The longitudinal association between infant negative emotionality, childhood maltreatment, and ADHD symptoms: A secondary analysis of data from the Fragile Families and Child Wellbeing Study

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Background

Evidence from a large (N>8000) twin study (1):
- Relative risk of having two or more neurodevelopmental diagnoses was 7 times higher in maltreated compared to non-maltreated children.
- Largely explained by genetic factors
- Small environmental effect on ADHD symptom load

Gene-environment interaction: Maltreatment risk could be impacted by temperamental traits that share a genetic basis with ADHD.

Meta-analytic evidence: The temperamental trait negative emotionality predicts ADHD (2).

Hypotheses

1) Negative emotionality in infancy predicts ADHD symptoms and maltreatment load in childhood.

2) This association between maltreatment load and ADHD symptoms is bi-directional.

3) Maltreatment load mediates the association between infant negative emotionality and ADHD symptoms in childhood.

4) ADHD symptoms mediate the association between infant negative emotionality and maltreatment load in childhood.

Results

Model fit= very good
- RMSEA= .02
- CFI= .99
- TLI= .96

The model controlled for for the effects of child sex, low birth weight, physical disabilities of the child, age of mother & child, presence of depression in mothers and socio-economic status on the outcomes

All hypotheses could be confirmed or partially confirmed (hypothesis 1).

ADHD symptoms above cutoff (%)

14.64 — 5 years
18.74 — 9 years

Cutoff symptoms > 6
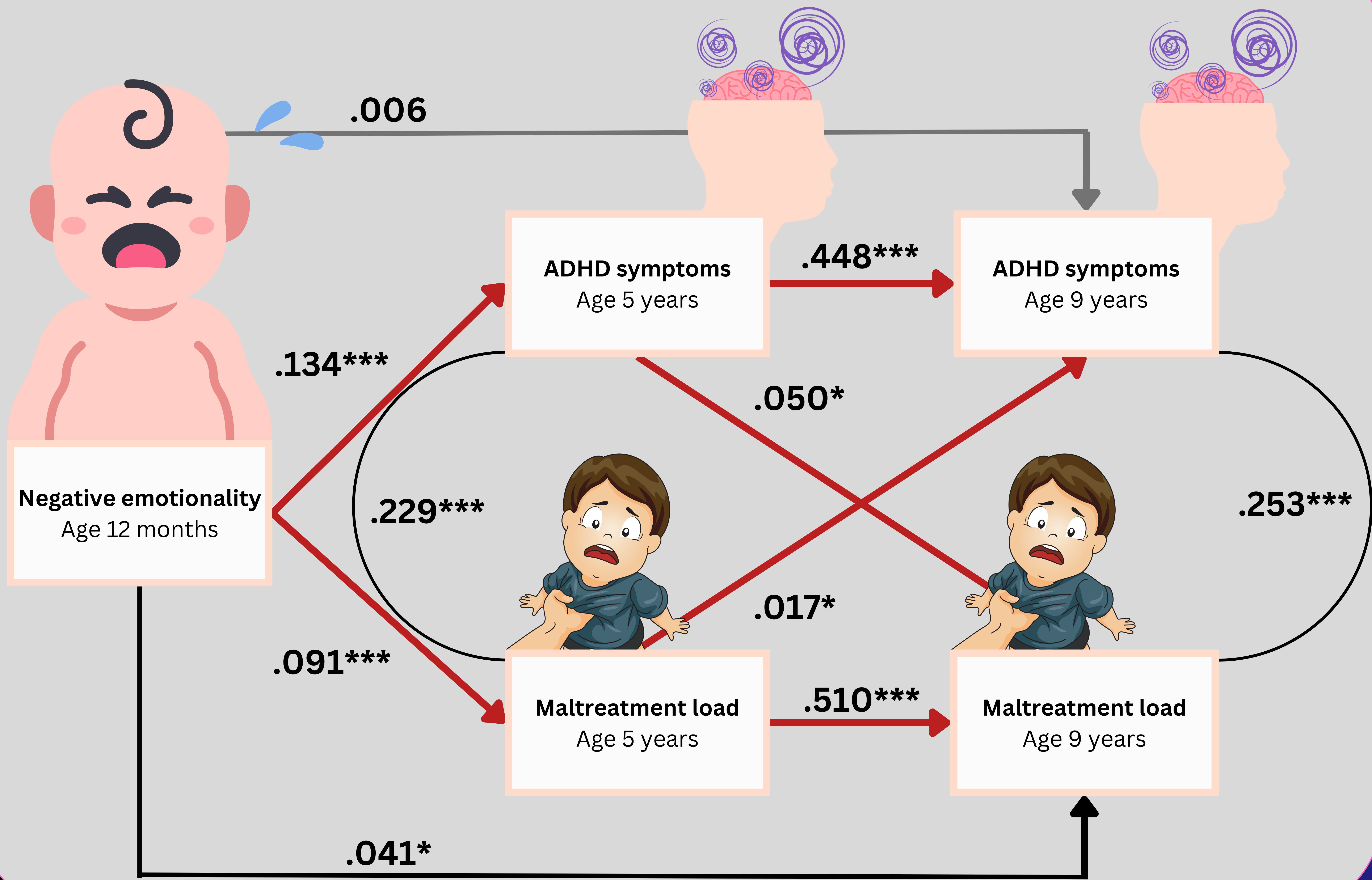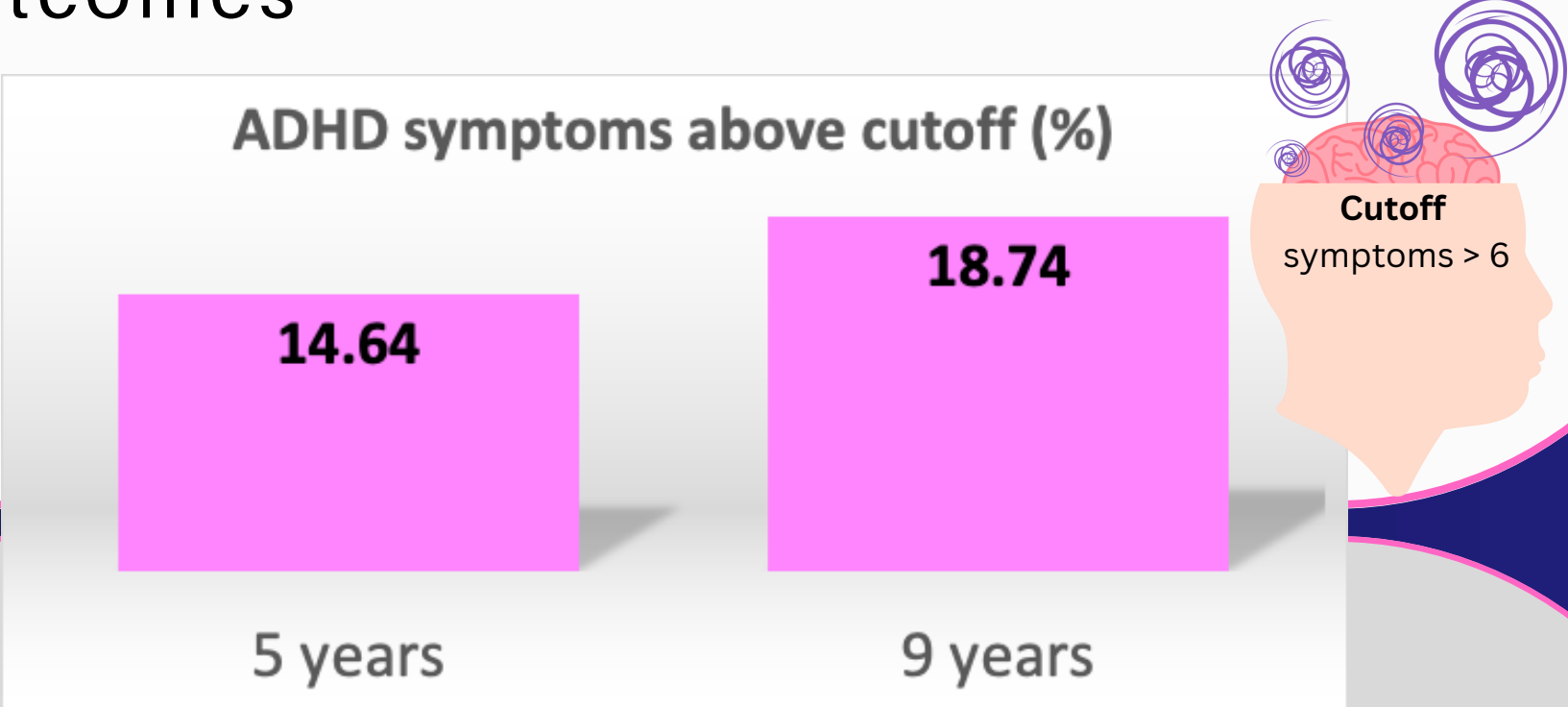
Methods

We used longitudinal data from the Fragile Families & Wellbeing Study (3) to create a cross-lagged path model in Mplus (N= 2860).

Negative emotionality

3 items from the Emotionality, Activity, and Sociability Temperament Survey (4).

Items:
Often fusses and cries, Gets upset easily, Reacts intensely when upset.

ADHD symptoms

11-item Attention Problems subscale of the Child Behaviour Checklist (5).

Example item: *Can't concentrate, can't pay attention for long.*

Maltreatment

15 items from the Conflict Tactics Scale (5 per subscale).

Psychological aggression: *Called him/ her dumb or lazy or some other name like that.*
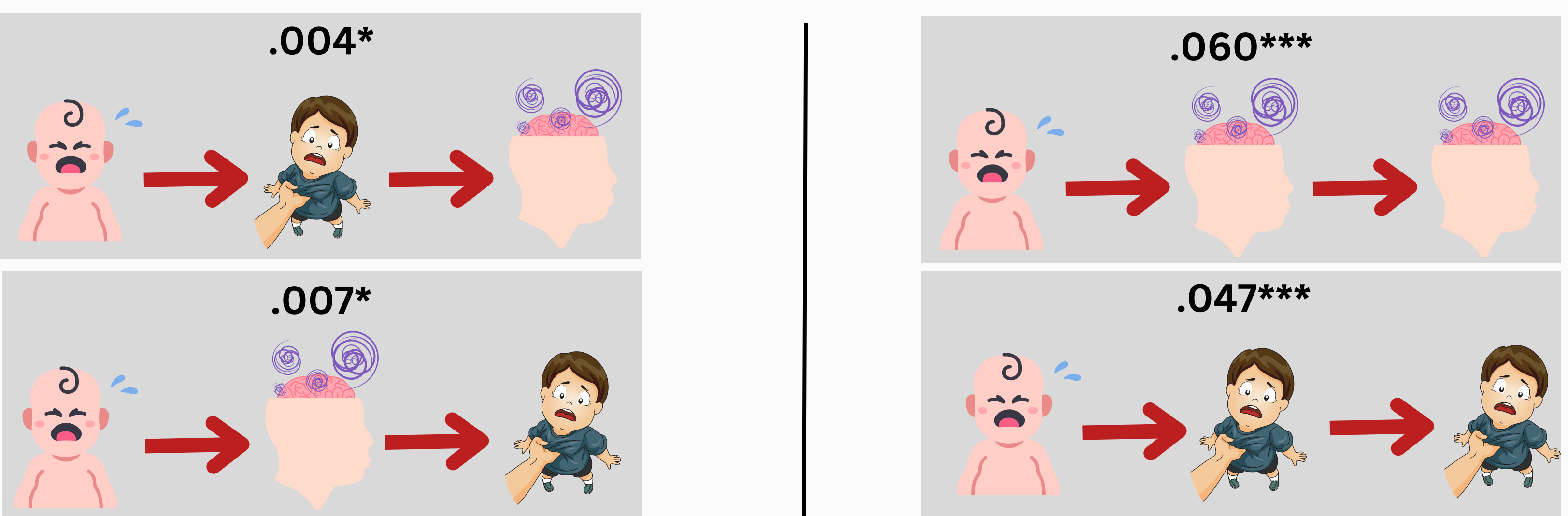
Physical assault: *Hit him/ her on the bottom with something like a belt, hairbrush, a stick or some other hard object*

Neglect: *Was so drunk or high that they had a problem taking care of their child.*

Descriptive statistics

Variable	Time point	Median	Range
Negative emotionality	12 months	2.67	1-5
Maltreatment	5 years	14.00	0-49
	9 years	10.00	0-52
ADHD symptoms	5 years	2.00	0-17
	9 years	2.00	0-22

Indirect effects

.004*

.060***

.007*

.047***

Path model figure:

- Negative emotionality Age 12 months → ADHD symptoms Age 9 years: .006
- Negative emotionality Age 12 months → ADHD symptoms Age 5 years: .134***
- ADHD symptoms Age 5 years → ADHD symptoms Age 9 years: .448***
- ADHD symptoms Age 5 years ↔ Maltreatment load Age 5 years: .229***
- ADHD symptoms Age 5 years → Maltreatment load Age 9 years: .050*
- Negative emotionality Age 12 months → Maltreatment load Age 5 years: .091***
- Maltreatment load Age 5 years → ADHD symptoms Age 9 years: .017*
- Maltreatment load Age 5 years → Maltreatment load Age 9 years: .510***
- ADHD symptoms Age 9 years ↔ Maltreatment load Age 9 years: .253***
- Negative emotionality Age 12 months → Maltreatment load Age 9 years: .041*

Discussion

Our findings highlight the bi-directional relationship between maltreatment experiences and ADHD symptoms. Maltreatment increases ADHD symptom load and the more ADHD symptoms a child displays, the higher their risk of being maltreated by their caregivers.

Negative emotionality is a shared risk factor for ADHD symptoms and maltreatment.

The results from our work could help health visitors identify families with additional support needs.

References

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Legend

- Asterisks: significant direct effects (*p<.05, **p<.01, ***p<.001)
- red line: significant indirect effects
- curved line: significant correlation