2021 Autism Month Webinar Series

Interventions for children on the autism spectrum:

A synthesis of research evidence

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Healthy Possibilities

Acknowledgement of Country

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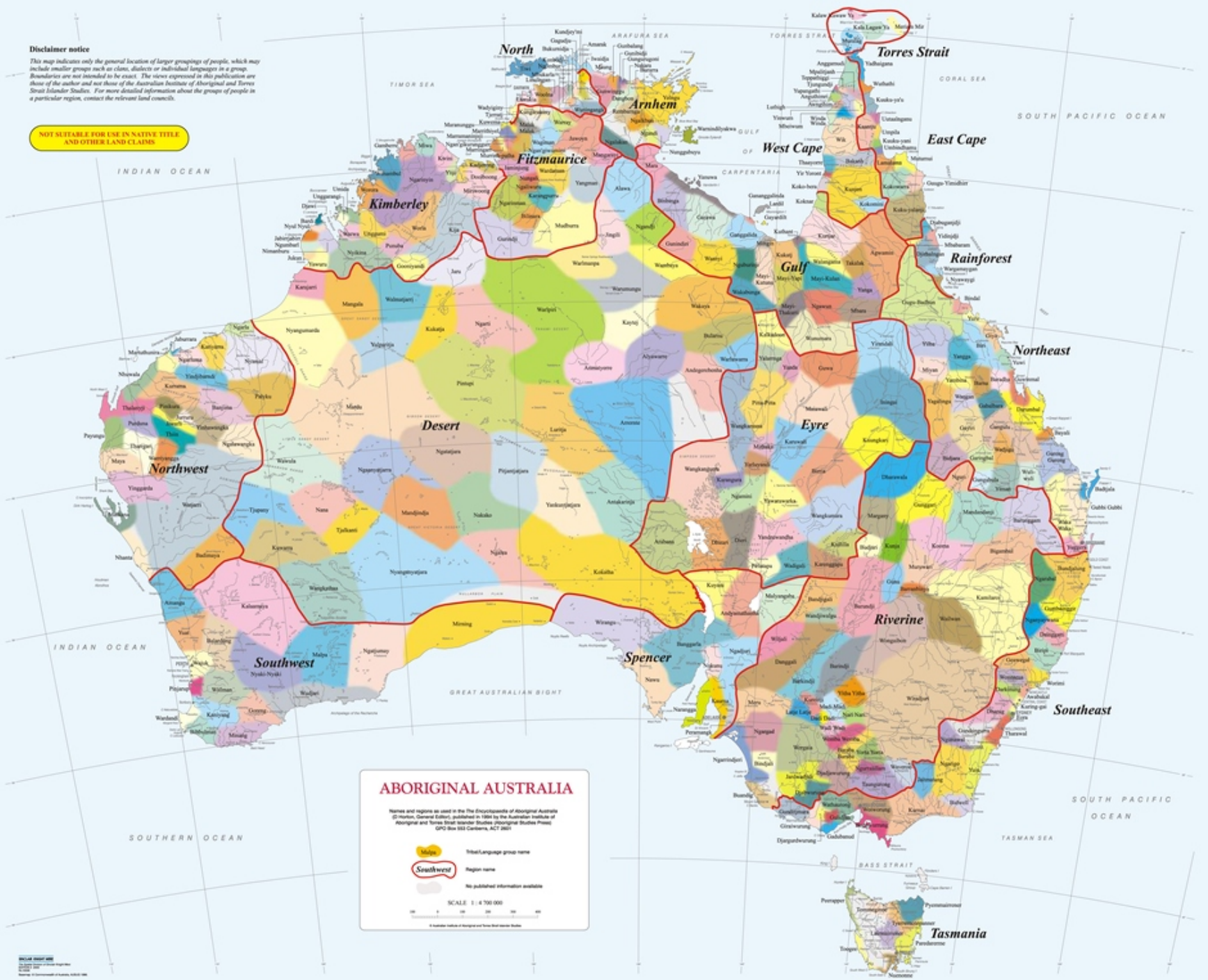
https://aiatsis.gov.au/explore/map-indigenous-australia

Map of Indigenous Australia

https://aiatsis.gov.au/explore/map-indigenous-australia



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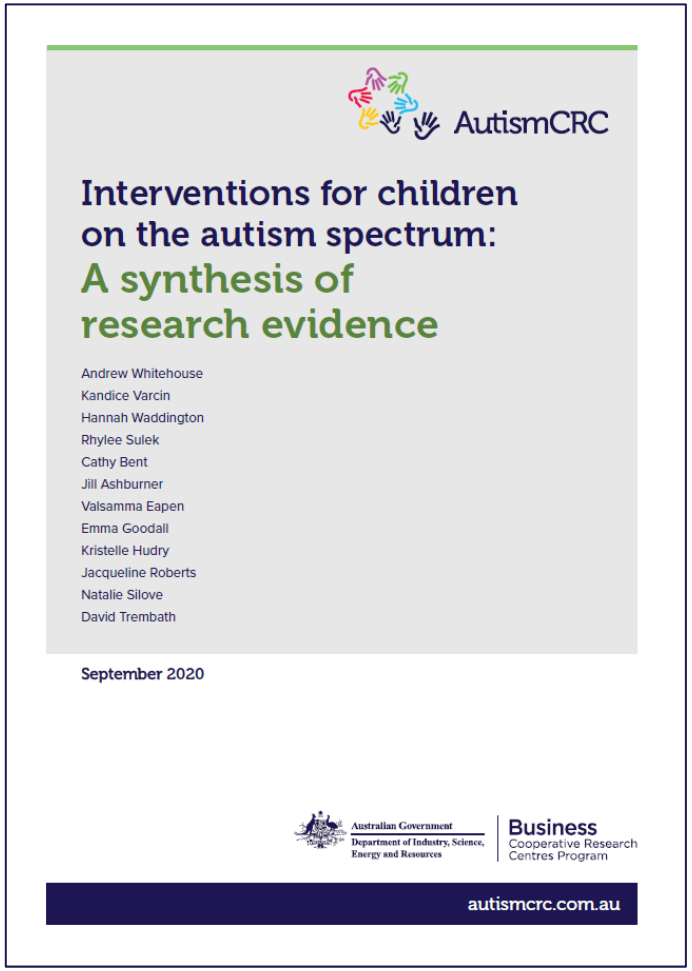
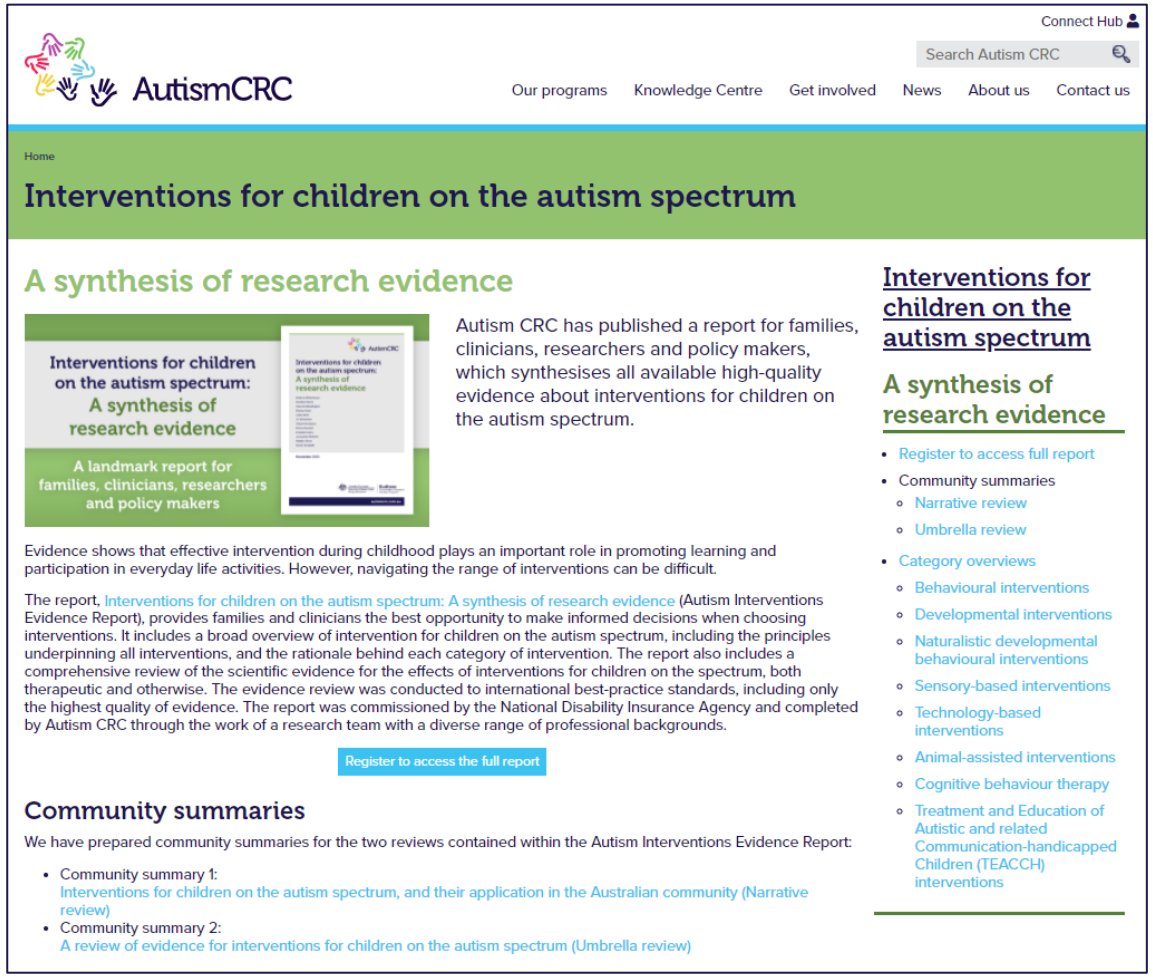
The Report and Resources





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https://www.autismcrc.com.au/interventions-evidence

Acknowledgment

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Consultation: Dr Cindy Stern, Joanna Briggs Institute, University of Adelaide.

Michelle DuBroy and Bonnie Dixon (Librarians, Griffith University)

- Peter De Natris, Lisa O'Brien and teams (NDIA)
- Andrew Davis, Cally Jackson, Jason Kotzur (Autism CRC)

Children and families who were the original participants of the research included in this synthesis.

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Declaration of interests

The Team:	All members of the project team received a salary contribution or honorarium to support our work on the review. A full list of disclosures is available via the Open Science Framework registration https://osf.io/jxpg4/
Presenters:	David has been involved in university programs that train health professionals, has received state and federal government research funding, has published research in this area, has received honoraria for professional services, holds positions on committees relevant to practice, and has family members who receive NDIS funding.
	Emma has been involved in university programs that train education professionals, holds a position in a federally funded organization that produces education around autism for families and schools, has had responsibility for autistic students within state education departments including policy development and implementation, has published research and books in this area, holds positions on committees relevant to practice, and is autistic.

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Acknowledgement of perspectives and preferences

The project team and presenters warmly acknowledge the diverse community perspectives and preferences in relation to understandings of autism; language and terminology; and the relevance and role of interventions, therapies, supports, services at individual, community, and societal levels in the lives of individuals and their families.

We seek to work in ways that unite us all in a commitment to upholding the human rights, dignity, choice, and preferences of the children and families who are the focus of this work.

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Webinar overview

The need	What we did	What it means
To improve access to evidence-based interventions and supports	Introduction to context, aims, and scope of the review (Chapter 1)	Insights based on personal expertise (Dr Emma Goodall)
To make sense of the range of interventions available and their delivery	Narrative review of interventions and training pathways (Chapter 2)	
To provide a synthesis (integrated summary) of the research evidence	Umbrella review of evidence for interventions (Chapter 3)	
To consider the next steps for practice and research	Summary of findings, limitations, and future directions (Chapter 4)	

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Context

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Current clinical practice

Why intervention?

Intervention during childhood is a significant opportunity to support early development, minimise disability and maximise each child's strengths and opportunities.

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The intervention maze

There are numerous interventions available for children on the autism spectrum

They vary in so many ways:

- Who are they designed for?
- What are the goals?
- How are they proposed to work?
- How are they used in practice
- What is the evidence?

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The challenge:

- The complexity makes it extremely difficult to:
  1. Understand theoretical and practical aspects of intervention
     - *What actually are the different interventions for children on the autism spectrum?*
  2. Select interventions that are most likely to be helpful and desired by an individual child and family
     - *How do I make an informed choice on the most appropriate intervention?*
- Both are imperative to ethical clinical practice.

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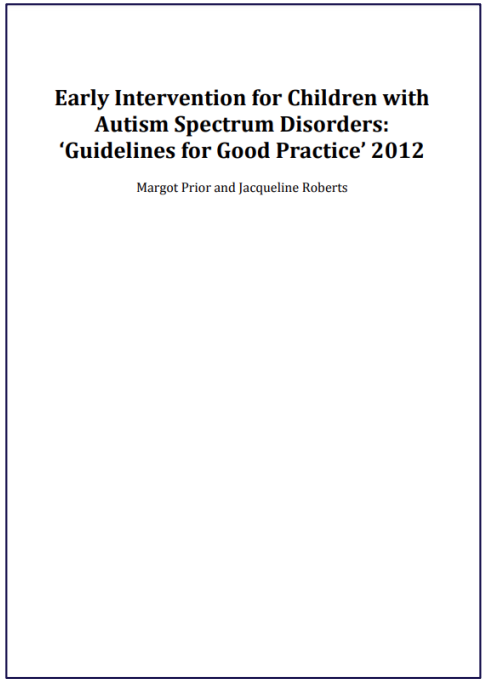
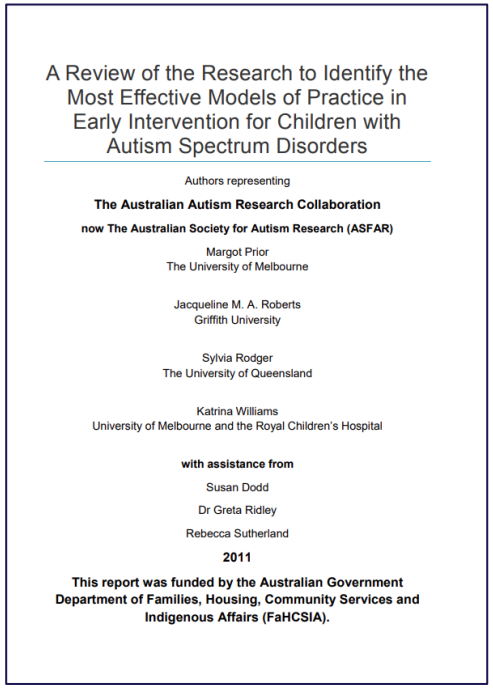
Previous reviews

1. Roberts and Prior (2006)
   - Report for DoHA
2. Prior, Roberts, Rodger, Williams (2011)
   - Report for FaHCSIA
3. Roberts and Williams (2016)
   - Report for the NDIA

Have provided insights and helped to identify core principles that should underpin clinical practice


Early Intervention for Children with Autism Spectrum Disorders: 'Guidelines for Good Practice' 2012

Margot Prior and Jacqueline Roberts


A Review of the Research to Identify the Most Effective Models of Practice in Early Intervention for Children with Autism Spectrum Disorders

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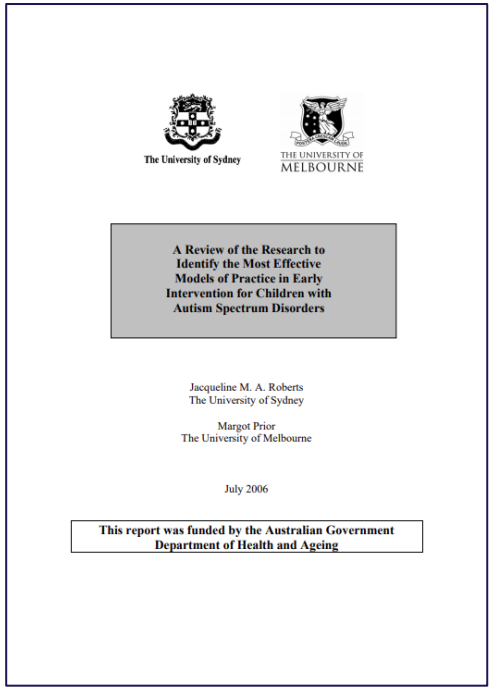
The University of Sydney

THE UNIVERSITY OF MELBOURNE

A Review of the Research to Identify the Most Effective Models of Practice in Early Intervention for Children with Autism Spectrum Disorders

Jacqueline M. A. Roberts
The University of Sydney

Margot Prior
The University of Melbourne

July 2006

This report was funded by the Australian Government Department of Health and Ageing

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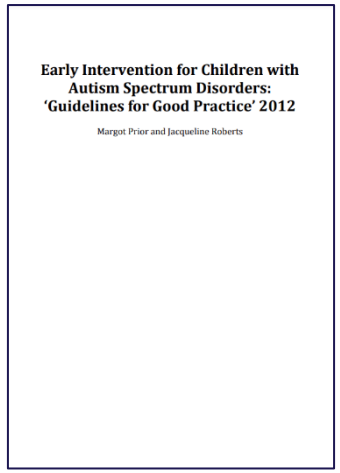
Table 1. Core principles that are important to interventions for children on the autism spectrum

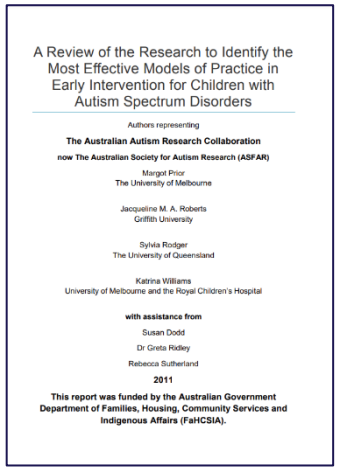
Core principle	Description
Holistic assessment	An initial assessment of an individual's strengths, challenges, goals, and preferences is critical to developing intervention targets that are meaningful to the child and family.
Individual and family-centred	The person on the autism spectrum, and their family members, are the individuals receiving clinical services, and are to be considered equal partners with clinical practitioners.
Lifespan perspective	The types of interventions and supports that are most appropriate will change across the life-course, as children move from early childhood settings into school, and ultimately adult life.
Evidence-based	Intervention is most effective and safe when it is based on the best available research evidence, combined with evidence from clinical practice and the preferences and priorities of fully informed children (to the extent possible) and families.

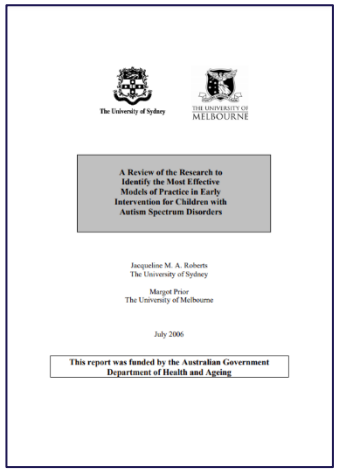
Limitations of previous reviews

1. Were not designed to be as systematic as possible (in the scientific sense)

2. A lot has changed (e.g., understanding, intervention options, evidence)







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What did we do?

Two aims of the report:

1. To provide an **overview** of (non-pharmacological) interventions that have been developed for children on the autism spectrum, and the **training pathways** in Australia for clinical practitioners who provide these interventions; and

2. To review the **scientific evidence** for the therapeutic (and other) effects of interventions for children on the autism spectrum

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Report structure

1. Introduction
2. Narrative review
3. Umbrella review
4. Appendices

Warning!

The report is long

….but for a reason!

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Who is the report for?

- Individuals on the autism spectrum and their families
- Clinicians
- Policy makers
- Researchers

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Contribution to Evidence Based Practice

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Contribution to policy

“There are many interventions available for children on the autism spectrum with no ‘one size fits all’. Learning about these interventions can sometimes be challenging for families, clinical practitioners and educators. One thing that is clear, is the role of parents and caregivers is as important as professionals when supporting their child’s development.

The Autism CRC’s research along with other evidence and research are being used to inform future NDIS operational guidelines, and increased transparency on reasonable and necessary supports. Some of the other considerations include:

- key principles for autism interventions
- standards for the delivery of autism interventions

”

Research evidence → **Evidence-based practice and policy** → **Optimal child and family outcomes**

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Reflecting on:

The context for the report

(Dr Emma Goodall)

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- Significant numbers of children diagnosed autistic, at a young age
- Early intervention thought to enable improved life outcomes
  - Medical model vs social model
- Myriad interventions offered, hard to choose
- Ethically important to research the evidence base for interventions
  - Effective?
  - What for?
  - Who for?
  - Over what time?

Narrative Review

Making sense of the range of interventions

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Narrative review

Addresses the following questions:

1. What is an appropriate method for **categorising** the broad range of interventions for children on the autism spectrum?

2. What are the **theoretical premises** underpinning different intervention categories, and the principles guiding their practical application?

3. What **clinical competencies** are typically required in the Australian context to deliver the interventions described in this report?

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First things first: Terminology

Table 3. Terms used to classify intervention activities in the current report along with an example of the classification system.

Term	Description	Examples
Category	One or more practices that share similar theoretical underpinnings.	Behavioural interventions
Practice	A combination of techniques evaluated and implemented together to target the acquisition of one or more skills.	Early Intensive Behavioural Intervention, Discrete Trial Training, the Picture Exchange Communication System
Technique	A discrete clinical strategy, targeting the acquisition of a discrete skill.	Prompting, modelling, shaping, reinforcement

Categorising interventions

The issue:

- There are numerous interventions
- There is no universal system for categorising these
- There is a great deal of overlap

The impact:

- This has created a maze for parents, practitioners, researchers, and policy makers, ultimately impacting children

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Table 2. Overview of intervention categories

Category	Proposed primary reason that the intervention may help support development of children on the autism spectrum
Behavioural interventions	Children learn new skills, mainly based on the outcomes of their behaviours as they interact with other people and the environment.
Developmental interventions	Children learn new skills through developmentally-appropriate interactions with other people and the environment.
Naturalistic developmental behavioural interventions	Children learn new skills through developmentally-appropriate interactions with other people during play and daily routines, including the outcomes of their behaviour.
Sensory-based	Learning can be enhanced by changing how children process sensory stimuli.
Technology-based	Technology use may complement the behavioural characteristics of children, thus supporting learning and participation.
Animal-assisted	Human-animal interactions may be particularly motivating and provide a context for learning and improved wellbeing.
Cognitive behaviour therapy	People can learn to identify and replace unhelpful thoughts, and their associated behaviours, leading to positive effects on emotions and behaviour.
TEACCH	Children learn new skills most effectively when learning tasks and environments are adapted to their learning characteristics.
Other	There are a variety of other interventions that do not align directly with the features of the other specific categories.

Narrative review

For each we describe:

1. Theoretical premise
2. Clinical application
3. Principles underpinning their clinical use

Clinical competencies

- It is not intuitive how clinicians get trained to deliver interventions
- This creates confusion in the community
- Making this clearer is an ethical imperative

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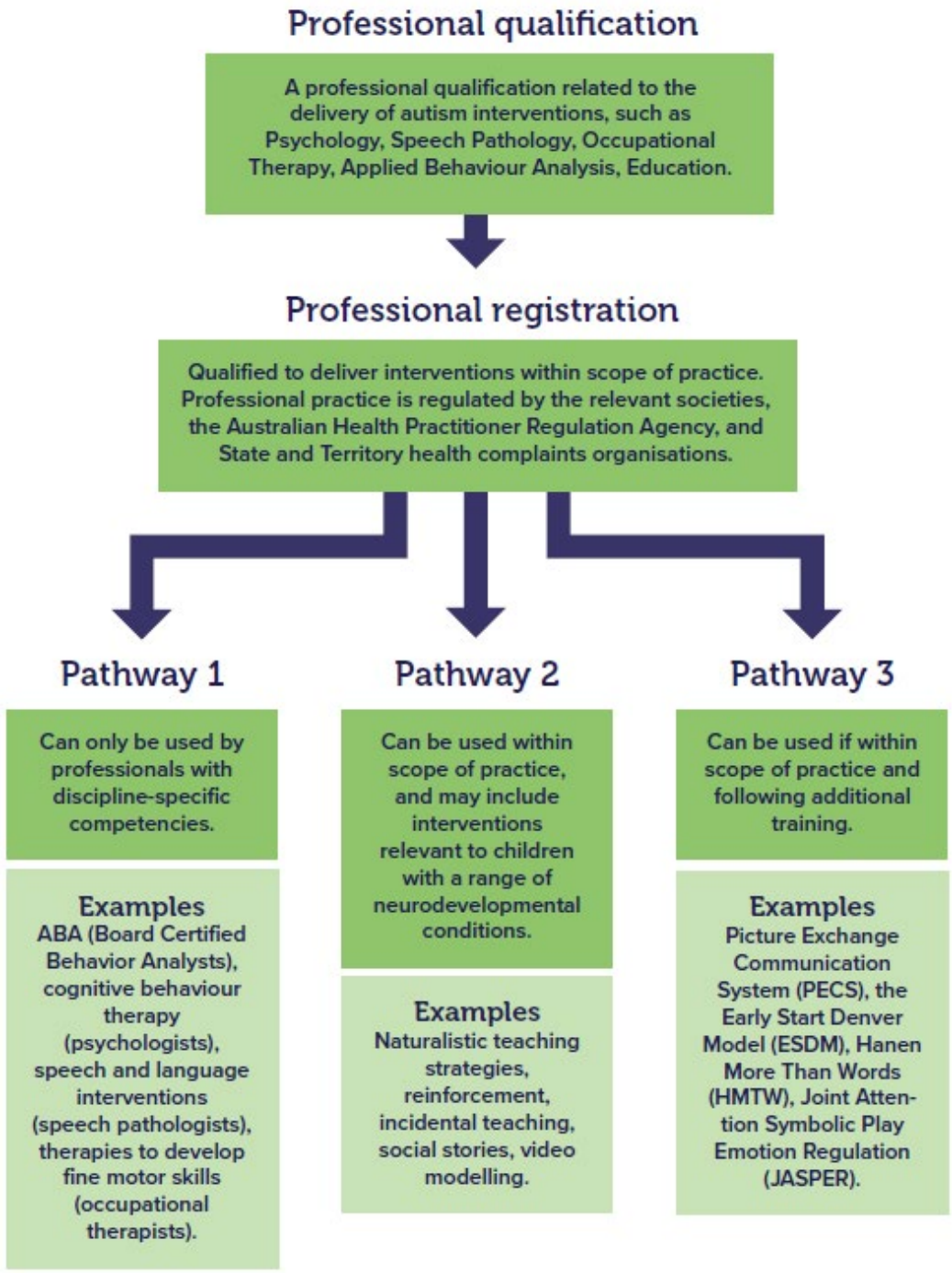
Professional training pathways typically required to deliver interventions for children on the autism spectrum in Australia.



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Reflecting on:

The range of interventions and their delivery

(Dr Emma Goodall)

- Different names for the same and for different interventions
  - what does it all mean?
- Not all interventions covered
  - Why is there so little/much research?
- Delivery styles and types;
  - individual, small group, large group, targeted, generic etc

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Umbrella Review

Making sense of the research evidence

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The context: There is rapidly growing body of research studies

Study 1

Study 2

Study 3

Study 4

Study 5

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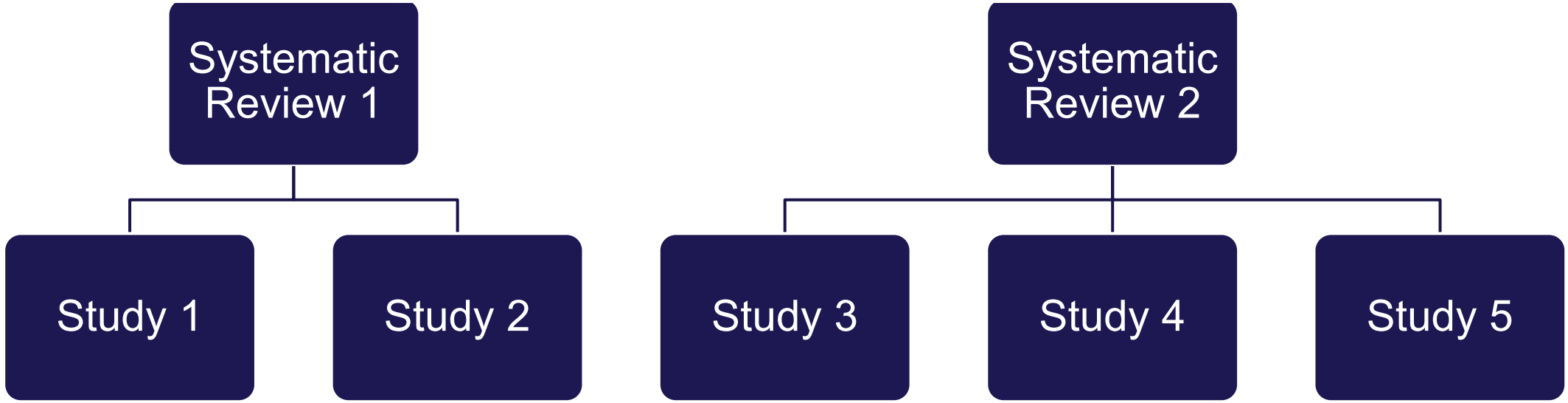
The context: And an increasing number of systematic reviews of individual studies



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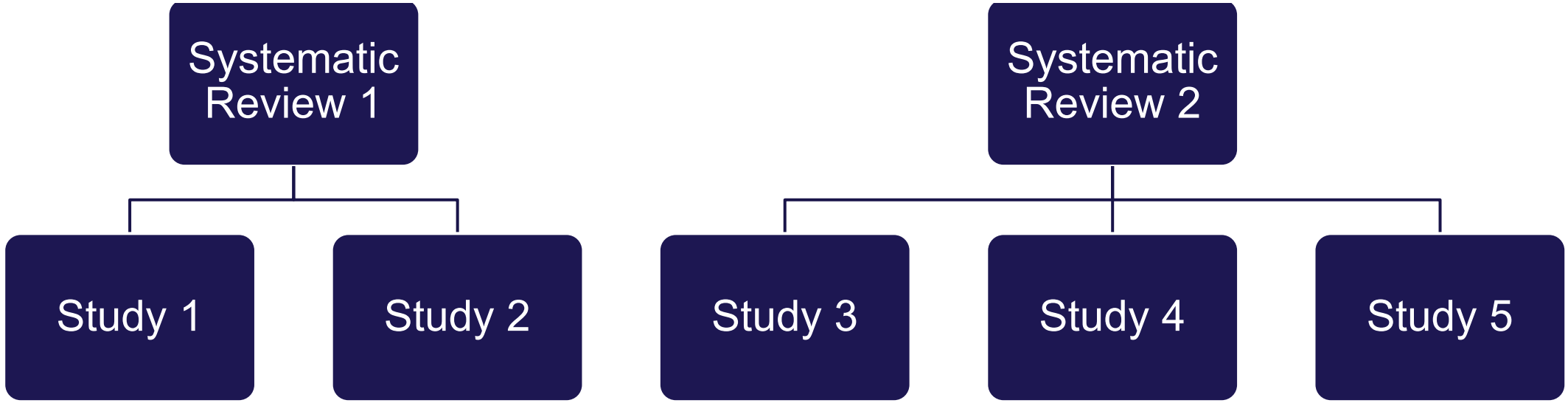
The challenge: But the systematic reviews differ in terms of focus, quality, and methods used



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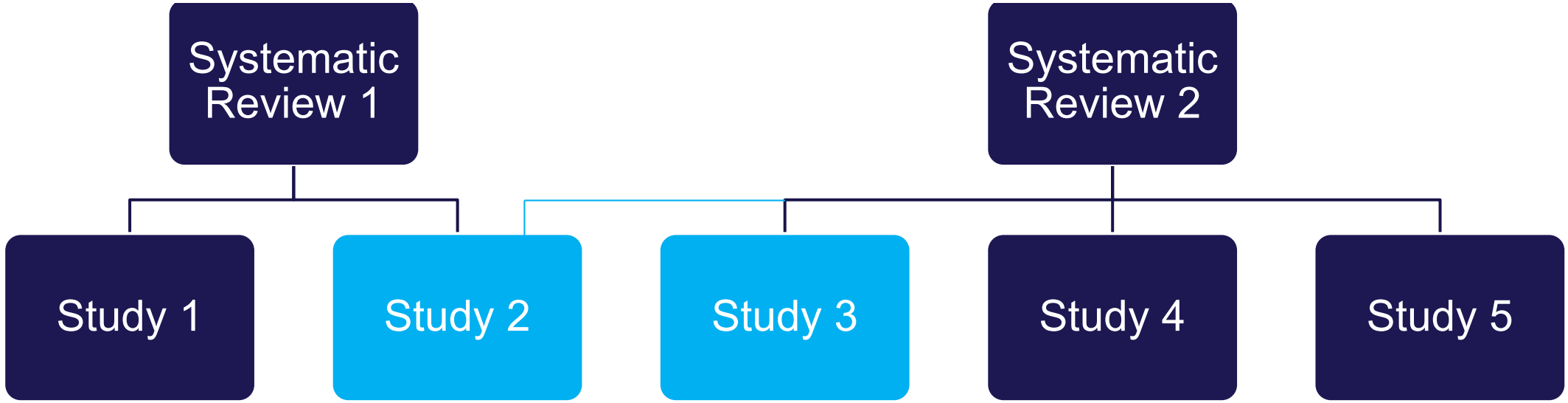
The challenge: And sometimes they overlap in terms of the studies they include



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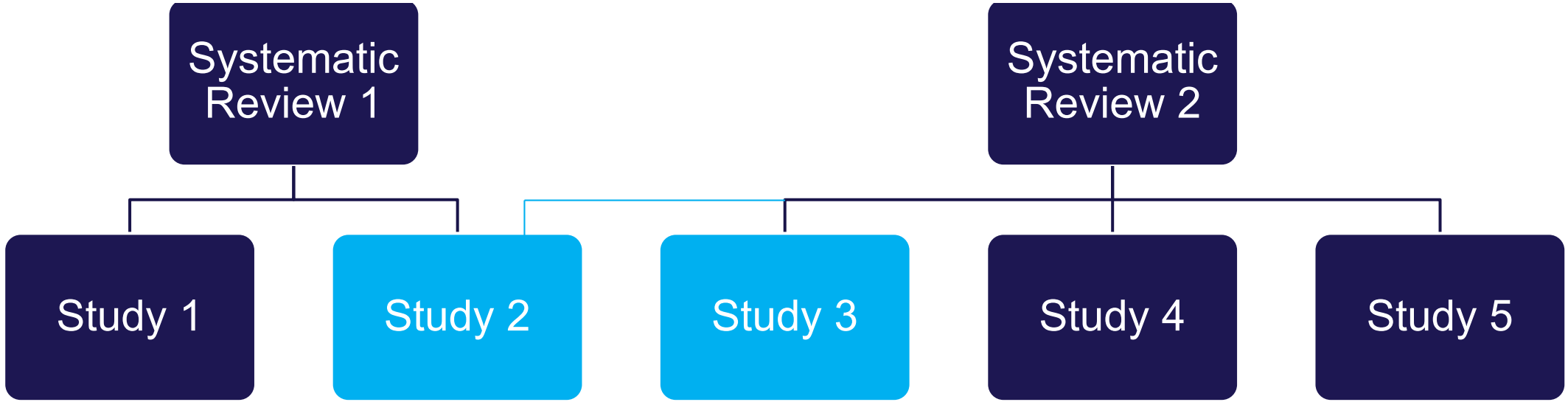
The challenge: How do we make sense of the different findings?



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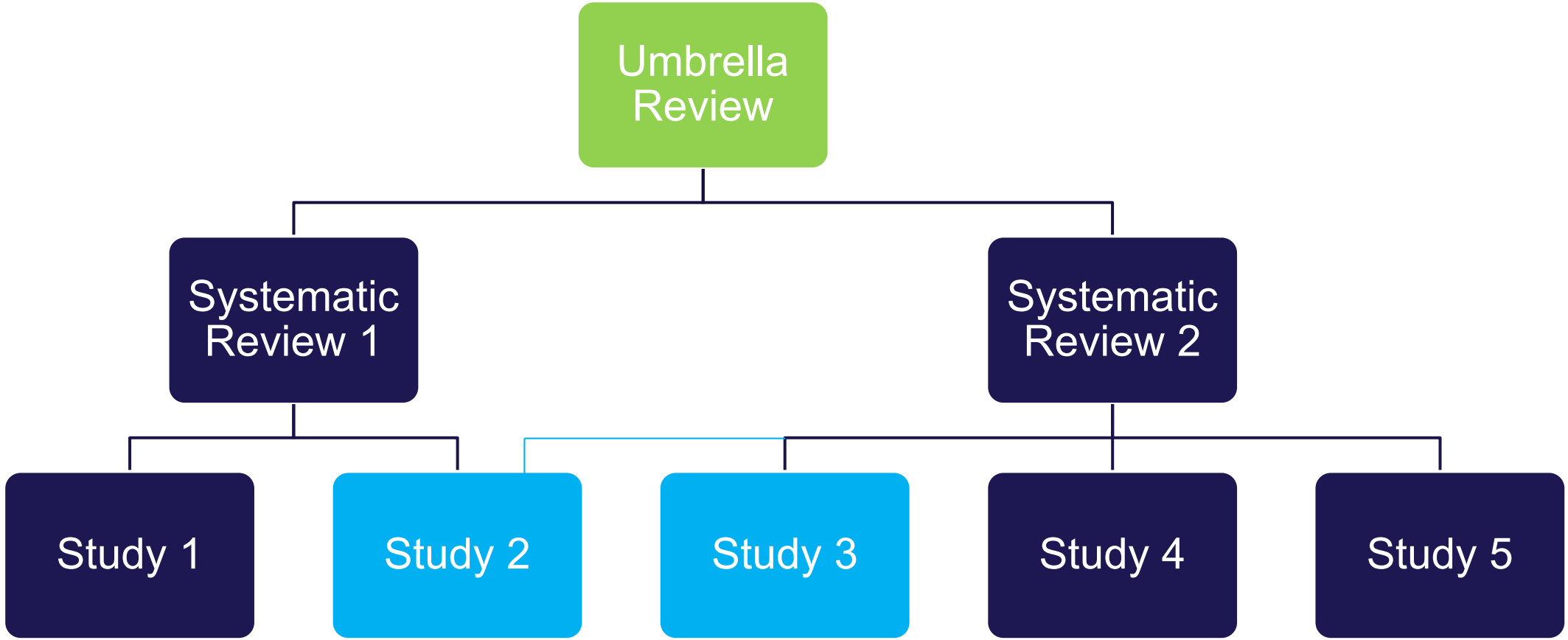
The solution: An umbrella review synthesises evidence from a range of systematic reviews



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Umbrella review

- A systematic review of systematic reviews
  - Provides a method of combining and synthesizing findings

- Particularly suited to:
  - Providing summary outcomes in a broad field of enquiry
  - Linking summary outcomes to policy

Umbrella review – research questions

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

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The process

Determine parameters of literature search → Conduct the search → Identify the relevant studies → Extract the data → Collate, combine, synthesise

Ensuring rigor and transparency

- Pre-registration on PROSPERO and Open Science Framework
- Consultation with umbrella review expert at Joanna Briggs Institute and Griffith University librarians, searching broad range of sources
- All search records independently screened and selected by two reviewers
- Independent reliability checks for 20%, and consensus checks for the remaining 80% of all data extracted
- Every review appraised for quality, every piece of data in report checked by at least two researchers, 388 pages of appendixes presenting data

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Eligibility criteria (summary, see report)

- Be a systematic review (with or without meta-analysis)
- include children on the autism spectrum aged 0-12 years
- report on at least one non-pharmacological intervention relevant to the categories described and target the acquisition or development of educational skills
- include at least one RCT, quasi-RCT, and/or controlled clinical trial
- report summarised quantitative data on the impact of the intervention on child and family outcomes of interest including any adverse effects
- be in a peer-reviewed journal or as a publicly available scientific report with a full-text copy available in the English language.

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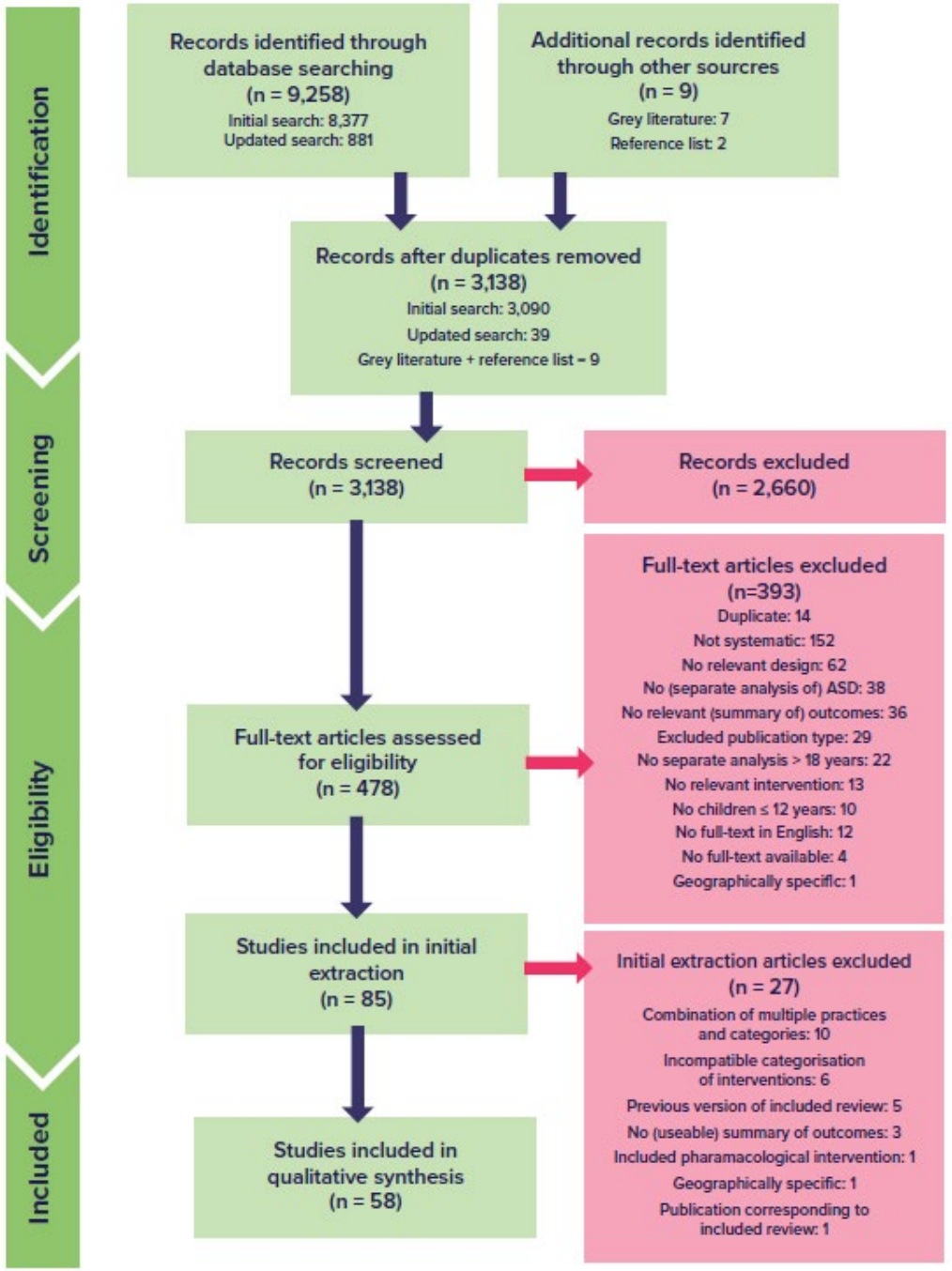
Study selection

- 9,267 records retrieved
- 3,138 records screened
- Full text review for 478 systematic reviews
- 58 systematic reviews included



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Question 1

- What non-pharmacological interventions have been examined?
  - 58 systematic review, which drew on data from 1787 articles
  - At least 111 intervention practices across 9 categories

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Umbrella review – Question 2 and 3

- What effects do non-pharmacological interventions have on child outcomes?

- What effects do non-pharmacological interventions have on parent/caregiver outcomes?

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The findings are presented in table 6 in the report

	Interventions	No. of systemic reviews	Core autism characteristics				Related skills and development									Education and participation				Family wellbeing				
			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[a]	School/ learning readiness	Academic skills	Quality of life	Community participation	Caregiver communication and interaction strategies	Caregiver social emotional wellbeing	Caregiver satisfaction	Caregiver financial wellbeing	Child satisfaction
Developmental	**Systematic reviews of assorted developmental interventions***	2		+ M			o M													+ H				
	Developmental relationship-based treatment	1													? L									
	DIR/Floortime	2		+ M			o M				o M				o L									
	Naturalistic teaching strategies	2		+ LL			+ LL			+ L	+ L	+ L	+ L	+ L		+ LL	+ L							
Naturalistic developmental behavioural interventions	**Systematic reviews of assorted NDBIs***	2	o M	+ M	o M		+ M	+ M	+ M	+ M		o M	+ M	o M										
	Early Start Denver Model	2	o M	o M	o M		+ M			+ M				o M	+ M					+ M	+ M	+ M		
	Pivotal Response Treatment	3		? L	+ L		o L	+ L					+ L		? L	+ L					? L			

Across the top are the outcomes of interest

	Interventions	No. of systemic reviews	Core autism characteristics				Related skills and development									Education and participation				Family wellbeing				
			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	Caregiver communication and interaction strategies	Caregiver social emotional wellbeing	Caregiver satisfaction	Caregiver financial wellbeing	Child satisfaction
Developmental	**Systematic reviews of assorted developmental interventions***	2		+ M			o M													+ H				
Developmental	Developmental relationship-based treatment	1													? L									
Developmental	DIR/Floortime	2		+ M			o M				o M				o L									
Developmental	Naturalistic teaching strategies	2		+ LL			+ LL			+ L	+ L	+ L	+ L	+ L		+ LL	+ L							
Naturalistic developmental behavioural intervetions	**Systematic reviews of assorted NDBIs***	2	o M	+ M	o M		+ M	+ M	+ M	+ M		o M	+ M	o M										
Naturalistic developmental behavioural intervetions	Early Start Denver Model	2	o M	o M	o M		+ M			+ M				o M	+ M					+ M	+ M	+ M		
Naturalistic developmental behavioural intervetions	Pivotal Response Treatment	3		? L	+ L		o L	+ L					+ L		? L	+ L					? L			

+ Positive therapeutic effect
? Inconsistent therapeutic effect
o Null effect
Blank cell indicates no evidence available
*Combines assorted interventions practices for this category. Please see page 79 for a full list.

L = Low quality
M = Moderate quality
H = High quality

Down the side are categories of intervention

	Interventions	No. of systemic reviews	Core autism characteristics				Related skills and development									Education and participation				Family wellbeing				
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Developmental	Naturalistic teaching strategies	2		+ LL			+ LL			+ L	+ L	+ L	+ L	+ L		+ LL	+ L							
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Naturalistic developmental behavioural intervetions	Early Start Denver Model	2	o M	o M	o M		+ M			+ M				o M	+ M					+ M	+ M	+ M		
Naturalistic developmental behavioural intervetions	Pivotal Response Treatment	3		? L	+ L		o L	+ L					+ L		? L	+ L					? L			

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Naturalistic developmental behavioural intervetions	Pivotal Response Treatment	3		? L	+ L		o L	+ L					+ L		? L	+ L					? L			

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o Null effect
Blank cell indicates no evidence available
*Combines assorted interventions practices for this category. Please see page 79 for a full list.

L = Low quality
M = Moderate quality
H = High quality

For each category, systematic reviews that combined an assortment of practices are presented first

	Interventions	No. of systemic reviews	Core autism characteristics: Overall autistic characteristics	Core autism characteristics: Social-communication	Core autism characteristics: Restricted and repetitive interests and behaviours	Core autism characteristics: Sensory behaviours	Related skills and development: Communication	Related skills and development: Expressive language	Related skills and development: Receptive language	Related skills and development: Cognition	Related skills and development: Motor	Related skills and development: Social-emotional/ challenging behaviour	Related skills and development: Play	Related skills and development: Adaptive behaviour	Related skills and development: General outcomes*	Education and participation: School/ learning readiness	Education and participation: Academic skills	Education and participation: Quality of life	Education and participation: Community participation	Family wellbeing: Caregiver communication and interaction strategies	Family wellbeing: Caregiver social emotional wellbeing	Family wellbeing: Caregiver satisfaction	Family wellbeing: Caregiver financial wellbeing	Family wellbeing: Child satisfaction
Developmental	**Systematic reviews of assorted developmental interventions***	2		+ M			o M													+ H				
	Developmental relationship-based treatment	1													? L									
	DIR/Floortime	2		+ M			o M				o M				o L									
	Naturalistic teaching strategies	2		+ LL			+ LL			+ L	+ L	+ L	+ L	+ L		+ LL	+ L							
Naturalistic developmental behavioural intervetions	**Systematic reviews of assorted NDBIs***	2	o M	+ M	o M		+ M	+ M	+ M	+ M		o M	+ M	o M										
	Early Start Denver Model	2	o M	o M	o M		+ M			+ M				o M	+ M					+ M	+ M	+ M		
	Pivotal Response Treatment	3		? L	+ L		o L	+ L					+ L		? L	+ L					? L			

+ Positive therapeutic effect
? Inconsistent therapeutic effect
o Null effect
Blank cell indicates no evidence available
*Combines assorted interventions practices for this category. Please see page 79 for a full list.

L = Low quality
M = Moderate quality
H = High quality

Followed by systematic reviews of individual practices

	Interventions	No. of systemic reviews	Core autism characteristics: Overall autistic characteristics	Core autism characteristics: Social-communication	Core autism characteristics: Restricted and repetitive interests and behaviours	Core autism characteristics: Sensory behaviours	Related skills and development: Communication	Related skills and development: Expressive language	Related skills and development: Receptive language	Related skills and development: Cognition	Related skills and development: Motor	Related skills and development: Social-emotional/ challenging behaviour	Related skills and development: Play	Related skills and development: Adaptive behaviour	Related skills and development: General outcomes*	Education and participation: School/ learning readiness	Education and participation: Academic skills	Education and participation: Quality of life	Education and participation: Community participation	Family wellbeing: Caregiver communication and interaction strategies	Family wellbeing: Caregiver social emotional wellbeing	Family wellbeing: Caregiver satisfaction	Family wellbeing: Caregiver financial wellbeing	Family wellbeing: Child satisfaction
Developmental	**Systematic reviews of assorted developmental interventions***	2		+ M			o M													+ H				
Developmental	Developmental relationship-based treatment	1													? L									
Developmental	DIR/Floortime	2		+ M			o M				o M				o L									
Developmental	Naturalistic teaching strategies	2		+ LL			+ LL			+ L	+ L	+ L	+ L	+ L		+ LL	+ L							
Naturalistic developmental behavioural intervetions	**Systematic reviews of assorted NDBIs***	2	o M	+ M	o M		+ M	+ M	+ M	+ M		o M	+ M	o M										
Naturalistic developmental behavioural intervetions	Early Start Denver Model	2	o M	o M	o M		+ M			+ M				o M	+ M					+ M	+ M	+ M		
Naturalistic developmental behavioural intervetions	Pivotal Response Treatment	3		? L	+ L		o L	+ L					+ L		? L	+ L					? L			

+ Positive therapeutic effect
? Inconsistent therapeutic effect
o Null effect
Blank cell indicates no evidence available
*Combines assorted interventions practices for this category. Please see page 79 for a full list.

L = Low quality
M = Moderate quality
H = High quality

The number of systematic reviews upon which evidence is based is indicated

	Interventions	No. of systemic reviews	Core autism characteristics: Overall autistic characteristics	Core autism characteristics: Social-communication	Core autism characteristics: Restricted and repetitive interests and behaviours	Core autism characteristics: Sensory behaviours	Related skills and development: Communication	Related skills and development: Expressive language	Related skills and development: Receptive language	Related skills and development: Cognition	Related skills and development: Motor	Related skills and development: Social-emotional/ challenging behaviour	Related skills and development: Play	Related skills and development: Adaptive behaviour	Related skills and development: General outcomes*	Education and participation: School/ learning readiness	Education and participation: Academic skills	Education and participation: Quality of life	Education and participation: Community participation	Family wellbeing: Caregiver communication and interaction strategies	Family wellbeing: Caregiver social emotional wellbeing	Family wellbeing: Caregiver satisfaction	Family wellbeing: Caregiver financial wellbeing	Family wellbeing: Child satisfaction
Developmental	**Systematic reviews of assorted developmental interventions***	2		+ M			o M													+ H				
Developmental	Developmental relationship-based treatment	1													? L									
Developmental	DIR/Floortime	2		+ M			o M				o M				o L									
Developmental	Naturalistic teaching strategies	2		+ LL			+ LL			+ L	+ L	+ L	+ L	+ L		+ LL	+ L							
Naturalistic developmental behavioural intervetions	**Systematic reviews of assorted NDBIs***	2	o M	+ M	o M		+ M	+ M	+ M	+ M		o M	+ M	o M										
Naturalistic developmental behavioural intervetions	Early Start Denver Model	2	o M	o M	o M		+ M			+ M				o M	+ M					+ M	+ M	+ M		
Naturalistic developmental behavioural intervetions	Pivotal Response Treatment	3		? L	+ L		o L	+ L					+ L		? L	+ L					? L			

+ Positive therapeutic effect
? Inconsistent therapeutic effect
o Null effect
Blank cell indicates no evidence available
*Combines assorted interventions practices for this category. Please see page 79 for a full list.

L = Low quality
M = Moderate quality
H = High quality

The effects on the outcomes of interest are indicated

	Interventions	No. of systemic reviews	Core autism characteristics				Related skills and development									Education and participation				Family wellbeing				
			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	Caregiver communication and interaction strategies	Caregiver social emotional wellbeing	Caregiver satisfaction	Caregiver financial wellbeing	Child satisfaction
Developmental	**Systematic reviews of assorted developmental interventions***	2		+ M			o M													+ H				
Developmental	Developmental relationship-based treatment	1													? L									
Developmental	DIR/Floortime	2		+ M			o M				o M				o L									
Developmental	Naturalistic teaching strategies	2		+ LL			+ LL			+ L	+ L	+ L	+ L	+ L		+ LL	+ L							
Naturalistic developmental behavioural intervetions	**Systematic reviews of assorted NDBIs***	2	o M	+ M	o M		+ M	+ M	+ M	+ M		o M	+ M	o M										
Naturalistic developmental behavioural intervetions	Early Start Denver Model	2	o M	o M	o M		+ M			+ M				o M	+ M					+ M	+ M	+ M		
Naturalistic developmental behavioural intervetions	Pivotal Response Treatment	3		? L	+ L		o L	+ L					+ L		? L	+ L					? L			

+ Positive therapeutic effect ? Inconsistent therapeutic effect o Null effect

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Blank cell indicates no evidence available

*Combines assorted interventions practices for this category. Please see page 79 for a full list.

And the quality of the systematic review is indicated

	Interventions	No. of systemic reviews	Core autism characteristics: Overall autistic characteristics	Core autism characteristics: Social-communication	Core autism characteristics: Restricted and repetitive interests and behaviours	Core autism characteristics: Sensory behaviours	Related skills and development: Communication	Related skills and development: Expressive language	Related skills and development: Receptive language	Related skills and development: Cognition	Related skills and development: Motor	Related skills and development: Social-emotional/ challenging behaviour	Related skills and development: Play	Related skills and development: Adaptive behaviour	Related skills and development: General outcomes*	Education and participation: School/ learning readiness	Education and participation: Academic skills	Education and participation: Quality of life	Education and participation: Community participation	Family wellbeing: Caregiver communication and interaction strategies	Family wellbeing: Caregiver social emotional wellbeing	Family wellbeing: Caregiver satisfaction	Family wellbeing: Caregiver financial wellbeing	Family wellbeing: Child satisfaction
Developmental	**Systematic reviews of assorted developmental interventions***	2		+ M			o M													+ H				
Developmental	Developmental relationship-based treatment	1													? L									
Developmental	DIR/Floortime	2		+ M			o M				o M				o L									
Developmental	Naturalistic teaching strategies	2		+ LL			+ LL			+ L	+ L	+ L	+ L	+ L		+ LL	+ L							
Naturalistic developmental behavioural intervetions	**Systematic reviews of assorted NDBIs***	2	o M	+ M	o M		+ M	+ M	+ M	+ M		o M	+ M	o M										
Naturalistic developmental behavioural intervetions	Early Start Denver Model	2	o M	o M	o M		+ M			+ M				o M	+ M					+ M	+ M	+ M		
Naturalistic developmental behavioural intervetions	Pivotal Response Treatment	3		? L	+ L		o L	+ L					+ L		? L	+ L					? L			

+ Positive therapeutic effect ? Inconsistent therapeutic effect o Null effect

L = Low quality M = Moderate quality H = High quality

Blank cell indicates no evidence available

*Combines assorted interventions practices for this category. Please see page 79 for a full list.

Findings in brief (see table 6 in report)

- Evidence indicated positive therapeutic effects for Behavioural interventions, Developmental interventions, NDBIs, Technology-based interventions, and CBT on a range of child and family outcomes.
- Positive effects for Sensory-based interventions were reported for certain practices only and were limited to select child and family outcomes.
- A mix of inconsistent and null intervention effects on child and family outcomes were reported for TEACCH and Animal-assisted interventions.

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Umbrella review – Question 4

What are the optimal delivery characteristics of non-pharmacological interventions, with a focus on intervention dosage, setting, format, agent, and mode?

Findings in brief (see tables 8 and 9 in report)

- Minimal data available
- Where data were available, effects were inconsistent or null, including for the amount (e.g., total hours, duration, intensity)

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Umbrella review – Question 5

- What child characteristics influence intervention effects, with a focus on child age, core autism characteristics, cognition, and communication skills?

Findings in brief (see Table 10 in report)

- Minimal data available
- Where data were available, effects were inconsistent or null

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Reflecting on:

The evidence for interventions

(Dr Emma Goodall)

- Who did the study/how was it funded?
  - Conflicts of interest
- Quality of evidence?
  - Reproducibility
  - Disclosure of unintended side effects
  - Hierarchy of research types
- Difficulty with generalising evidence for an intervention across the diversity of the autism spectrum
  - We are all so different, what works for one may not work for another

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Implications and next steps

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In a nutshell:

- What could we answer?
  - What interventions have a positive effect on which outcomes.

- What could we not answer?
  - Which interventions have a positive effect on which outcomes, for which children?

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Identified gaps

- Few studies reported on the effect of interventions on:
  - Children's education, participation, and quality of life
  - Caregiver outcomes including family well being

- There has been a lack of attention in systematic reviews to potential adverse effects

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Clinical Implications

The findings re-affirm that

- There is no single best intervention for all children on the autism spectrum.
- No intervention has been demonstrated to effectively target all child and family outcomes examined in this review, including optimised education, community participation, and quality of life.
- Interventions vary considerably in terms of the total number of child and family outcomes addressed for which they promote positive effects.
- There is a concerning lack of reporting of adverse effects in the literature to date, including null or negative findings.

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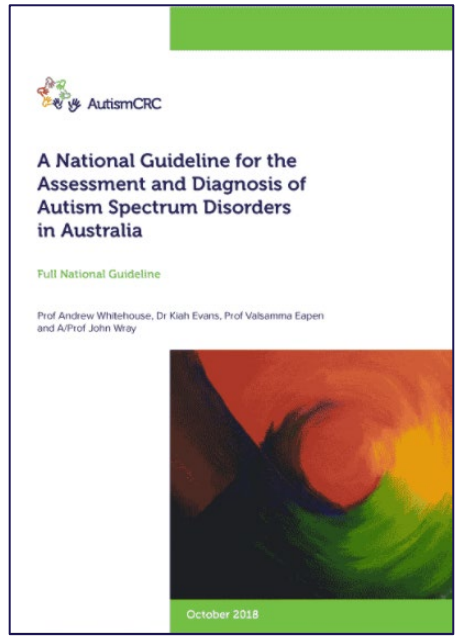
Next steps

A clinical guideline for practice, to complement the diagnostic guideline



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Reflecting on:

Implications and next steps

(Dr Emma Goodall)

- Interventions that are currently offered may not be evidence based or useful
  - Barrier to improved life outcomes
  - Waste of time/money
  - May even harm the child
- Report and tables may be hard for many to understand
  - Need an easy to read guide for families and professionals
- Lived experiences of unintended consequences of effective interventions needs researching

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Thank you!

Questions?

Report details:

https://www.autismcrc.com.au/interventions-evidence

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