Early dyadic intervention in Autism Spectrum Disorder

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A transactional account of autism development

Autism as individual difference within neurodiversity

- Difficulties in social communication and interaction
- Repetitive patterns of behaviour, interests, activities

ASD development (like all development) happens in transaction with the environment

Differential susceptibility to impaired social relatedness in development

- Symptom trajectories secondary to this ….

Mixed vulnerabilities and strengths – but significant, lifelong impact

- The ‘economic cost’ of autism (UK £32 billion annually) is linked to this social impairment

Intervention understood in this context…..
Parent-mediated transactional intervention within a developmental context

Prodromal period – iBASIS

Post Diagnostic pre-school and early school years – PACT
The beginnings of autism

Discovery of early biomarkers

- BASIS
  British Autism Study of Infant Siblings (n>200)

- 8 months
- 14 months
- 24 months
- 36 months

Autism
The beginnings of autism

Discovery of early biomarkers

Neural sensitivity (ERP) to gaze

BASIS
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8 months

Predict autism emergence at 3yrs

14 months

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Parent-infant interaction

Predict autism emergence at 3yrs

Autism
Parent-infant interaction in prodromal autism

- 6-min parent-infant free floor play videotaped in lab
- *Manchester Assessment of Caregiver-Infant Interaction* (MACI; Wan et al., 2012, 2013)
- Global rating (1-7) scales, blind-rated, independently validated on HR and LR samples

5 MACI scales of interest

- Nondirectiveness
- Sensitive responsiveness
- Mutuality
- Attentiveness to parent
- Affect
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Distinguishes HR from TD at 7 & 14 mos
Parent-infant interaction

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- **Nondirectiveness**
  - Distinguishes HR from TD at 7 & 14 mos
- **Sensitive responsiveness**
  - Associated with infant visual ERP atypicality
- **Mutuality**
- **Attentiveness to parent**
- **Affect**

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Distinguishes HR from TD at 7 & 14 mos

At 13 months, predicts ASD at 3 years
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Attention disengagement

Parent-infant interaction

Atypical behaviour

8 months

Predict autism emergence at 3yrs

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Autism
Theory

- Interactive specialisation of the ‘social brain’ and social functioning experience dependent

- Many hours of caregiver-infant interaction in the first year
  - fine tuning of perceptual systems, joint attention, intentional communication, social imitation

- Alterations of early interaction related to atypical infant developmental biases
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• Alterations of early interaction related to atypical infant developmental biases  *Wan et al 2012, 2013*

• ……may act to reduce learning opportunities and amplify an initially disordered developmental trajectory at a behavioural and neural level

• Modification of this social environment as a prodromal intervention
The beginnings of autism

BASIS
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Neural sensitivity (ERP) to gaze

Attention disengagement

Parent-infant interaction

Atypical behaviour

Prodromal Intervention
iBASIS 9-14 months

8 months

14 months

24 months

36 months

Autism
The beginnings of autism

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Risk biomarker proximal outcomes

Atypical behaviour

Prodromal Intervention
iBASIS 9-14 months

Downstream symptoms/’behavioural phenotype’ outcome

Autism

8 months

14 months

24 months

36 months
Parent and therapist interaction changes parent behaviour

Changed parental behaviour leads to improved child dyadic communication

Improved child dyadic communication generalises to other contexts

Parent-mediated intervention

Intervention delivered with parents to enhance social development in the neurologically-vulnerable child
What is special about parent-mediated intervention?

- Natural environment of family
  - Context for social development
  - Transactional account of known developmental processes
  - Does not imply primary relational/attachment problems
- Parental empowerment, confidence, family function
- Efficient of professional time
- Potential 24/7 therapeutic effect extending beyond treatment end
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• To do this the intervention aims to make focused, reproducible impacts on targeted parental interactions using video feedback
  – More than education or coaching
  – Known to be very effective for observation, reflection and adult learning
Chain of effect:

Parent change

leads to

Child interaction change with parent

leads to

Improved child interaction with others – symptom reduction
**Process**

- Key *mechanism of therapy process* is episodes of video-feedback with parent
  - (no direct work with child)

- Clinic/home sessions -
  - Review of progress since last time
  - Video of naturalistic play
  - Video-viewing and feedback session focused according to programme stage
  - Home-practice preparation and written summary
Infancy intervention – ‘iBASIS-VIPP’

- Home based, manualised
- 12 sessions over 5 months (9-14 months)
- Daily practice plans for parents

**Sequential themes**
  - ‘Infant watching’
  - ‘Speaking for the baby’ – *inferring intentionality*
  - Generalising to mealtime and other activities
  - Sharing feelings – *affect matching*
  - ‘Sharing talk’ – *promoting communication*

**Adapting to ‘atypicality’:**
- Inflexible attentional style, face preference and visual face processing, affect matching and reciprocity, reactivity, atypical sensory behaviours, social babble/early communication
iBASIS Intervention RCT N=54, 9-14 months

Parent-mediated intervention versus no intervention for infants at high risk of autism: a parallel, single-blind, randomised trial

Jonathan Green, Tony Charman, Andrew Pickles, Ming W Wan, Mayada Elsabbagh, Vicky Slonims, Carol Taylor, Janet McNally, Rhonda Booth, Teodora Gliga, Emily J H Jones, Clare Harrop, Rachael Bedford, Mark H Johnson, and the BASIS team*

Lancet Psychiatry 2015; 2: 133–40

Randomised trial of a parent-mediated intervention for infants at high risk for autism: longitudinal outcomes to age 3 years

J. Green,1,2 A. Pickles,3,4 G. Pasco,3,5 R. Bedford,3 M.V. Wan,6 M. Elsabbagh,5,7 V. Slonims,8 T. Gliga,5 E.J.H. Jones,5 © C.H.M. Cheung,5 T. Charman,3 M.H. Johnson,5 and The British Autism Study of Infant Siblings (BASIS) Team*
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Parental ‘non-directive’ and ‘synchronous’ interaction with infant

![Graph showing the effect of therapy on caregiver non-directive and synchronous behavior over time. The graph includes a line for MACI non-directive and DCMA synchronous, with error bars indicating variability. The area under the graph where the p-value is .014 is highlighted.]
Child ‘attentiveness’ and ‘communication initiation’ to parent

(C)

Child Attentiveness

and Initiations

effect size difference

Area $p = .015$

months from start of therapy

therapy

<MACI attentiveness>  
<DCMA initiation>

Control

iBASIS-VIPP
Child autism symptoms

![Graph showing autism symptomatology effect size difference over months from start of therapy.](image)

- **AOSI** (Assessment of Social Inclusion)
- **ADOS** (Autism Diagnostic Observation Schedule)

**Area p = .030**

**Therapy**

- **Control** (dashed line)
- **iBASIS-VIPP** (solid line)
• Numbers too small to be informative on ASD diagnostic outcome
• No change in ‘structural language’ - but improved social use of language
• No change in other developmental indices
• Replication in Australia
Post-diagnostic intervention

PACT
Pre-school Autism Communication Trial
Theoretical base

- **Atypical communication in autism**
  - Reduced shared attention and mutuality
  - Child communicative signals weak or infrequent

- **Imbalanced Parent-Child interaction**
  - Parent perplexity
  - Reduced ‘meshing’ - ‘asynchrony’
  - ‘Fill in the gaps’ or withdraw
  - Increase adult initiations/non-reciprocal interactions
  - Reduced child opportunities for communication learning, relating

- **But positively** –
  - Altering transaction by attending to communication acts increases them
  - Expansion from child’s base (‘semantic contingency’) increases communication
  - Children with autism need a high dose of this

- **Developmental hierarchy** - of pre-cursor skills for communication
13 month intervention

Initial 6 months – Biweekly clinic visits (3 hrs) + home work (30 mins/day) – viz 2hrs/wk

Next 6 months – Consolidation – Monthly clinic visits + homework (30 mins/day) and generalisation

18 sessions possible (median 16 (IQR 13-17) attended in PACT)
Random allocation

TAU
N=75

PACT
N=77

13 months later

82 months later

Parent synchrony
Child communication
Autism Symptoms
Child Language

Core autism

- Age average 45 months
- 79% learning difficulties
- Language ability ~18 month level
- 23% phrase speech

Parent synchrony
Child communication
Autism Symptoms
Child language
Social functioning

80% FU
Parent-mediated communication-focused treatment in children with autism (PACT): a randomised controlled trial

Jonathan Green, Tony Charman, Helen McConachie, Catherine Aldred, Vicky Slonims, Pat Howlin, Ann Le Couteur, Kathy Leadbetter, Kristelle Hudry, Sarah Byford, Barbara Barrett, Kathryn Temple, Wendy Macdonald, Andrew Pickles, and the PACT Consortium

The Lancet (2010), 375, 9732; 2152-2160

Parent-mediated social communication therapy for young children with autism (PACT): long-term follow-up of a randomised controlled trial

Andrew Pickles, Ann Le Couteur, Kathy Leadbetter, Erica Salomone, Rachel Cole-Fletcher, Hannah Tobin, Isabel Gammer, Jessica Lowry, George Vamvakas, Sarah Byford, Catherine Aldred, Vicky Slonims, Helen McConachie, Patricia Howlin, Jeremy R Parr, Tony Charman, Jonathan Green

The Lancet (2016); 388: 2501-2509
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Improved child interaction with others – symptom reduction
Effect of therapy on targeted parent behaviour

PACT group

Treatment as usual group

Better ➔

Parent acts: proportion synchronous

Treatment trial period: baseline to endpoint

Followed from endpoint to follow-up

Baseline to treatment end

Follow-up

Months from therapy start
Effect of therapy on targeted child behaviour with parent

Increase in child social communication with parent persisted

Treatment trial period baseline to treatment end

Followed from endpoint to follow-up

Months from therapy start

Better ➔
The time path of autism symptom severity

**ADOS CSS**

- **Treatment as usual**
- **PACT**

Change in proportion (%) with severe symptoms

Better ➔

Parent *and teacher* outcome ratings support the blinded findings

No change in structural language but improved pragmatics
The time path of autism symptom severity

Relative to baseline

ADOS CSS

- Treatment as usual
- PACT

months from therapy start

Better ➔

baseline  endpoint

follow-up

Log-odds effect size

< AOSI >

< ADOS >

Effect size difference

Area p = .030

months from start of therapy

Autism symptomatology
Mediation analysis confirms theory and implementation (Pickles et al 2016)

Treatment effect on parental synchrony 70% mediates child communication change

Child communication change 97% mediates treatment effect on autism SC symptoms
Summary

Targeted alteration in dyadic social transaction in early autism reduces autism symptom severity in both social and repetitive behaviour domains.

Sustained effect after treatment end (2 and 6 years) suggests embedded change (mediated in PACT by parental responsiveness).

ADOS change reflects generalisation beyond the dyad.

Results support a transactional model of social development in autism.

Efficient early support for family resilience and management in an enduring condition.
Dissemination and ongoing work

**UK NIHR ‘Signal’ study** for high quality design and relevance to decision makers

**NICE Clinical Guideline 170 (2013)**

**UK 'Improving Access to Psychological Treatment' (IAPT) curriculum for Autism**

**Dissemination:** **IMPACT CiC** - Training in 10 countries

Generalisation to School

Adaption and scale up in India
Jonathan Green, Ming Wai Wan, Samina Holsgrove, Janet McNally, Clare Harrop, Carol Taylor, Hannah Venton-Platz, Ami Brooks

Mark Johnson, Mayada Elsabbagh, Emily Jones, Teea Gliga, Helen Maris, Helen Ribeiro, Kim Davies, Jeanne Guiraud, Janice Fernandes, Leslie Tucker

Vicky Slonims, Rhonda Booth

Andrew Pickles, Tony Charman, Greg Pasco, Rachael Bedford

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PACT Collaborating Team

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Thank you!

More Information (papers, videos, blogs, interviews, media):

Search ‘iBASIS’ or ‘PACT 7-11’, Manchester

Training in PACT -  
http://research.bmh.manchester.ac.uk/pact/TrainingPACT/

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