

# Interventions for children on the autism spectrum: A systematic umbrella review

Hannah Waddington<sup>1,2</sup>, David Trembath<sup>2,3</sup>, Kandice Varcin<sup>2,3</sup>, Rhylee Sulek<sup>2,3</sup>, Catherine Bent<sup>2,4</sup>, Jill Ashburner<sup>5</sup>, Valsamma Eapen<sup>6</sup>, Emma Goodall<sup>7</sup>, Kristelle Hudry<sup>4</sup>, Jacqueline Robert<sup>3</sup>, Natalie Silove<sup>8</sup>, Andrew Whitehouse<sup>2,9</sup>.

<sup>1</sup> Victoria University of Wellington

<sup>2</sup> Cooperative Research Centre for Living with Autism (Autism CRC)

<sup>3</sup> Griffith University

<sup>4</sup> La Trobe University

<sup>5</sup> Autism Queensland

<sup>6</sup> University of New South Wales

<sup>7</sup> Healthy Possibilities

<sup>8</sup> Sydney Children's Hospital Network Westmead, University of Sydney

<sup>9</sup> Telethon Kids Institute, University of Western Australia

## Project aim

To conduct an umbrella review which synthesises the scientific evidence for the therapeutic (and other) effects of interventions for children on the autism spectrum aged 0-12 years.

## Background

Access to effective intervention during childhood supports early development and promotes longer-term quality of life for children on the autism spectrum. There are a large number of interventions available within clinical practice, which vary in their theoretical orientation and practical application. However, no previous review has provided a systematic evaluation and synthesis of the evidence for autism interventions across different intervention types.

## Methods

The umbrella review was conducted according to the procedures outlined in the Joanna Briggs Institute manual for evidence synthesis and the PRISMA Reporting Guidelines. The review protocol was pre-registered (PROSPERO; Open Science Framework) and focused on systematic reviews (SRs) that included at least one randomised controlled trial or controlled clinical trial of an intervention designed for use with children aged 0-12 years. We searched 10 databases and grey literature between the years of 2010-2020. Interventions were grouped into nine different theoretically-derived intervention categories (see Table 1).

## Results

Interventions	No. of SRs	Core autism characteristics				Related skills and development								Education and participation				
		Overall autistic characteristics	Social-communication	Restricted and repetitive interests and behaviours	Sensory behaviours	Communication	Expressive language	Receptive language	Cognition	Motor	Social-emotional/challenging behaviour	Play	Adaptive behaviour	General outcomes	School/learning readiness	Academic skills	Quality of life	Community participation
Behavioural	7	? M	+ LM	+ L	+ L	+ LM	? LM	+ M	+ LM	+ LM	? LM	+ L	+ L	? L	+ LM	+ L		
Developmental	5		+ LM			? LM			+ L	? LM	+ L	+ L	+ L	? L	+ L	+ L		
Naturalistic developmental behavioural (NDBI)	7	O M	? LM	? LM		? LM	+ LM	+ M	+ M		O M	+ LM	O M	+ LM	+ L			
Sensory-based	9	? L	? LM		? LM	? LM	O M	+ LM	+ LM		+ L	? L	? L	? LM	+ L	+ L	+ M	+ L
TEACCH	1		O M											? L				
Technology-based	11		? LMH			? LH	O H	O H	+ LH	+ LH	? LM	+ L	+ L	? L	+ L	? L		
Animal assisted Cognitive behavioural therapy	7		? LM		+ L	O L			O L	? L	? L		O L	? LM			? L	? L
Other	2	Not possible to combine practices for "other" interventions																

+ Positive therapeutic effect ? Inconsistent therapeutic effect/differential effects across practices O Null therapeutic effect  
Blank cell = no available evidence L = Low quality M = Moderate quality H = High quality

Table 1: Summarised intervention effects and quality of evidence for child outcomes across all practices within each category.

Note: This table has been adapted from the original full report to enable the findings to be presented in a poster format. Specifically, results have been summarised across all practices within each category. Outcomes for specific practices within each category (e.g. discrete trial training within the "behavioural" category) and the effect of interventions on family outcomes are available in the full report.

## Results cont.

The search yielded 58 SRs, representing 1,787 unique studies. They were of variable quality and provided data on at least 111 different practices across the 9 intervention categories.

Evidence from the SRs indicates the following effects on child and family outcomes:

- Positive intervention effects for Behavioural, Developmental, NDBIs, Technology-based intervention and CBT.
- Positive intervention effects for certain sensory-based interventions only, limited to select child and family outcomes.
- A mix of inconsistent and null intervention effects for both TEACCH and Animal-assisted interventions.

There were no consistent findings for the possible effects of intervention delivery characteristics (e.g., amount, agent, delivery format) or child characteristics (e.g., age, cognitive skills) on intervention outcomes.

## Conclusion

A range of interventions had positive effects on child and family outcomes but there was no single best intervention for all children. No intervention had positive effects across all outcomes examined. The influence of intervention and child characteristics on outcomes remains unclear.

## Research Questions

1. What non-pharmacological interventions have been examined in SRs?
2. What effects do non-pharmacological interventions have on child outcomes?
3. What effects do non-pharmacological interventions have on family wellbeing?
4. What are the optimal delivery characteristics of non-pharmacological interventions, with a focus on the amount of intervention, setting, format, agent, and mode?
5. What child characteristics influence intervention effects, with a focus on child age, core autism characteristics, cognition, and communication skills?



The full report of the umbrella review, including tables showing all intervention effects, is available at: <https://www.autismcrc.com.au/interventions-evidence>

## For more information

Hannah Waddington | Phone: +64 (04) 463 9773 | Email: [Hannah.Waddington@vuw.ac.nz](mailto:Hannah.Waddington@vuw.ac.nz)

[autismcrc.com.au](https://www.autismcrc.com.au)  
[@autismcrc](https://www.autismcrc.com.au)