

Impact of Maternal Trauma History on Child Cognitive Performance at 5 Years by Child Internalizing Symptoms at 3.5 Years

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Introduction

Maternal lifetime traumatic experiences, including experiences prior to the child's conception, may have intergenerational effects on a range of offspring neurodevelopmental outcomes throughout the life course. A growing body of research indicates that maternal lifetime traumatic experiences, including experiences prior to the child's conception, may have intergenerational effects on a range of offspring neurodevelopmental outcomes throughout the life course.

Numerous mechanisms have been proposed to account for these effects. Elevated prenatal cortisol, maternal psychopathology during pregnancy, and disrupted mother-infant attachment have all been studied as potential contributors to negative child cognitive outcomes during the first several years of life (Bergman, Sarkar, Glover, & O'Connor, 2010; Davis & Sandman, 2010; Campbell et al., 2019). In this analysis, we examine child internalizing and externalizing symptoms at 3.5 years as a mediator between maternal trauma history and child cognitive performance at 5 years of age.

The current study tested the hypothesis that maternal trauma history influences child intellectual functioning by middle childhood via child mental health in early childhood.

Methods

Sample

184 mother-child dyads were recruited to study the effects of maternal and child lifetime stress exposures on child health and development.

Variable	Measure	Time Period
Lifetime stress exposures and prenatal mental health	Lifetime Exposure to Stressful/Traumatic Events (LSC-R)	Pregnancy
Child emotional and behavioral problems	Child Behavior Checklist (CBCL)	3 Years
Cognitive development	Wechsler Preschool and Primary Scale of Intelligence (WPPSI-IV)	5 Years

Demographics

Sex	Male	53%
	Female	47%
Racial/Ethnic Background	White	19.1%
	Black	50.8%
	Hispanic	23.5%
	Other	4.9%
Maternal Education	≤ High school	10.9%
	High school	19.1%
	Some college	29%
	College	17.5%
Annual Household Income	Graduate degree	13.1%
	<\$20k	
	\$20-59k	
	\$60-99k	
	\$100k+	

Analyses

Analyses tested the associations of maternal lifetime trauma exposures, child anxious/depressed and externalizing symptoms at 3.5 years, and child cognitive performance at 5 years, controlling for maternal education and family income.

Mediation models with full-information maximum likelihood (FIML) tested for indirect effects of child cognitive performance through child internalizing symptoms.

Sex-stratified analyses were used to assess sex differences.

Results

Mediation models with full-information maximum likelihood showed a significant indirect effect of maternal trauma history on child performance on the WPPSI Information subtest through child anxious/depressed symptoms (beta=-0.07, 95% CI [-0.12,-0.01], p=0.012).

Sex-stratified analyses revealed that these findings were specific to female children.

Indirect Effects of Child's Performance on the WPPSI Information Subtest Through Child's Internalizing Symptoms

	B	SE	Z	p	95% CI for Mean
LSCR					
Male	.002	.03	0.06	0.954	[-.06, .06]
Female	-.14	.05	-2.78	0.005	[-.23, -.04]
Income					
Male	-.01	.09	-0.11	0.911	[-.19, .17]
Female	.27	.12	2.27	0.023	[.04, .501]
Education					
Male	.18	.15	1.22	0.223	[-.11, .47]
Female	-.201	.14	-1.49	0.136	[-.47, .06]

Indirect Effects of Child's Performance on the WPPSI Information Subtest Through Child's Externalizing Symptoms

	B	SE	Z	p	95% CI for Mean
LSCR					
Male	-.009	.02	-0.52	0.601	[-.04, .02]
Female	-.13	.05	-2.62	0.009	[-.22, -.03]
Income					
Male	.008	.02	0.36	0.720	[-.04, .05]
Female	.139	.12	1.20	0.231	[-.09, .37]
Education					
Male	-.01	.03	-0.33	0.745	[-.07, .05]
Female	-.06	.15	-0.40	0.693	[-.35, .23]

Discussion

The model showed a significant indirect effect of maternal trauma history on child performance on the WPPSI Information subtest through child anxious/depressed symptoms and the model through child's externalizing symptoms approached significance (beta=-0.05, 95% CI [-0.09,0.001], p=0.055). Anxious/depressed and externalizing symptoms were moderately correlated (r = .56).

In addition, family income exerted a mediating effect independent of child anxious/depressed symptoms (beta=0.14, 95% CI [0.002, 0.29], p=0.047).

These results suggest that maternal trauma history may increase child risk for elevated anxiety and depressive symptoms, which, in turn, may impair child long-term memory and the acquirement of general knowledge.

There are several potential underlying biological and behavioral mechanisms responsible for these associations. For example, prior findings from the PRISM cohort describe prenatal cortisol as a sex-specific biological mechanism modifying the association between maternal trauma history and child cognitive development (Campbell et al., 2019). In the future, additional biological and behavioral mechanisms that may contribute to the association between prenatal maternal traumatic experiences and child cognitive outcomes should be explored.

These findings have implications for identifying at-risk families and providing early intervention services to maximize children's emotional wellbeing and cognitive development.



References

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