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The evidence-base for ABA and other psychosocial interventions

Bethesda, MD

Friday 23rd October 2009

Professor Tony Charman
Chair in Autism Education

Centre for Research in Autism and Education
http://www.ioe.ac.uk/crae/

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Conflict of interest statement

- **Funding by government agencies**
  - Medical Research Council; Department for Children Schools and Families
- **Funding by charities**
  - Autism Speaks (USA); Autism Speaks (UK); Clothworkers' Foundation; Pears Foundation; Kirby Laing Foundation
- **No financial interests to declare**

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Applied Behavior Analysis (ABA) or Early Intensive Behavioral Intervention (EIBI)

- **Includes Lovaas approach to discrete trial teaching**
  - Break skills into discrete steps; use behavioral techniques to build new repertoires and reduce interfering behavior
- **Usually intensive; at least 20 hours often 30+ hours**
- **Usually commenced in preschool years (often at home)**
- **Follows developmental sequences**
- **Covers all skill domains**
- **Parents as co-therapists**
- **Modern approaches incorporate other elements**
  - TEACCH; PECS; verbal behavior; pivotal response approaches etc.

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ABA/EIBI the evidence-base

- **The most studied intervention**
- **100s if not 1000s of single case or case series reports**
- **10 to 12 case-controlled or randomised controlled trials (only 2 of the latter)**
  - Randomisation is the best protection against bias
  - Number of case-controlled ('quasi-experimental') studies depends on inclusion/exclusion criteria applied
- **Note: ABA/EIBI is not specifically a treatment approach developed for children with autism per se**
  - Rather it is an approach that uses well-grounded psychological principles that has been employed with children with autism

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Several recent reviews of ABA/EIBI

Journal of Clinical Child & Adolescent Psychology, *37*(1), 8–38, 2008

Evidence-Based Comprehensive Treatments for Early Autism

Sally J. Rogers and Laurie A. Vismara
M.I.N.D. Institute, University of California Davis

Journal of Clinical Child & Adolescent Psychology, *38*(3), 439–450, 2009

ISSN: 1537-4416 print/1537-4424 online
DOI: 10.1080/15374410902851739
Routledge Taylor & Francis Group

Meta-Analysis of Early Intensive Behavioral Intervention for Children With Autism

Sigmund Eldevik
School of Psychology, Bangor University; Faculty of Behavioral Science, Akershus University College; and Highfield Centre
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School of Psychology, Bangor University
Erik Jahr
Akershus University Hospital
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VOLUME 114, NUMBER 1: 23–41 | JANUARY 2009 AJIDD

Systematic Review of Early Intensive Behavioral Interventions for Children With Autism

Patricia Howlin and Iliana Magiati
Institute of Psychiatry, King's College (London, UK)
Tony Charman
University College, London, Institute of Child Health

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PLoS one

Behavioural and Developmental Interventions for Autism Spectrum Disorder: A Clinical Systematic Review

Maria B. Ospina[1], Jennifer Krebs Seida[1], Brenda Clark[2], Mohammad Karkhaneh[1], Lisa Hartling[1], Lisa Tjosvold[1], Ben Vandermeer[1], Veronica Smith[3]*
PLoS ONE 3(11): e3755.

(J Pediatr 2009;154:338-44)

Efficacy of Applied Behavioral Intervention in Preschool Children with Autism for Improving Cognitive, Language, and Adaptive Behavior: A Systematic Review and Meta-analysis

MICHÉLE SPRECKLEY, MCSP, AND ROSLYN BOYD, PHD, MSC (PHYSIOTHERAPY)

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Mixed conclusions…

Journal of Clinical Child & Adolescent Psychology, 37(1), 8–38, 2008

Evidence-Based Comprehensive Treatments for Early Autism

Sally J. Rogers and Laurie A. Vismara
M.I.N.D. Institute, University of California Davis

In closing, early intervention for children with autism is currently a politically and scientifically complex topic. Positive effects of early intervention programs have been demonstrated in both short-term and long-term studies, but initial reports of dramatic changes and excellent outcomes in a large minority of children receiving a specific treatment have been reported in few studies thus far.

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Mixed conclusions…

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dence that initial IQ (but not age) was related to progress. This review provides evidence for the effectiveness of EIBI for some, but not all, preschool children with autism.

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Mixed conclusions…

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PLoS one

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PLoS ONE 3(11): e3755.

Conclusions: While this review suggests that Lovaas may improve some core symptoms of ASD compared to special education, these findings are based on pooling of a few, methodologically weak studies with few participants and relatively short-term follow-up. As no definitive behavioural or developmental intervention improves all symptoms for all individuals with ASD, it is recommended that clinical management be guided by individual needs and availability of resources.

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Mixed conclusions…

(J Pediatr 2009;154:338-44)

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Conclusions Currently there is inadequate evidence that ABI has better outcomes than standard care for children with autism. Appropriately powered clinical trials with broader outcomes are required. *(J Pediatr 2009;154:338-44)*

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Mixed conclusions…

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These effect sizes are generally considered to be large and moderate, respectively. Our results support the clinical implication that at present, and in the absence of other interventions with established efficacy, Early Intensive Behavioral Intervention should be an intervention of choice for children with autism.

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How can the conclusions of systematic reviews/meta-analyses be so variable?

- **Broadly the same search strategies**
- **Different criterion for inclusion/exclusion**
  - Notably Reichow & Wolery (2009) and Eldevik et al (2009) included non RCTs in 'meta-analysis'
- **Different metrics of effect (size)**
- **Different breadth of studies included**
  - Some focus on ABA only; others on all psychosocial/ psychoeducational interventions
- **The threshold that is set determines conclusions drawn**
  - In common with other developmental disabilities insufficient RCTs

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Other important factors that vary between studies

- **What the comparison group receives**
  - Type, amount, delivery, length
- **How the implementation (fidelity) in both groups is monitored**
- **What the outcome measures are**
- **How the outcome measures are reported**
- **What analysis is conducted**
- **Variable focus on group vs. inidividual child outcomes**

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The most common outcome measures – in descending (and historical) order of frequency

- **IQ**
- **Adaptive behaviour**
- **School placement**
- **Language and communication abilities**
- **Autism severity measures**
  - Remember...behavioral techniques themselves do not target core autism symptoms but can act as one framework for doing so…
  - Though they can be incorporated into programs that do; such as Sally Rogers' Early Start Denver Model; Pivotal Response Training

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What are to conclude from all of this?

- **ABA/EIBI approaches are based on a sound psychological evidence-based approach**
- **In most but not all studies ABA/EIBI does produce (at a group level) positive outcomes for children with autism**
- **However, at the level of the individual child in every study some children make substantial progress; other less so; others make little progress at all**
- **Claims that ABA/EIBI should be recommended for all children with autism go beyond the evidence**
  - This remains a clinical decision based on the needs of the child and the most suitable approach *for that child*

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Some of the many unanswered questions

- **For which children is ABA/EIBI most effective?**
  - Most consistent finding is that higher IQ children make most progress
- **Is there evidence that earlier delivered interventions produce additional benefits?**
  - Developmental theory leads us to expect that this is true
  - Existing analysis used to support this claim do not separate out developmental from treatment effects
  - A study to answer this question would be hard to set up ethically
- **We lack comparative trials to answer these Qs:**
  - About ABA/EIBI vs. other approaches
  - About greater vs. lesser intensity
  - About effective elements of programmatic approaches

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We know less about moderating and mediating factors than we think we do

- **Moderating and mediating mechanisms need to be tested in RCTs for unbiased confirmation**
  - No study has set and tested a mediation hypothesis in an ABA/EIBI trial – this tests the putative *mechanism of effect*
- **Yoder & Stone (2006a,b) and Kasari et al (2008) have tested moderating effects**
  - Yoder & Stone: Object exploration predicts PECS response; level of JA predicts response to RPMT
  - Kasari: Early language predicts better response; interaction between initial language level and treatment (group) response – children with < 5 words did better (expressive language) in JA treatment

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Things we can learn from the communication intervention literature

- **It is possible to run RCTs**
  - More RCTs have been conducted within the social communication field than in the ABA/EIBI field
- **We can test effective elements by adding specific treatments into an ongoing programme**
- **Increasingly studies test a pre-specified primary outcome theoretically coherent to the intervention**
  - Some studies set out to test moderators and mediators of treatment effect

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BJPsych | The British Journal of Psychiatry (2008) 192, 323–325. doi: 10.1192/bjp.bp.107.046284

Editorial

Using intervention trials in developmental psychiatry to illuminate basic science

Jonathan Green and Graham Dunn

- **There are heuristic links between theory and treatment trials at several levels**
  - Treatments should have a theoretical basis
  - There should be a theoretical or empirical basis for predictions of treatment effects beyond what is taught
  - Treatment studies are one of the few research designs able to identify/confirm developmental mechanisms
- **In order to push research forward we need to create hierarchies of predictions regarding different potential outcomes**

Parent training RCTs

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Study	N	Treatment	Outcome	Result
Jocelyn et al (1998)	35	12 week psychoeducation + day care consultation	Knowledge, ABC, DP, Stress	Knowledge + ABC- Language+ Stress-
Drew et al (2002)	24	12 monthly PT sessions	NVIQ, CDI, ADI, PSI	NVIQ- CDI+ (one-tailed!) ADI- PSI-
Aldred et al (2004)	28	12 months PT (+ psychoeducation)	ADOS, CDI, PCI, PSI	ADOS+ CDI+ PCI+ PSI-
Rickards et al (2007) - NS trends for ASD group only - 12m f/up IQ only maintained	59 (39 ASD; 20 DD)	12 months (Special Ed) psychoeducation	IQ, BRS, BSQ, PBCL, VABS,	IQ+ BRS- BSQ- PBCL+ VABS-

Other communication RCTs

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Study	N	Treatment	Outcome	Result
Kasari et al (2006) 12m f/up language+	58	30 mins/day for 6 weeks (JA, SP, C)	JA, SP, PCI,	JA+ SP+ PCI+
Yoder & Stone (2006)	36	3 times/week for 6m (RPMT vs. PECS)	ESCS, UFPE, PCI	Some RPMT vs. PECS differences but most analyses i/a
Howlin et al (2007)	84	PECS workshop + consult	COSMIC (initiations, PECS use, vocals), EOWPT, BPVS, ADOS	Initiations+ PECS use+ Vocals- EOWPT- BPVS- ADOS-

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Journal of Consulting and Clinical Psychology
2008, Vol. 76, No. 1, 125–137

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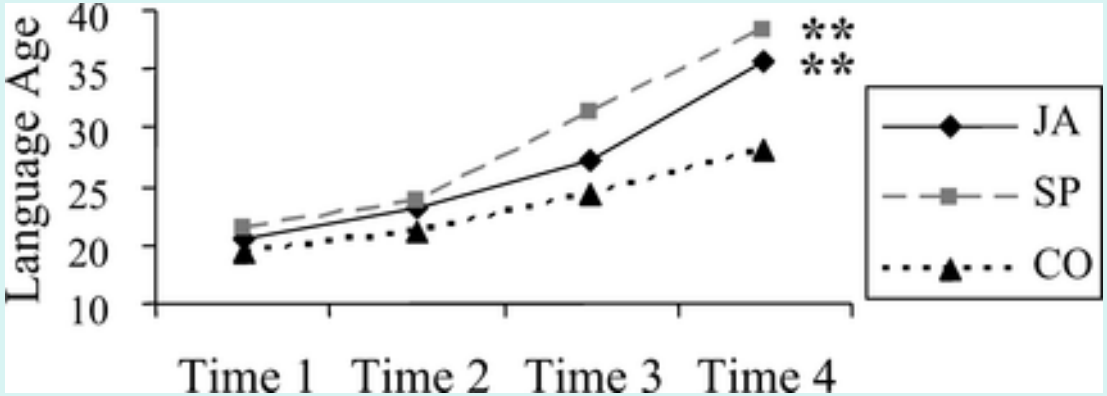
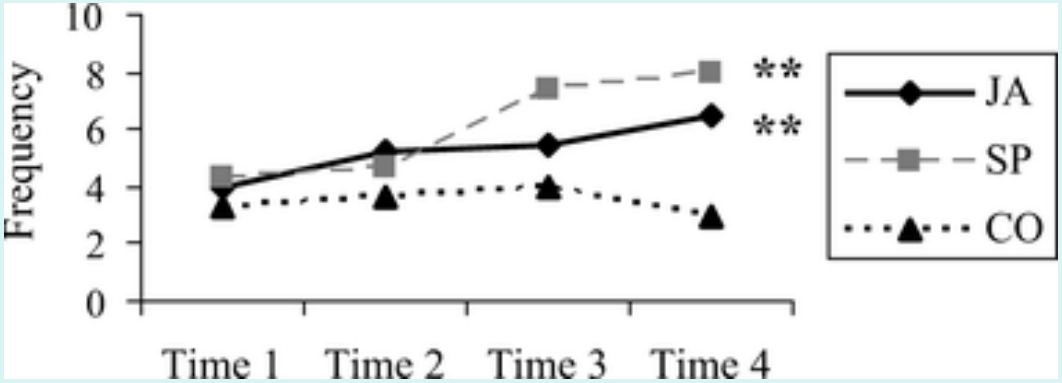
Language Outcome in Autism: Randomized Comparison of Joint Attention and Play Interventions

Connie Kasari, Tanya Paparella, and Stephanny Freeman
University of California, Los Angeles

Laudan B. Jahromi
Arizona State University

- N=58 3-to-4-year olds (~20 per group)
- 30 minute session daily in nursery for 6 weeks
- Randomised into 3 groups:
  - One treatment focused on promoting JA skills
  - One on promoting symbolic play skills
  - Control 'non-treated' group
- ALL children receiving 30 hours a week ABA nursery program (1:1 or 1:2)
- Language and child initiation outcomes at 12 months


Language Age
40
35
30
25
20
10
Time 1
Time 2
Time 3
Time 4
**
**
JA
SP
CO


Frequency
10
8
6
4
2
0
Time 1
Time 2
Time 3
Time 4
**
**
JA
SP
CO

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Journal of Child Psychology and Psychiatry 48:5 (2007), pp 473–481 doi:10.1111/j.1469-7610.2006.01707.x

The effectiveness of Picture Exchange Communication System (PECS) training for teachers of children with autism: a pragmatic, group randomised controlled trial

Patricia Howlin,[1] R. Kate Gordon,[2] Greg Pasco,[2] Angie Wade,[3] and Tony Charman[3]

[1]Institute of Psychiatry, Kings College, London, UK; [2]St. George's Hospital Medical School, University of London, UK; [3]UCL Institute of Child Health, London, UK

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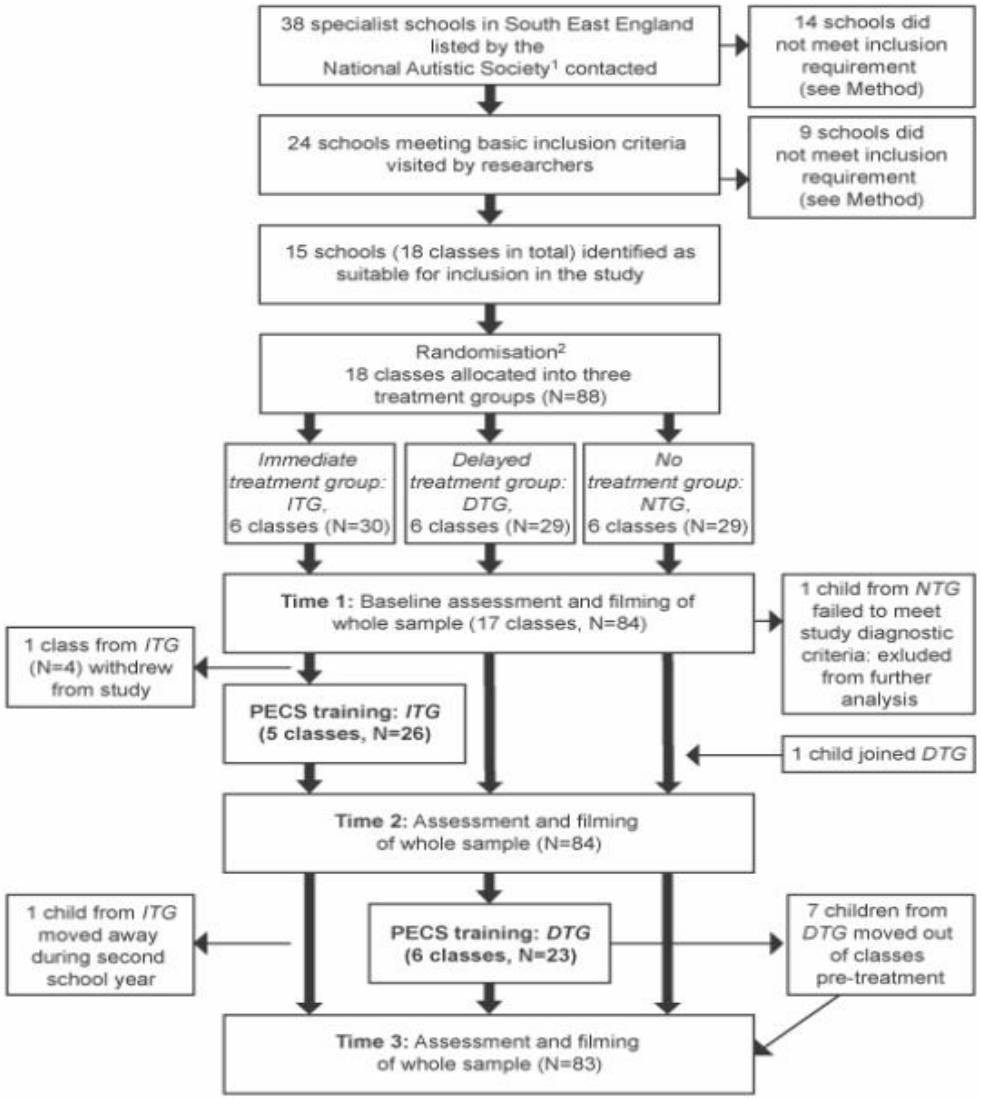
Figure 1. Flow chart illustrating sample selection, randomisation, treatment and assessment



[1] NAS: Schools, units and classes for children with autism and Asperger syndrome
[2] Stratified randomisation according to class size (≥6 children; <6 children)

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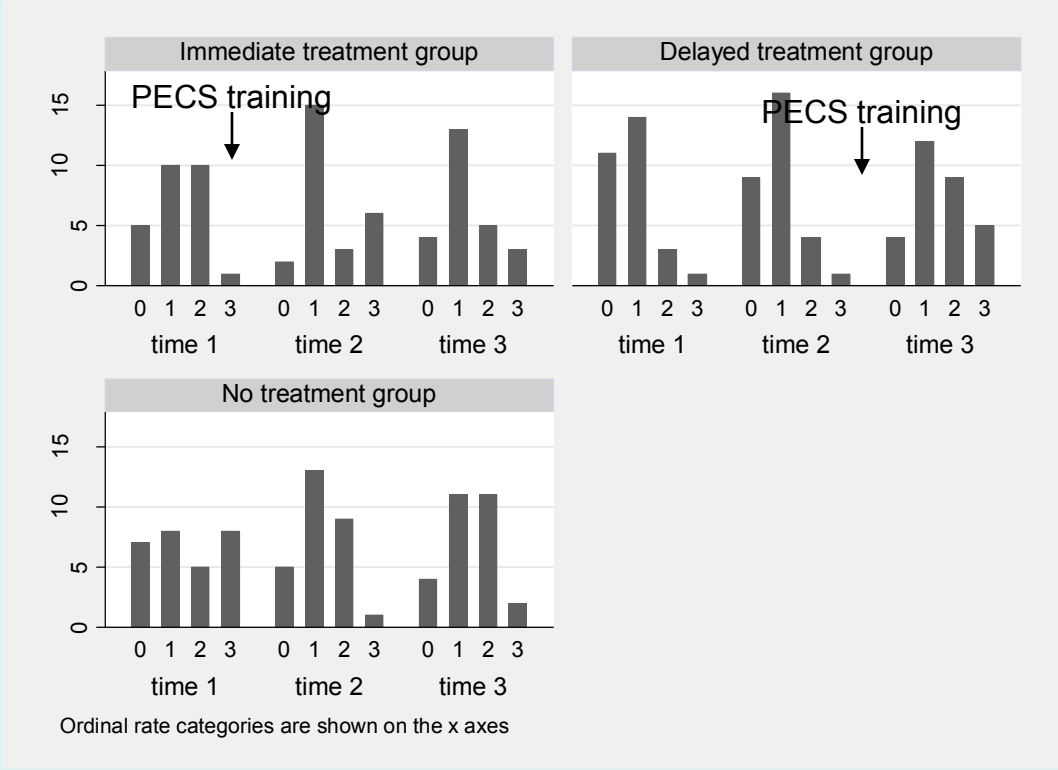
Rate of initiations



Odds ratio of being in a higher ordinal group = 2.7, p <.05

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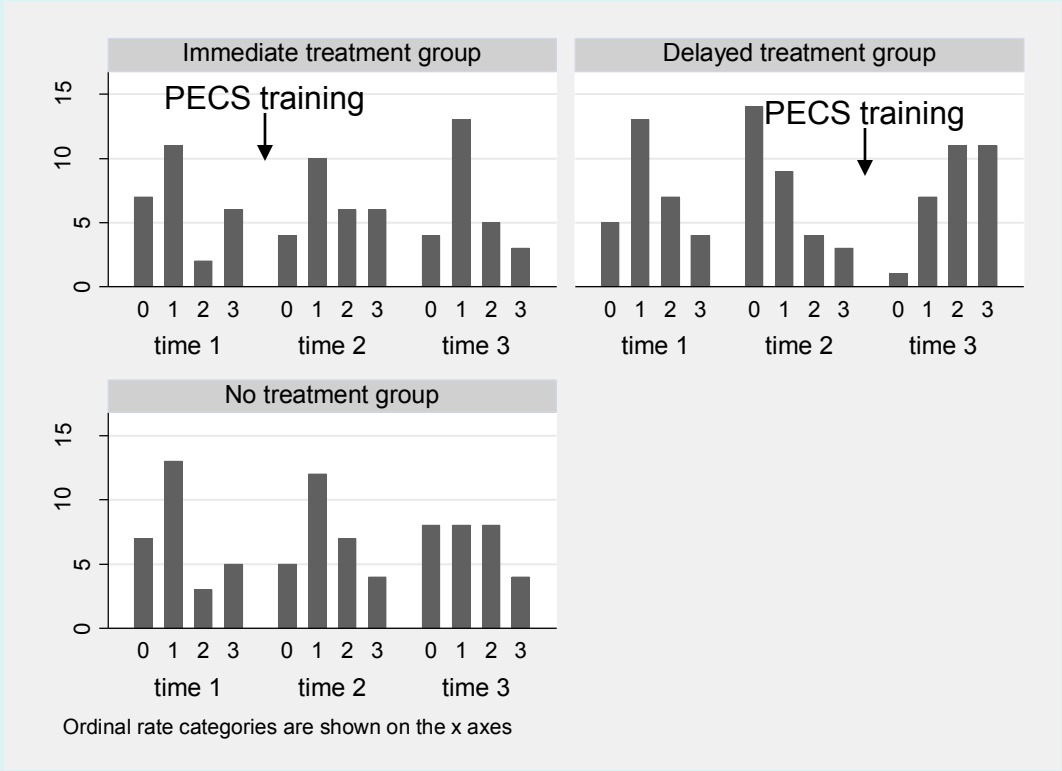
Rate of PECS use



Odds ratio of being in a higher ordinal group = 3.9, p <.001

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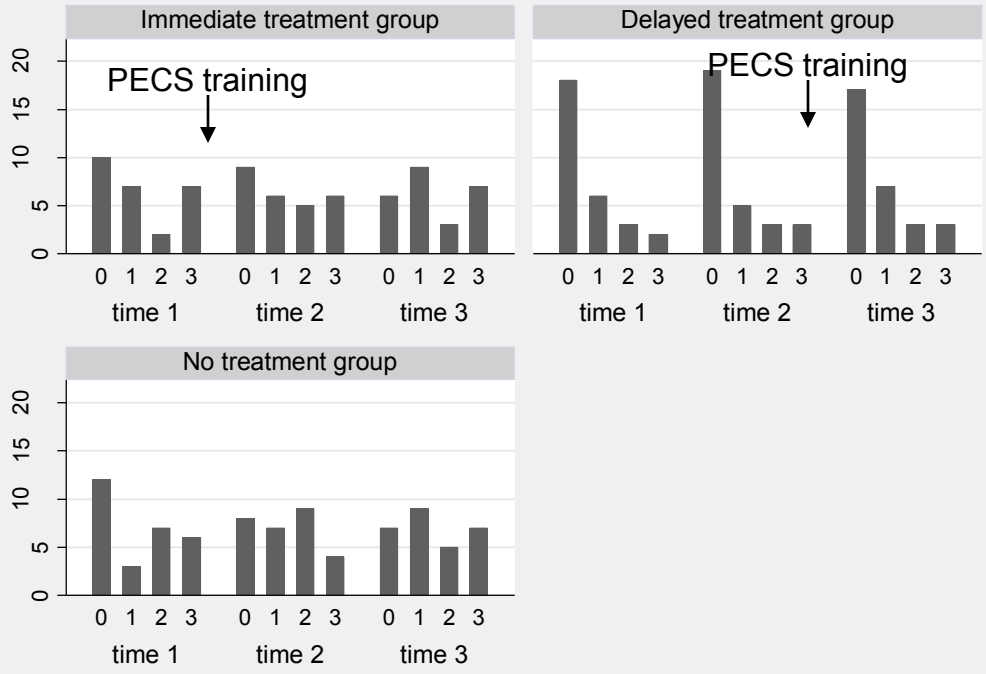
Rate of speech/vocalisations



Ordinal rate categories are shown on the x axes

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Journal of Child Psychology and Psychiatry 45:8 (2004), pp 1420–1430 doi: 10.1111/j.1469-7610.2004.00338.x

A new social communication intervention for children with autism: pilot randomised controlled treatment study suggesting effectiveness

Catherine Aldred,[1] Jonathan Green,[2] and Catherine Adams[1]

[1]Human Communication and Deafness Group, University of Manchester, UK; [2]Academic Department of Child Psychiatry, Booth Hall Children's Hospital, Manchester, UK

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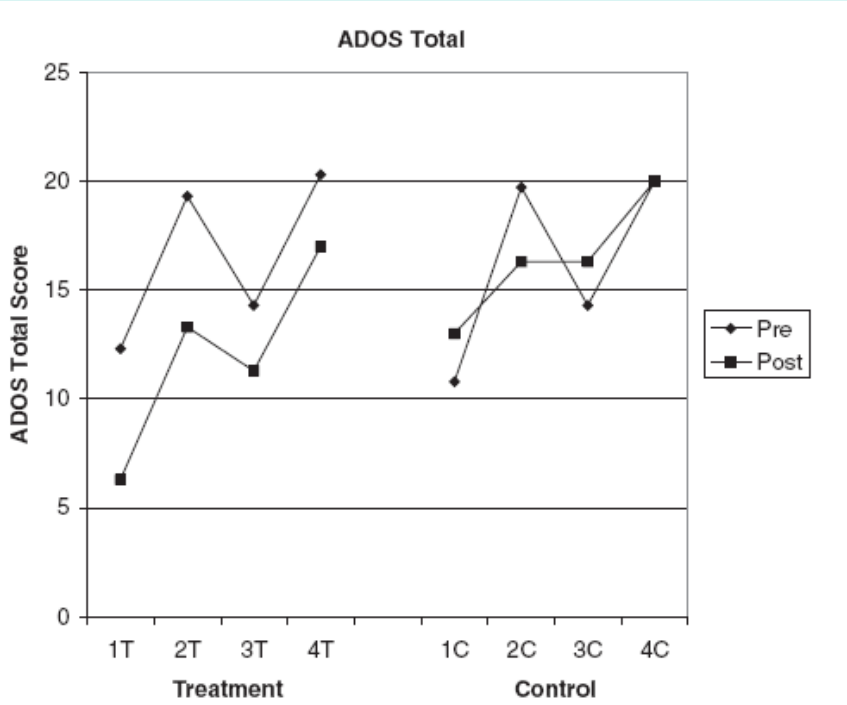
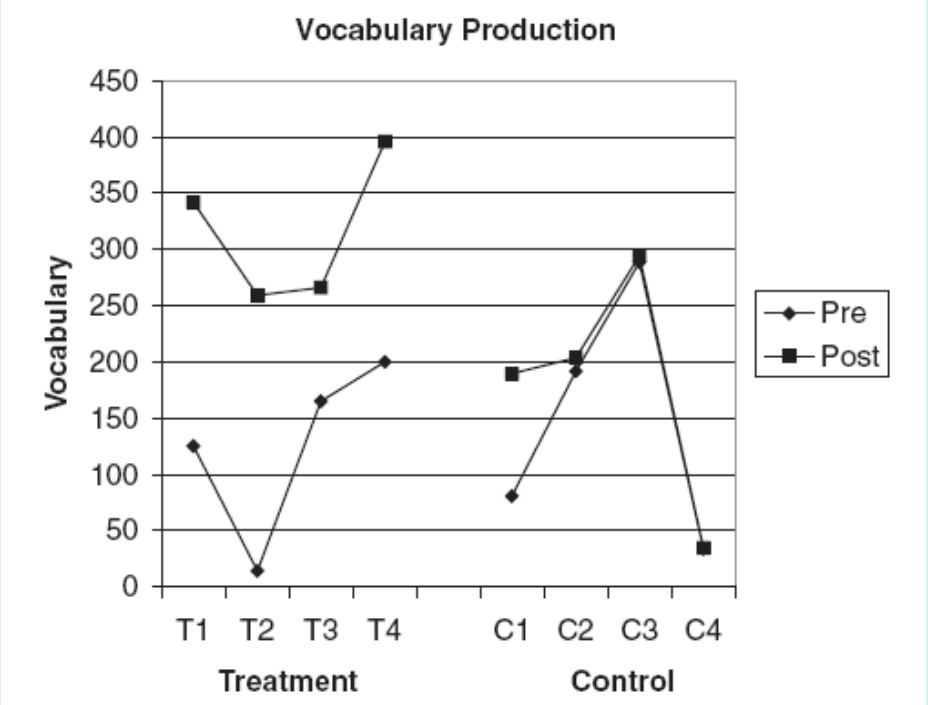
Staged programme with a focus on adapting parental communication

- **Eliciting shared attention, communication, enjoyment**
  - Child's focus, inferring intentions
- **Enhancing parental synchronous response**
  - Comment, acknowledge, child's focus, timing
- **Adapted communication strategies for parents**
  - Predictable sequences, routines, repetition, rehearsed play, imitation
- **Developing/elaborating child communication**
  - Expansions, elaborations, teasers


ADOS Total
ADOS Total Score
25
20
15
10
5
0
1T
2T
3T
4T
1C
2C
3C
4C
Treatment
Control
Pre
Post


Vocabulary Production
Vocabulary
450
400
350
300
250
200
150
100
50
0
T1
T2
T3
T4
C1
C2
C3
C4
Treatment
Control
Pre
Post

PACT
Pre-school Autism Communication Trial

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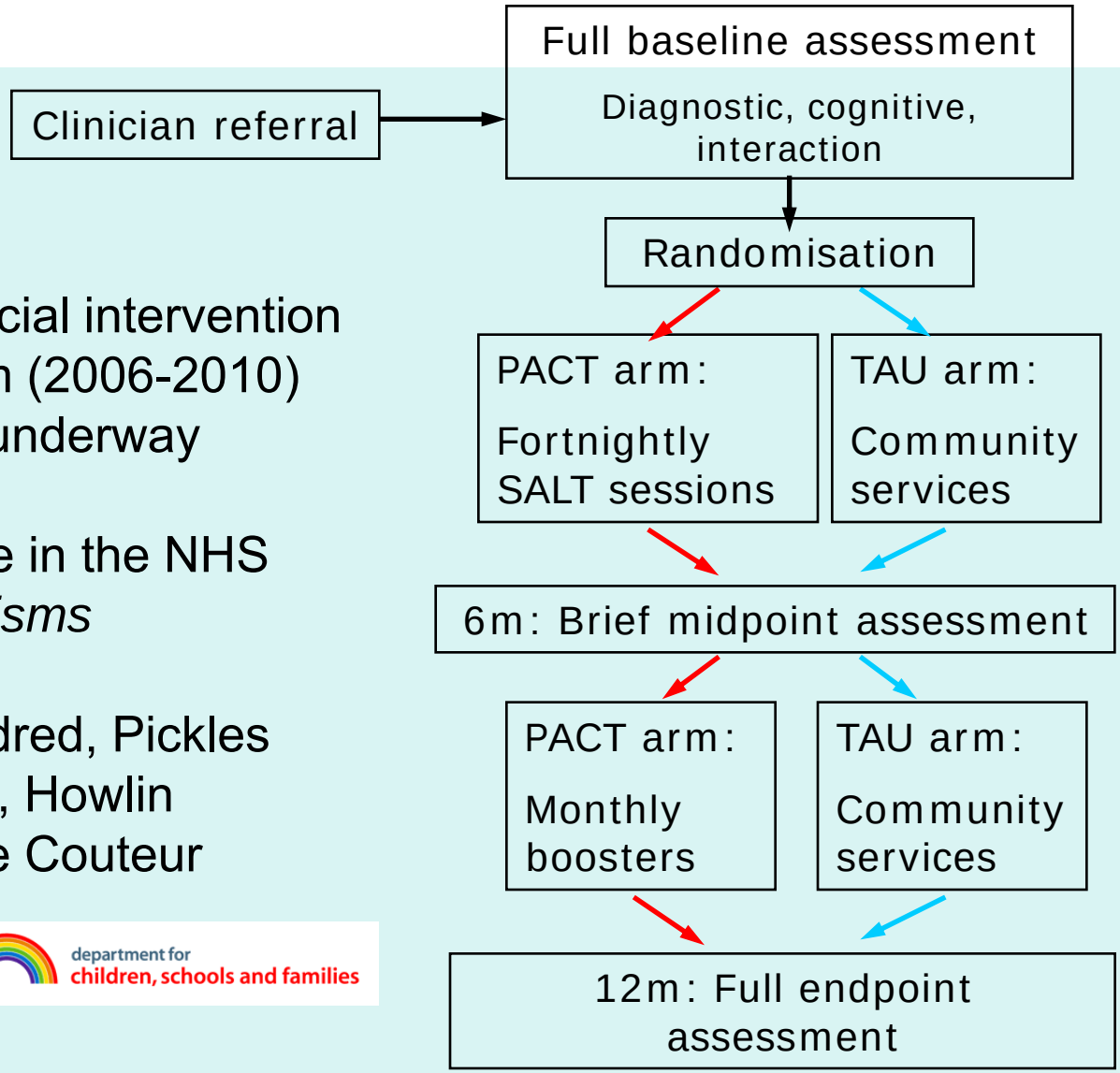
- N=152 RCT of a psychosocial intervention for preschoolers with autism (2006-2010)
- Largest psychosocial trial underway internationally
- Testing a model deliverable in the NHS
- Testing mediating *mechanisms*

Manchester: Green (CI), Aldred, Pickles
London: Charman, Slonims, Howlin
Newcastle: McConachie, Le Couteur



MRC Medical Research Council
DH Department of Health
department for children, schools and families

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Early intervention – What do we know?

- **There is emerging and increasing evidence for behavioural and social-communication approaches**
- **Early intervention should focus on the core deficits/needs**
  - Managing behaviour
  - Enhancing social interaction
  - Enhancing (non-verbal) communication skills
- **Treatments involving parents educate and empower them at a time when they are seeking guidance**
- **However, effectiveness is very variable in every trial**
  - Some children make great gains; others less so; some very little

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Early intervention – What do we need?

- **A fair-minded approach to evaluating the evidence**
- **Better dissemination of the existing evidence-base**
- **More large-scale randomised controlled trials**
- **Identification of the effective elements of interventions**
- **Evidence of how interventions might work differently in different settings**
  - Training parents; working in preschool
- **Recognition that one size does not fit all**
  - Can we identify 'what works for whom'?
- **Improved access to appropriately trained professionals and services**
  - As the evidence-base builds so (quite rightly) will the demand