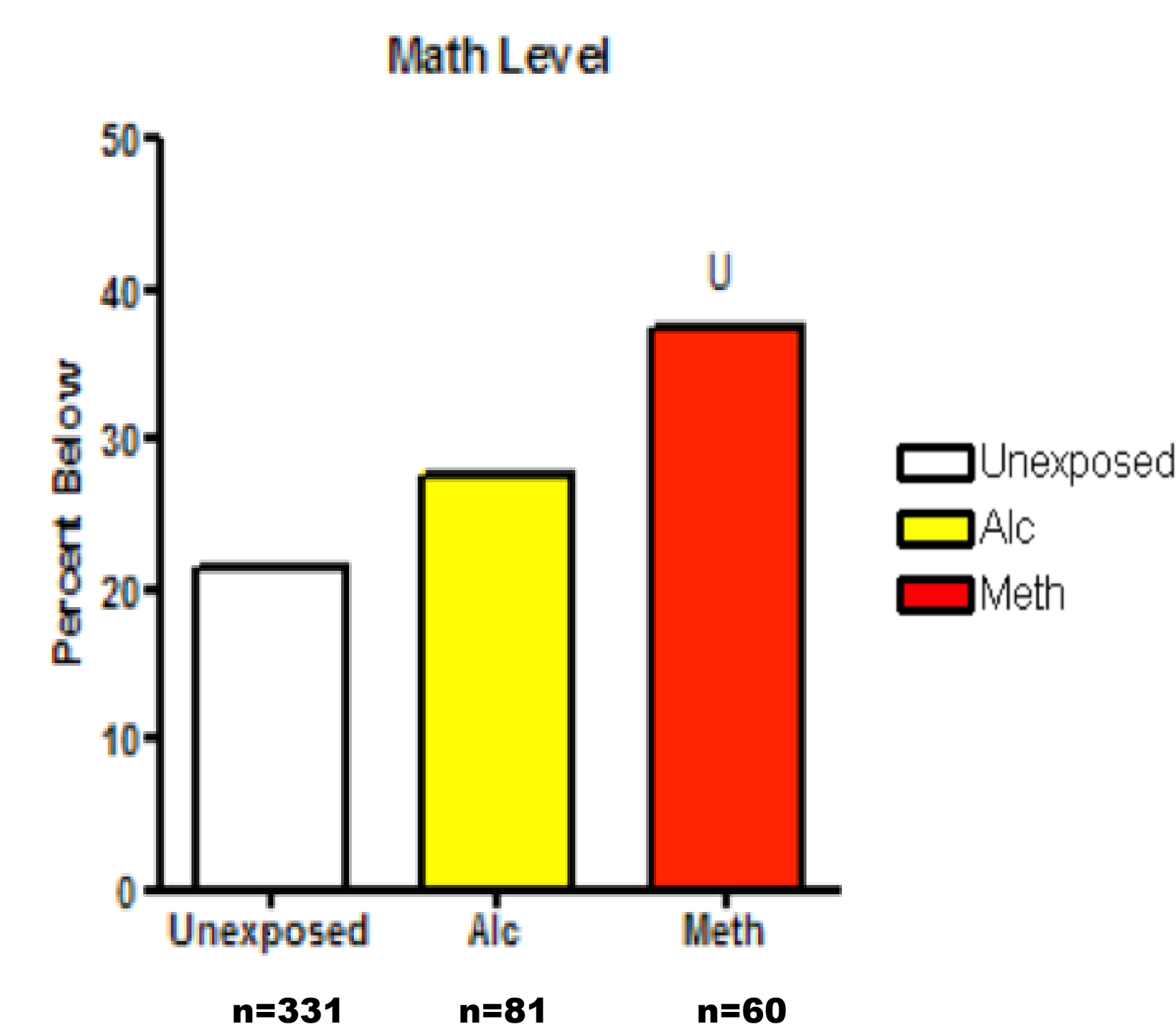
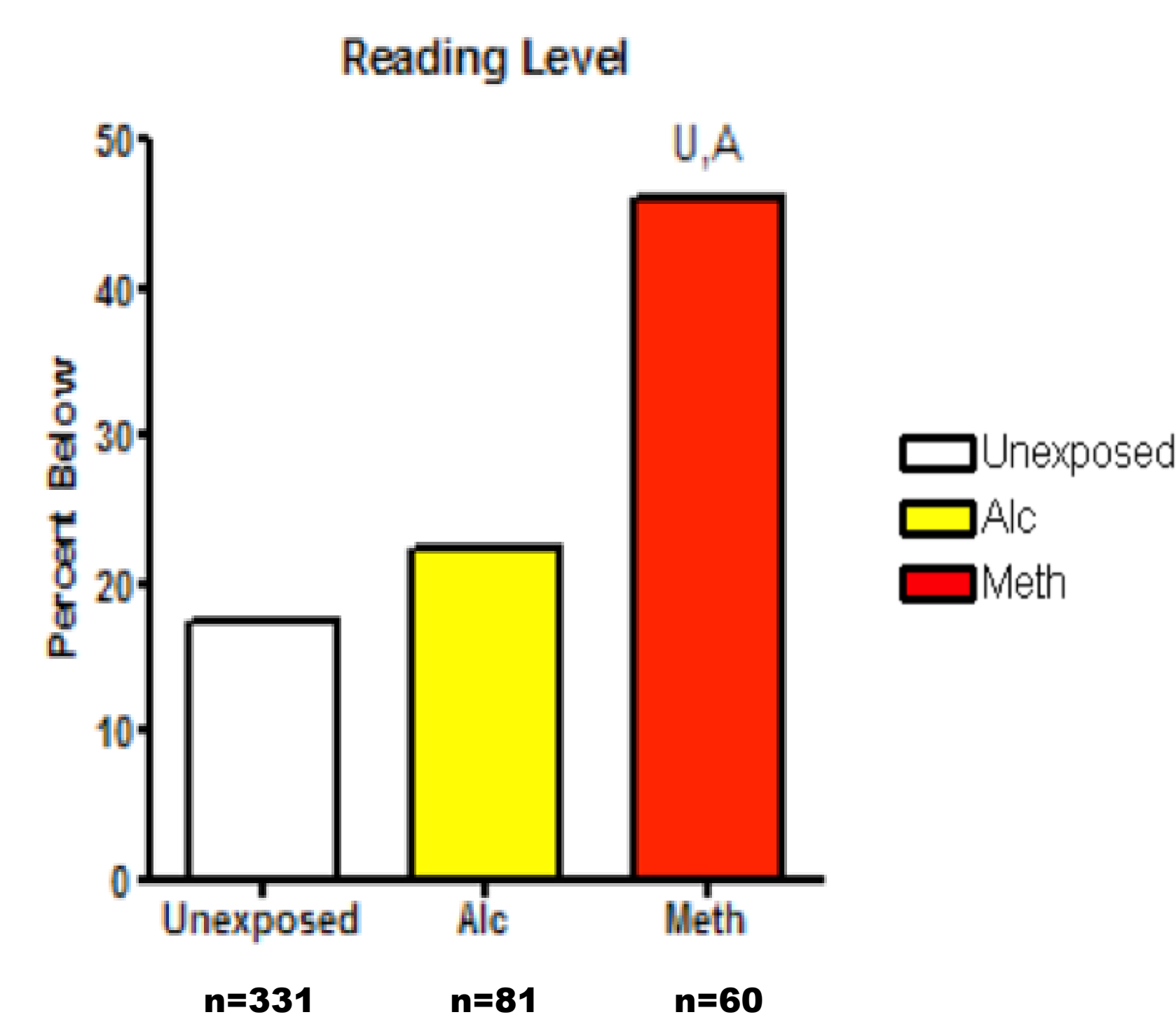
Prenatal Drug Exposure

	Meth -, Alc -	N	Meth-, Alc+	N	Meth+	N
Prenatal vitamins	74.6%	330	66.3%	83	8.3% ^{A, B}	60
Alcohol	0.0%	331	100.0% ^A	83	68.0% ^{A, B}	59
Cocaine	0.9%	331	4.8% ^A	83	23.3% ^{A, B}	60
Marijuana	8.5%	331	22.9% ^A	83	40.0% ^{A, B}	60
Meth	0.0%	331	0.0%	83	100.0% ^{A, B}	60
Nicotine	20.2%	329	36.3% ^A	82	88.4% ^{A, B}	60

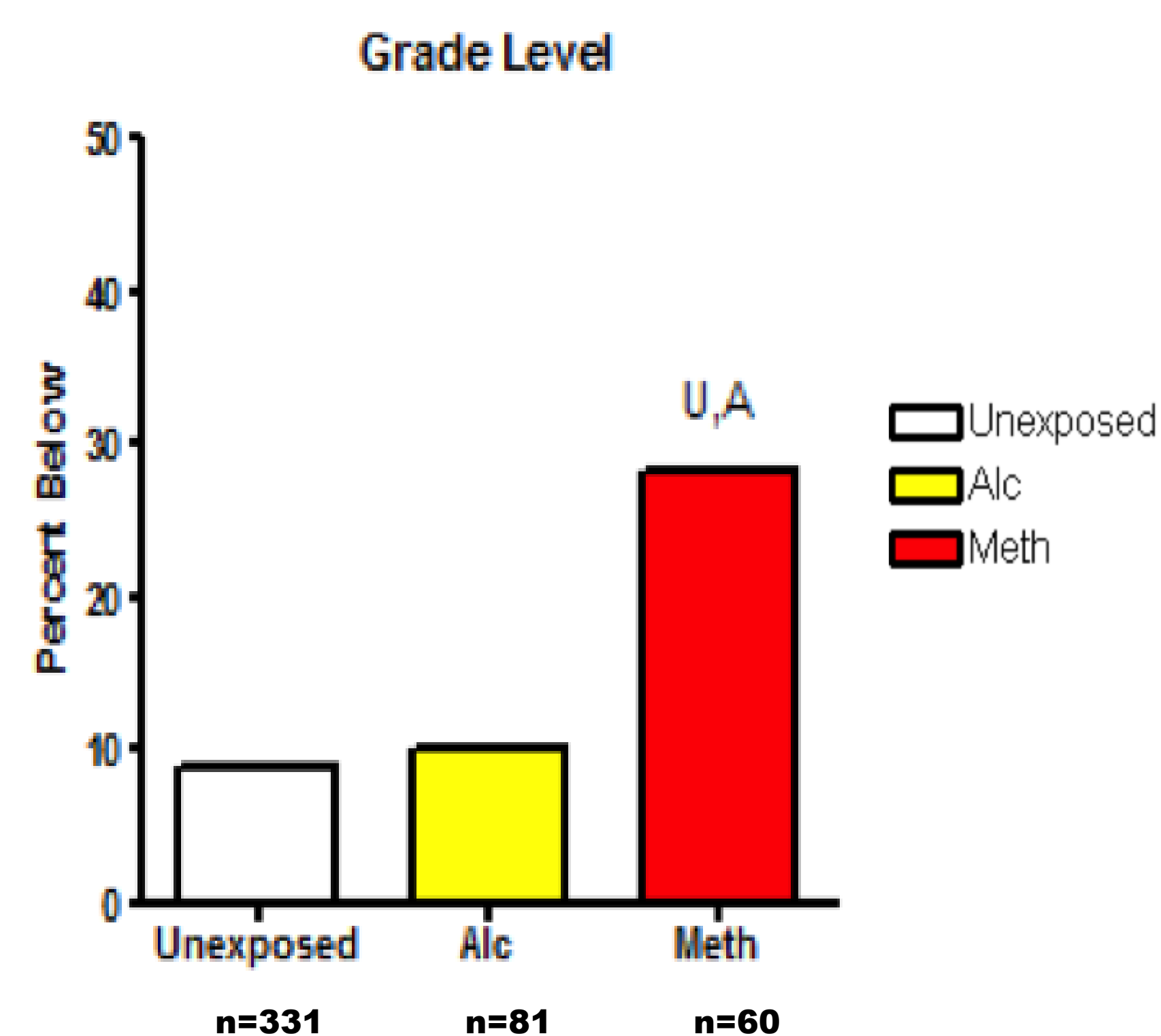
Alcohol Exposure

	Meth -, Alc -	N	Meth-, Alc+	N	Meth+	N
Alc during pregnancy	0.0%	331	100.0% ^A	83	68.0% ^{A, B}	59
>5 drinks in one sitting	0.0%	331	23.4%	77	69.3% ^B	24
Alc during 3rd trimester	0.6%	331	55.7% ^A	79	46.7% ^{A, B}	24
Alc daily	0.0%	331	7.9%	76	50.0% ^B	24

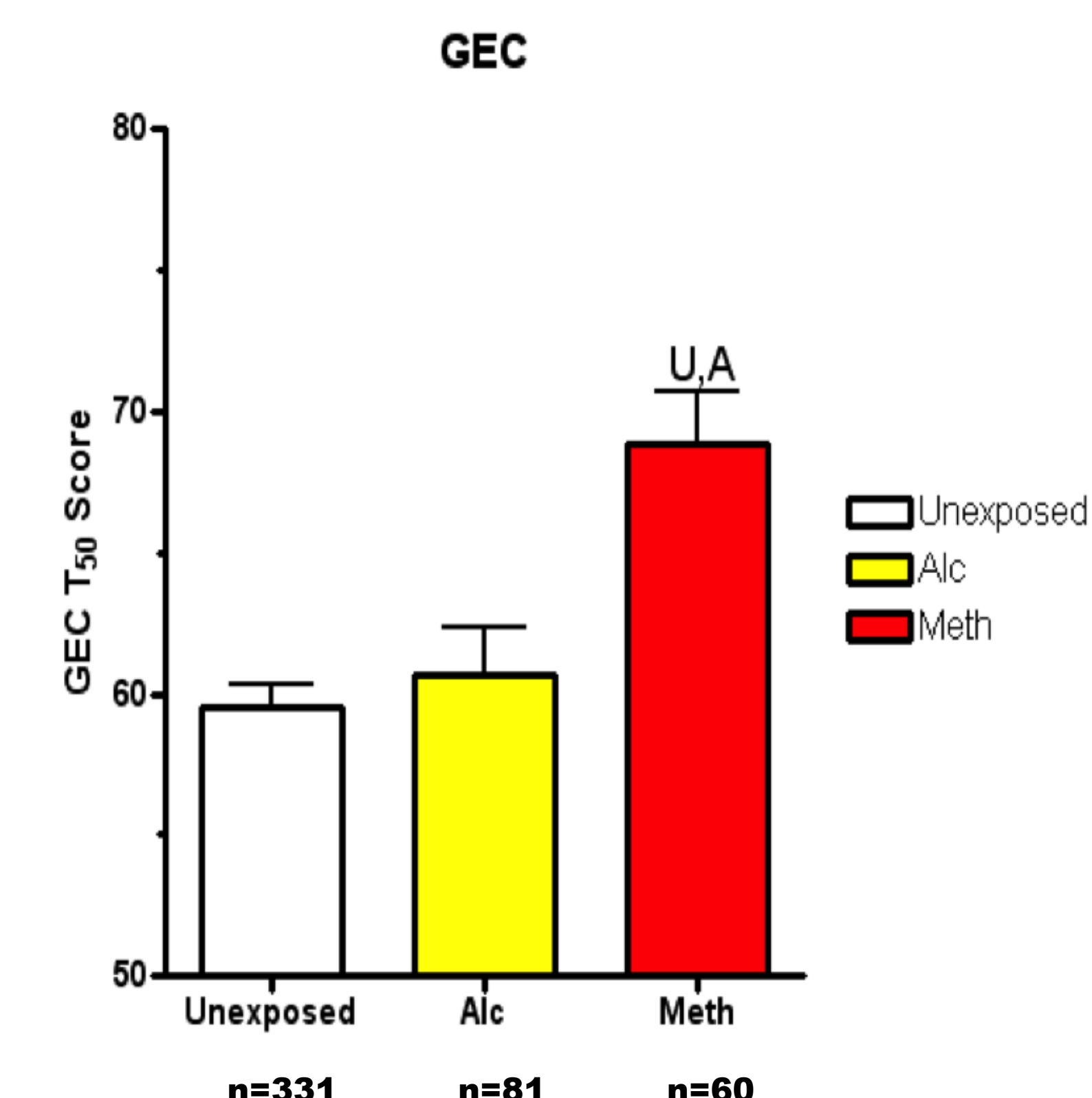
Children exposed to methamphetamine were more likely to fall behind grade level in math and reading



Children exposed to methamphetamine were nearly three times more likely to fall a full grade level behind in school



Children who were prenatally exposed to methamphetamine exhibited significant deficits in executive function



CONCLUSIONS

- ❖ Children exposed to methamphetamine were significantly more likely to fall behind their grade level in math and reading and nearly three times as likely to fall a grade behind in school compared to children who were not exposed to methamphetamine
- ❖ Children exposed to methamphetamine had greater deficits in executive function compared to children who were not exposed to methamphetamine

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