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ABA Today
Expect More

Early Intensive Behavioural Intervention for Autism
Understanding What Works for Whom

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"Expect More" and Learning Objectives

"Expect More": Might specific types of early intensive behavioural intervention (EIBI) be best suited to particular children with autism?

Critical for contemporary service provision, particularly under NDIS

Collaboration between two Melbourne-based community EIBI providers

Learning Objectives:

- To appreciate the state of autism early-intervention research
- To understand the distinction between traditional evaluations of efficacy and effectiveness vs. the more nuanced investigation of moderators and mediators
- To understand similarities and differences between intervention approaches and how these may suggest greater effectiveness of some for certain children
- To appreciate how important questions can be addressed – for basic science and applied knowledge – through community-based partnership projects

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Heterogeneity in Autism

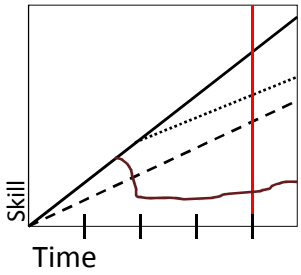
Characterised by symptoms in:

- Social & Communication Behaviour
- Behavioural Inflexibility

Mean age of diagnosis = 4y 1m (Bent et al., 2015)

Marked heterogeneity

- **In profile of specific symptoms and skills**
- **In lifespan developmental trajectories**
- **In response to intervention**



A neuro-developmental disorder; bio-medical

- Many conditions with a common behavioural phenotype

Autism as a Learning Disability (or Diff-ability)

Key assumption:

- By time of early childhood diagnosis, children with autism have reduced learning opportunities:
  - As a result of their disability, and
  - Further thwarting their developmental potential.

Early intervention can mitigate later adult disability, improving personal wellbeing and productivity, and reducing societal costs (Dawson, 2008; Reichow et al., 2012)

Programs based on ABA are efficacious for young children (Zwaigenbaum et al., 2015):

- Improving cognitive, adaptive, and social-communication outcomes
- E.g., **Comprehensive ABA** (ABA Leaf & McEachin, 1999; Lovaas, 1981), and

  Early Start Denver Model (ESDM; Dawson et al., 2010; Rogers & Dawson, 2010)

Two Approaches Founded in ABA

Comprehensive Applied Behaviour Analysis (ABA; Leaf & McEachin, 1999; Lovaas, 1981)

Early Start Denver Model (ESDM; Dawson et al., 2010; Rogers & Dawson, 2010)

Similarities:

- Both based on the UCLA/Lovaas model
- Both designed to achieve positive outcomes for children with autism
- Both comprehensive intervention approaches, that employ well trained therapists
- Importantly, both manualized approaches
  - With regular data collection on progress
- Both evaluated as efficacious in experimental and quasi-experimental studies
  - No evidence of superiority of one over the other approach

Two Approaches Founded in ABA

Comprehensive Applied Behaviour Analysis (ABA; Leaf & McEachin, 1999; Lovaas, 1981)

Early Start Denver Model (ESDM; Dawson et al., 2010; Rogers & Dawson, 2010)

Different theoretical bases and accompanying treatment techniques

- **Comprehensive ABA delivery**:
  - Highly structured (as needed)
  - Focus on learning across a range of developmental domains
  - Use of discrete trial teaching with early learners
  - Use of reinforcement strategies
  - Long history within Australian early educational settings
- **ESDM naturalistic and play-based**:
  - Developmentally appropriate for 1-5-yr-olds
  - Teaches foundational skills for social-cognitive development (e.g., joint attention, imitation)
  - Assumes intensive participation in socially rewarding experience builds social attunement, increasing natural learning opportunities
  - MD team to address various challenges, including focus on affect, attention and arousal

Two Approaches Founded in ABA

Comprehensive ABA and **Early Start Denver Model**

Strong evidence base for positive outcomes from both approaches

- But important individual differences in response to both programs

Smith & Iadarola, 2015; Trembath & Vivanti, 2014

Vivanti, Prior, Williams, & Dissanayake, 2014

Suggests individual children may be more responsive to one vs. other approach

A Brief Aside: Current State of Autism Intervention Research

Most research contrasts particular intervention vs. 'treatment as usual'(TAU)

- Few studies contrast different evidence-based approaches
- Interpretation complicated by a climate of improving TAU

Most research focuses on whether a particular intervention works *in general*

- Limited investigation of factors associated with *individual* response

- Existing studies find:
  - Initial non-verbal ability = a good *prognostic* indicator
  - Other standardised measures fairly unhelpful
    - Child age, autism symptoms, verbal ability, family SES, etc.

(Hudry et al., in prep; Zwaigenbaum et al., 2015)

A Brief Aside:
A Framework for Evaluating Autism Interventions

Varying levels of analysis:

- Intention to Treat (ITT) analysis: ***Does it work*** *(on average)?*
  - Non-significant ITT effect can hides substantial *variability* in outcomes
  - Non-significant ITT effect does not mean the *active ingredients* are incorrect
- Mediation Analysis: ***How*** does it work?
- Moderator Analysis: ***For whom*** does treatment work?

Promising overall impact of EIBIs shadowed by lack of knowledge about **"what works for whom"** (Stahmer, Schreibman, & Cunningham, 2011)

- Also Cost-Benefit Analysis: What is ***the cost*** of ***xxx*** amount of improvement?

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The Current Study – Aim and Hypotheses

Aim:

To characterize children who respond better and more poorly to two well-established early-intervention programs for pre-schoolers with autism.

Hypotheses:

1. Children will make gains following one year of Comprehensive ABA or ESDM
2. Non-verbal ability will predict better outcomes within *either* intervention program
3. Other learning skills will serve as good *predictors* of response to each approach
   - i.e., differentiating individual children who respond well to ABA *or* ESDM

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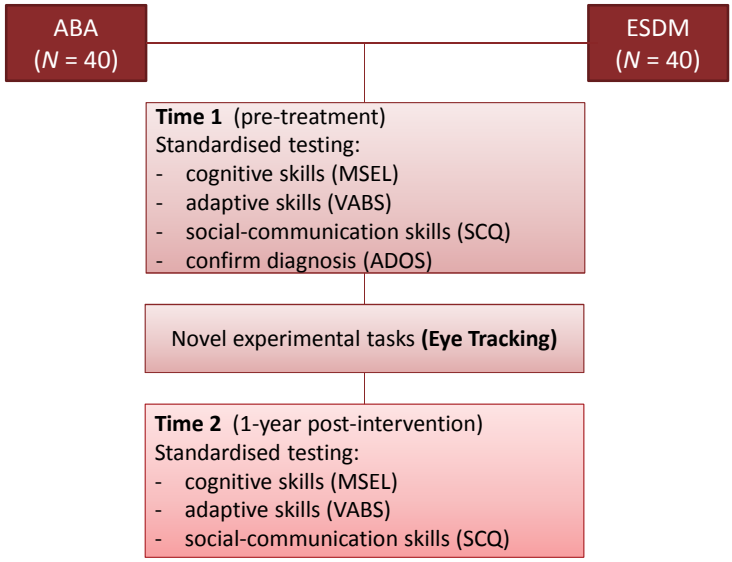
Study Design and Procedures



Participants – Target Sample

- 80 toddlers and preschool aged children (2- to 4-years) with ASD
  - Diagnoses confirmed using the ADOS (Lord et al., 2000)

ESDM Group: Children receiving group-based ESDM

- Victorian Autism Specific Early Learning and Care Centre (ASELCC), La Trobe Univ.

ABA Group: Children receiving comprehensive ABA

- Autism Partnership's "Little Learners" or "Little School"

The ESDM and ABA groups will have comparable:

- chronological age (2-to-4-years),
- cognitive level and autism symptom severity
- duration and intensity of intervention

Sample Characterisation Measures

- **Family Characteristics:**
  - Parental education level, income, ethnicity
  - Controlled for in analyses (if appropriate)

- **Sustained Shared Thinking and Emotional Well-being Scale:**

  (SSTEW; Sirag, Kingston & Melhuish, 2015)

  - Measure of learning environment across the intervention sites
  - Considers practices that support developing skills in all young children
  - To establish equivalence in quality of the learning environment (aside from specific intervention type) in the ABA and ESDM settings:
    - Administered by independent researcher, blind to study aims/hypotheses

Novel Experimental Learning Battery (Eye Tracking Tasks)

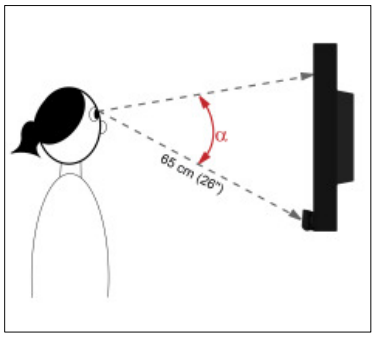
- Novel measures developed by the research team to define child learning profiles
- Developed based on the neuropsychology of learning (Johnson, 2005; Kuhl, 2007)
- Different tasks targeting social and non-social learning processes
  - Important given relevance of social learning difficulties to autism

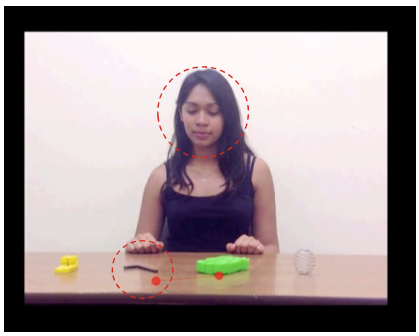
Advantages of eye-tracking over traditional standardised testing:

- No need for verbal instruction understanding, prior knowledge, or test-taking ability
- Measures are designed to be “culturally-fair”

Eye Tracking

- Tobii X2-60 Eye Tracker
- Participant observes stimuli on computer monitor
- Infrared light cameras measures visual attention and gaze patterns



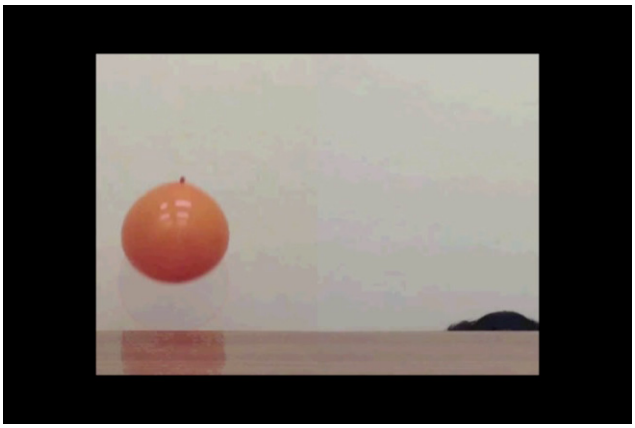


Verbal Labelling

- Videos show an actor pointing to a series of novel objects and labelling one object.
- Measures preferential gaze to the labelled target.

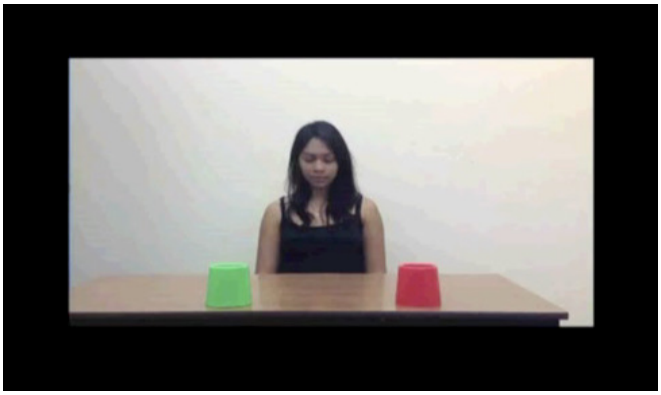
Social Attention

- Measures differential attention to social vs. non-social stimuli.



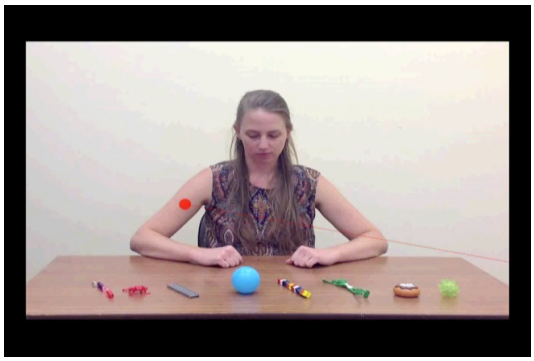
Response to Joint Attention

- Ability to follow someone else's' gaze towards an object of interest.
- Measures the proportion of looks to congruent vs. incongruent object.



Social Imitation

- Ability to imitate and learn from others'.
- Videos show playful vs. non-playful (neutral) examiners demonstrating arbitrary actions on objects.

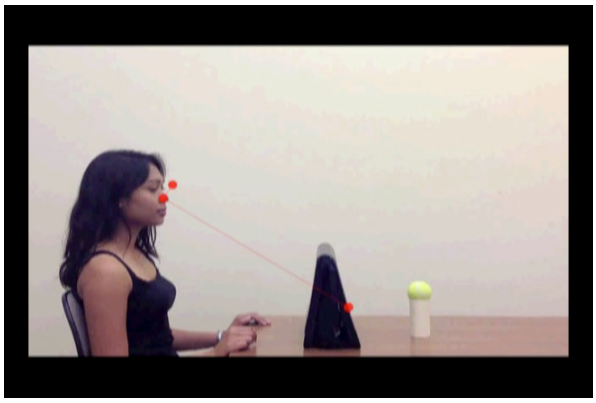


Goal-Directed Imitation

- Ability to recognise and reproduce the purpose of an observed action.
- Selectively imitate goal-directed actions and ignore irrelevant actions.

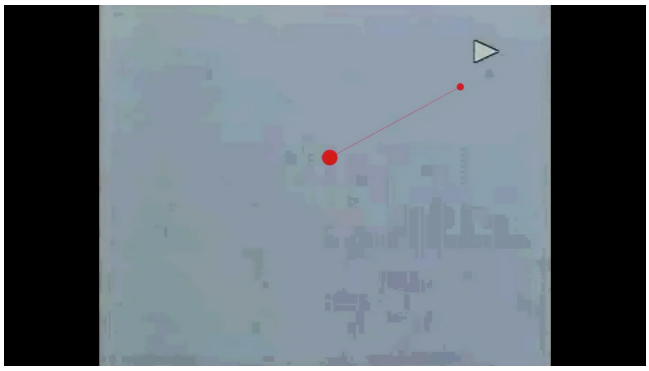
Understanding Motor Intentions

- Videos show an actor performing a series of goal-directed actions.
- Measure proactive gaze to the target of her actions.



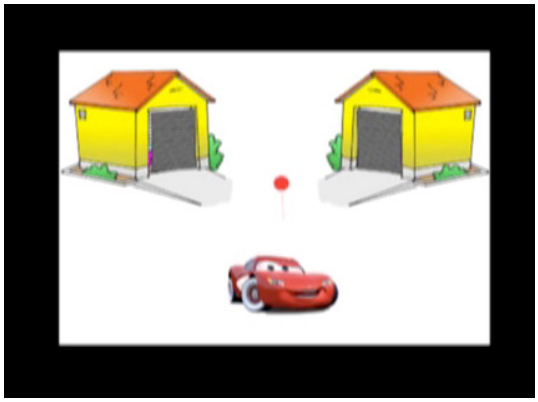
Sustained Attention

- Ability to direct and focus cognitive resources on a specific stimulus over time
- Eye-tracking task measures the duration of sustained attention to stimuli



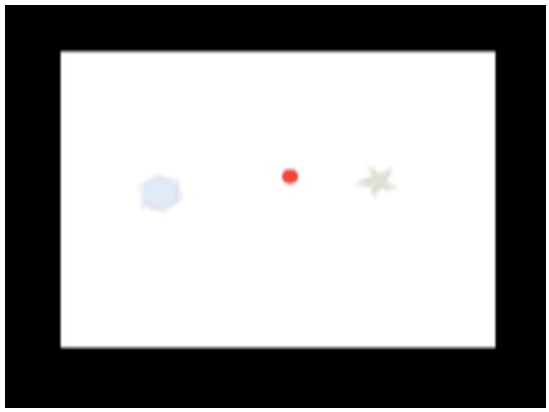
Working Memory

- Temporary storage and retrieval of relevant information – critical for learning
- Visual search task: ability to look for hidden objects previously seen



Habituation

- Ability to recognise novel (vs. repeating) stimuli.
- Measures the amount of trials before attention to unchanged stimulus decreases



Anticipated Outcomes

For **Developmental Science**:

- A better understanding of learning in autism (profiles of learning in the autisms)
  - Prognostic indicators of natural change vs. predictors of response to targeted change in environment (i.e., intervention/education)

For **Families**:

- Substantial prevalence and life-long support costs – to families and society
- NDIS Early Childhood Early Intervention (ECEI) Approach (Report 26th Feb 2016):
  - Supporting access to ECEI that is evidence-based and offers choice and control
  - Choice currently linked to proximity, anecdotal reports, persuasive marketing

To allow informed decision-making – for individual children – so that money, time and energy invested in intervention maximises child outcomes

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Thank you

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