

# Childhood Toxic Stress and Immune Cell Gene Expression: Testing the Protective Effects of the ATTACH Parenting Intervention

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## BACKGROUND

- Early life toxic stress exposure is associated with poor developmental and health outcomes
- High quality mother-child relationships are one way to buffer the effects of toxic stress
- Most studies have focused on child mental and developmental outcomes, but a growing body of research suggests that quality mother-child relationships also protect child health outcomes, particularly immune system activity (e.g., Puig et al, 2013; Miller et al, 2014; Brody et al, 2016)

**Table 1.** Child characteristics (N =20)

Variable	Mean +/- SD or % (N)	
	Intervention	Wait-list Control
Age (months)	36.1 +/- 19.4	33.7 +/- 17.8
Sex (female)	60% (6)	50% (5)
Race/ethnicity		
Black or African ancestry	10% (1)	20% (2)
North American Indigenous	40% (4)	20% (2)
Asian	10% (1)	10% (1)
Hispanic	0% (0)	10% (1)
Pacific Islander	20% (2)	0% (0)
White or Caucasian	10% (1)	30% (3)
Middle-eastern	10% (1)	10% (10)
Preterm (<37 weeks gestation)	30% (3)	10% (1)

**Table 2.** Maternal characteristics (N = 20)

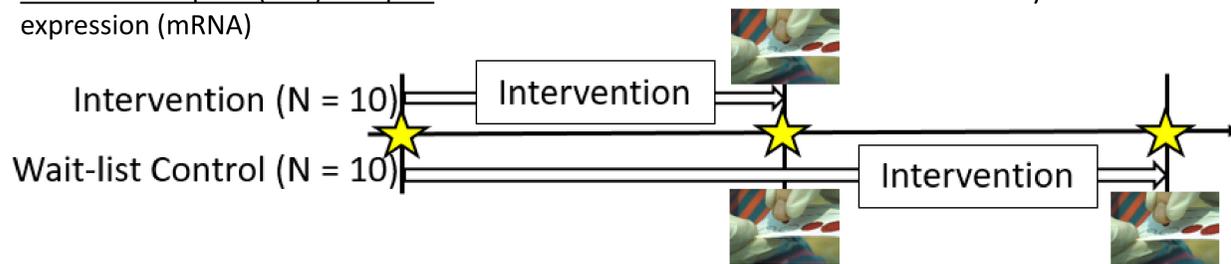
Variable	Mean +/- SD or % (N)	
	Intervention	Wait-list Control
Age (years)	31.8 +/- 6.49	31.3 +/- 3.09
Race/ethnicity		
Black or African ancestry	0% (0)	20% (2)
North American Indigenous	60% (6)	20% (2)
Asian	20% (2)	10% (1)
Hispanic	0% (0)	10% (1)
Pacific Islander	0% (0)	0% (0)
White or Caucasian	20% (2)	30% (3)
Middle-eastern	0% (0)	10% (1)
Citizenship (Canadian)	100% (10)	60% (6)
Country of origin (Canada)	80% (8)	50% (5)
Relationship Status		
Not in a relationship	70% (7)	60% (6)
Separated/Divorced	20% (2)	30% (3)
Living apart from partner	10% (1)	0% (0)
Education		
Less than high school	10% (1)	50% (5)
High school/GED	30% (3)	30% (3)
Some college	60% (6)	20% (2)
Household income		
Less than \$5,000	10% (1)	10% (1)
\$5,000 to \$14,999	40% (4)	60% (6)
\$15,000 to \$44,999	50% (5)	30% (3)
Unemployed	80% (8)	80% (8)
# People in household	2.80 +/- 1.32	3.00 +/- 1.16

## OBJECTIVE

- To determine whether a reflective function parenting intervention for mothers and children coping with toxic stress (domestic violence) predicts healthier immune cell activity profiles (i.e. lower pro-inflammatory and higher anti-inflammatory gene expression)

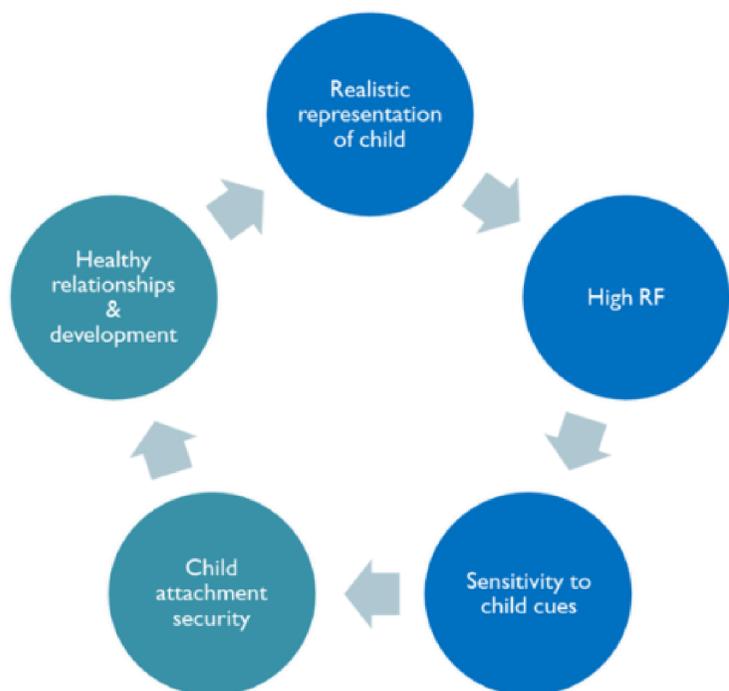
## METHODS

- The sample consisted of 20 mother-child dyads recruited from Discovery House, Calgary, AB, a shelter for women and children affected by domestic violence
- Action Team on Triadic Attachment and Child Health (ATTACH) Intervention (Figure 1 and Figure 2)
  - Psycho-educational program that fosters maternal reflective function (i.e. the ability to understand and respond to their own mental states and those of her child, namely thoughts and feelings)
- Dried blood spots (DBS) samples: Collected from mothers and children for assay of immune cell gene expression (mRNA)

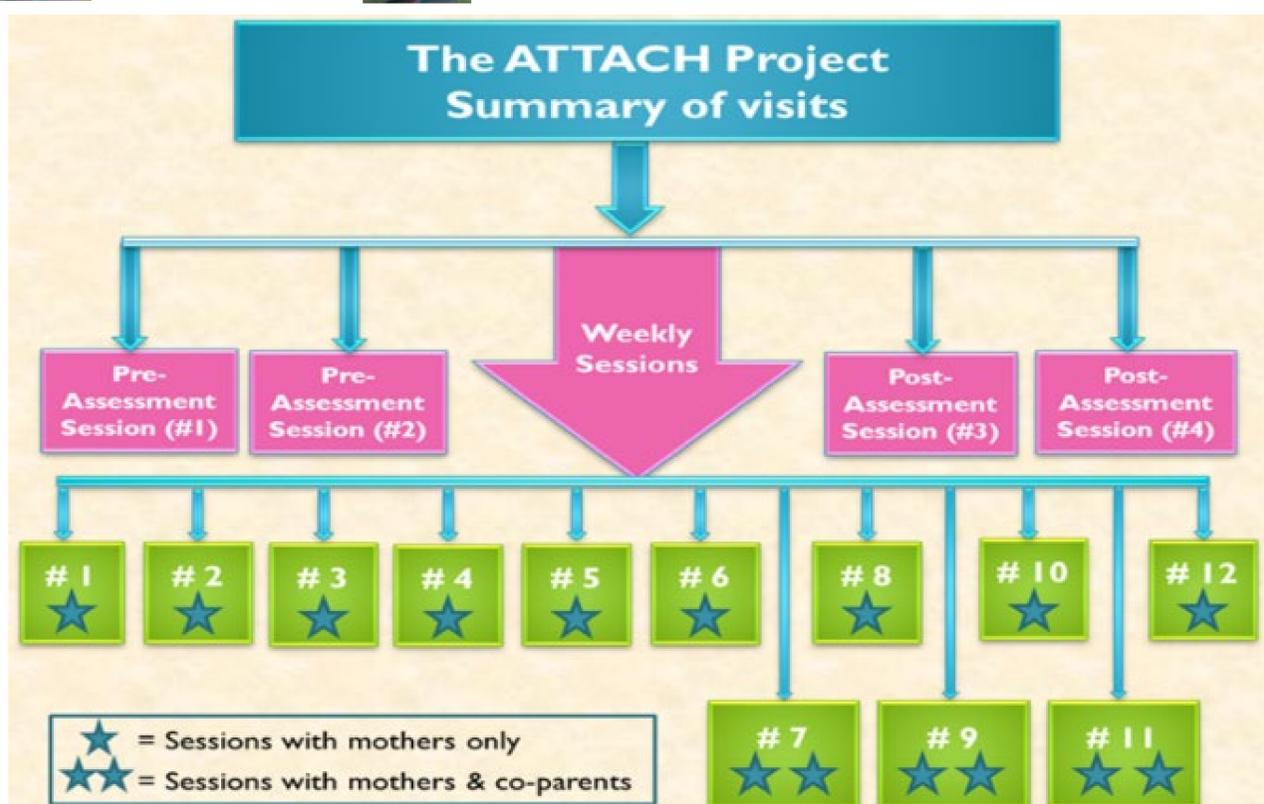


## RESULTS

- Child characteristics are presented in **Table 1**
- Mother characteristics are presented in **Table 2**
- All DBS samples were successfully collected from all mothers and children (Total N = 60)
- Samples have been sent to the University of California – Los Angeles (Dr. Steve Cole), where they are in the process of being assayed
- Results are anticipated by end of Summer 2019



**Figure 1.** ATTACH intervention conceptual model. Parents with a higher level reflective function tend to respond more sensitively to their children, which fosters secure attachment and healthy relationship development. This in turn leads to more realistic parental representations of the child, and further supports parental reflective function.



**Figure 2.** ATTACH intervention protocol. Each session consists of (1) a free play session with video feedback, (2) a hypothetical situation exercise, and (3) a real-life situation exercise (mothers-only sessions).

## IMPLICATIONS

Parenting interventions, such as ATTACH, have been shown to effectively reduce the impact of toxic stress and improve child developmental and mental outcomes. The role of parenting interventions in reducing the impact of toxic stress on adverse health outcomes in children is less examined. Determining whether a relatively short and straightforward parenting intervention can buffer the harmful health effects of early life toxic stress exposure on immune cell gene expression profiles has important implications for protecting the health of children living in adverse circumstances.