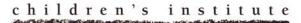# Predictive and Concurrent Associations of the Lead poisoning Item in the PACE with School Readiness and Functioning Variables

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EXECUTIVE SUMMARY

- The purpose of this report was to determine the concurrent and predictive validity of a parent-reported item of exposure to high levels of lead completed at entrance in kindergarten.

- Seven percent of parents in an urban sample reported that their child had ever being exposed to high levels of lead.

- Parental reports of exposure to lead had a significant concurrent association with parent ratings of child's language at entrance in kindergarten. This association persisted after socio-demographic risk factors were controlled for.

- Parental reports of exposure to lead had no detectable predictive association with Grade 1 reading comprehension and math Stanford scores.

INTRODUCTION

The PACE 1.2 asks parents whether their child has ever had high lead levels. Exposure to this neurotoxin has also been associated with learning disabilities and poor academic outcomes making it a serious public health concern (American Academy of Pediatrics, 1998). This study investigates whether the lead poisoning item in the PACE 1.2 has predictive associations with academic outcomes in 1st grade and concurrent associations with parent ratings in social, motor, cognitive and academic domains at entrance in kindergarten.

SAMPLE

There were 68 children whose parents reported that their children had ever been exposed to high levels of lead, constituting 7% of the urban population sampled. This sample includes only children who were tested in the Spring using the Stanford grade 1 reading comprehension and math tests. Possible reasons to miss testing include grade retention and participation in some forms of special education.

For general information on the PACE, please consult previous technical reports (Greenberg, Lotyczewski, & Hightower, 2003).

RESULTS

Two one-way multivariate analyses of variance (MANOVAs) were performed to determine the relationship between high lead levels and negative outcomes. One MANOVA included the PACE 1.2 subscales as the dependent variables, while the other specified Grade 1 math and reading achievement test scores as the dependent variables.

Table 1 Effect of high lead levels before controlling for demographic factors

	Has your child ever had high lead levels?		
	Yes	No	
	Mean (SE) n = 68	Mean (SE) n = 948	p
PACE 1.2			
Language	**3.33 (.08)**	**3.61 (.02)**	**< .01**
Motor	3.71 (.05)	3.73 (.01)	n.s.
Speech	3.49 (.08)	3.46 (.02)	n.s.
Preliteracy	2.37 (.10)	2.56 (.03)	<.10
Learning	3.34 (.09)	3.34 (.03)	n.s.
Social	2.58 (.04)	2.58 (.01)	n.s.
Grade 1	n=67	n=927	
Math	45.81 (2.58)	50.64 (.70)	< .10
Reading	49.18 (2.46)	50.95 (.66)	n.s.

High lead levels were not significantly related to grade 1 math and reading comprehension Stanford scores, either before (Wilk's lambda = .996, F (2, 991) = 1.91, n.s.) or after controlling for socio-demographic risk factors (Wilk's lambda = .998, F (2, 986) = .768, n.s.).

High lead levels had a significant effect on the PACE 1.2 subscales, Wilk's lambda = .982, F (6, 1009) = 3.16, p < .01.   Results are displayed in Table 2, indicating that parents who stated their children ever had high lead levels reported them to have lower language skills at entrance in Kindergarten than other parents.   This association persists even after demographic factors (sex, at-risk minority status, mother's education, Medicaid status and two parent household status) are controlled for (Wilk's lambda = .985, F (6, 1004) = 2.53, p < .05, see table 2).

Table 2. Effect of high lead levels after controlling for demographic factors

	Has your child ever had high lead levels?		
	Yes	No	
	Mean (SE)[a] n = 68	Mean (SE)[a] n = 948	p
PACE 1.2			
Language	**3.36 (.08)**	**3.61 (.02)**	**<.01**
Motor	3.72 (.05)	3.72 (.01)	n.s.
Speech	3.50 (.08)	3.46 (.02)	n.s.
Preliteracy	2.47 (.09)	2.55 (.03)	n.s.
Learning	3.38 (.09)	3.34 (.03)	n.s.
Social	2.58 (.04)	2.58 (.01)	n.s.
Grade 1	n = 67	n = 927	
Math	48.74 (2.45)	50.43 (.65)	n.s.
Reading	51.64 (2.33)	50.77 (.62)	n.s.

Note: [a] All means estimated with sex, at-risk minority status, mother's education, Medicaid status and two-parent household status as covariates.

DISCUSSION

Seven percent of parents in an urban sample reported that their child had ever being exposed to high levels of lead. Parental reports of exposure to lead had concurrent associations with parent ratings of child's language at entrance in kindergarten. This association persisted after socio-demographic risk factors were controlled for. Parental reports of exposure to lead had no detectable predictive associations with Grade 1 reading comprehension and math Stanford scores. A possible explanation for the lack of association lies in under-reporting of lead poisoning by parents.

REFERENCES.

American Academy of Pediatrics. (1998). Screening for elevated blood levels. *Pediatrics,* 101: 1072-1078.

Greenberg, S. R., Lotyczewski, B. S., Hightower, A. D. (2003). Community report on children entering school in 2002-2003. Rochester, New York. *Children's Institute Technical Report T03-013*.