A randomised controlled trial comparing the efficacy of pre-school language interventions - Building Early Sentences Therapy and an Adapted Derbyshire Language Scheme

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Language Intervention in the Early Years

- A cluster RCT with settings randomised to receive
  - Building Early Sentences Therapy (BEST)
  - Adapted DLS (A-DLS)
  - Continuing classroom support (CCS)

- Data collection commenced in January 2020
- COVID-19 meant that the study paused till January 2021
- Concern about ethics of CCS
- Changed to compare BEST and A-DLS

https://research.ncl.ac.uk/lively/

RQs

1. Are BEST and A-DLS associated with improvements in receptive and/or expressive language and communicative participation?
2. Which intervention is most effective?
3. Do interventions differ in the degree to which benefits transfer to non-targeted language structures and/or communicative participation?
4. Do interventions differ in the degree to which language abilities continue to improve after the intervention is complete?

Why compare interventions?

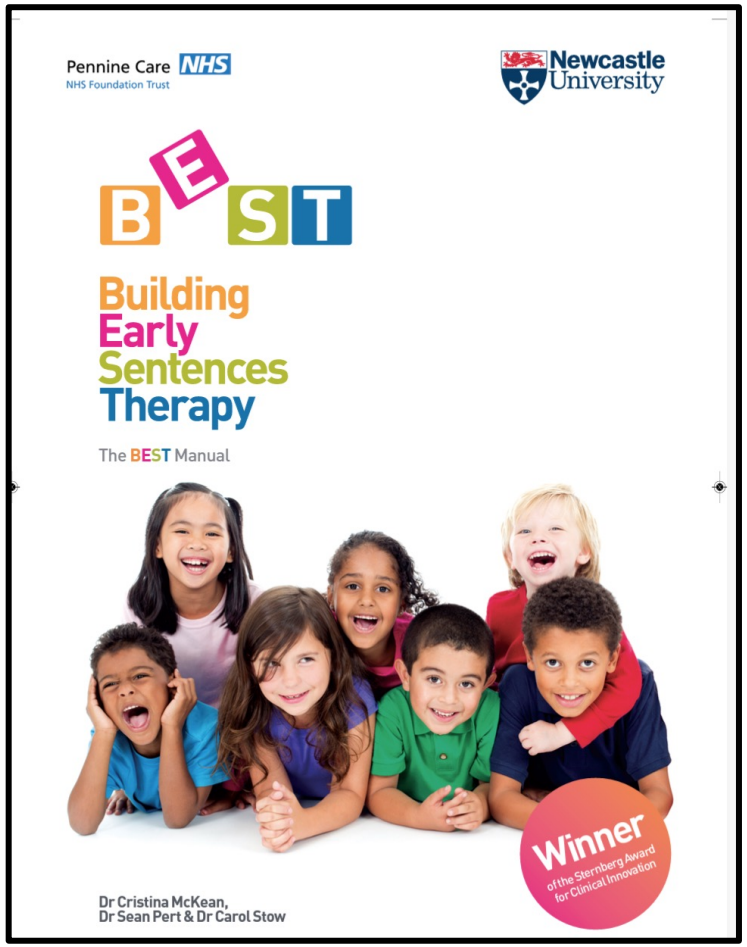
- To enable informed choices to be made regarding which work best for a given child, outcome, context, or family preference

- Comparisons of interventions delivered with the same dosage, delivery context, and treatment fidelity allow us to test whether it is the specific learning mechanisms/active ingredients exploited by the interventions which promote change or whether benefits are ‘therapy general’ effects

BEST…….

- Is an intervention for young children with low language 3; 06 plus
- Aims to develop children's ability to
  - use range of simple 2, 3 and 4 element sentences
  - flexibly, with a range of verbs and nouns
  - and with appropriate grammatical morphology
- Usually delivered in small groups
- 15 mins 2x per week for 8 weeks
- Homework booklet for home input after each session

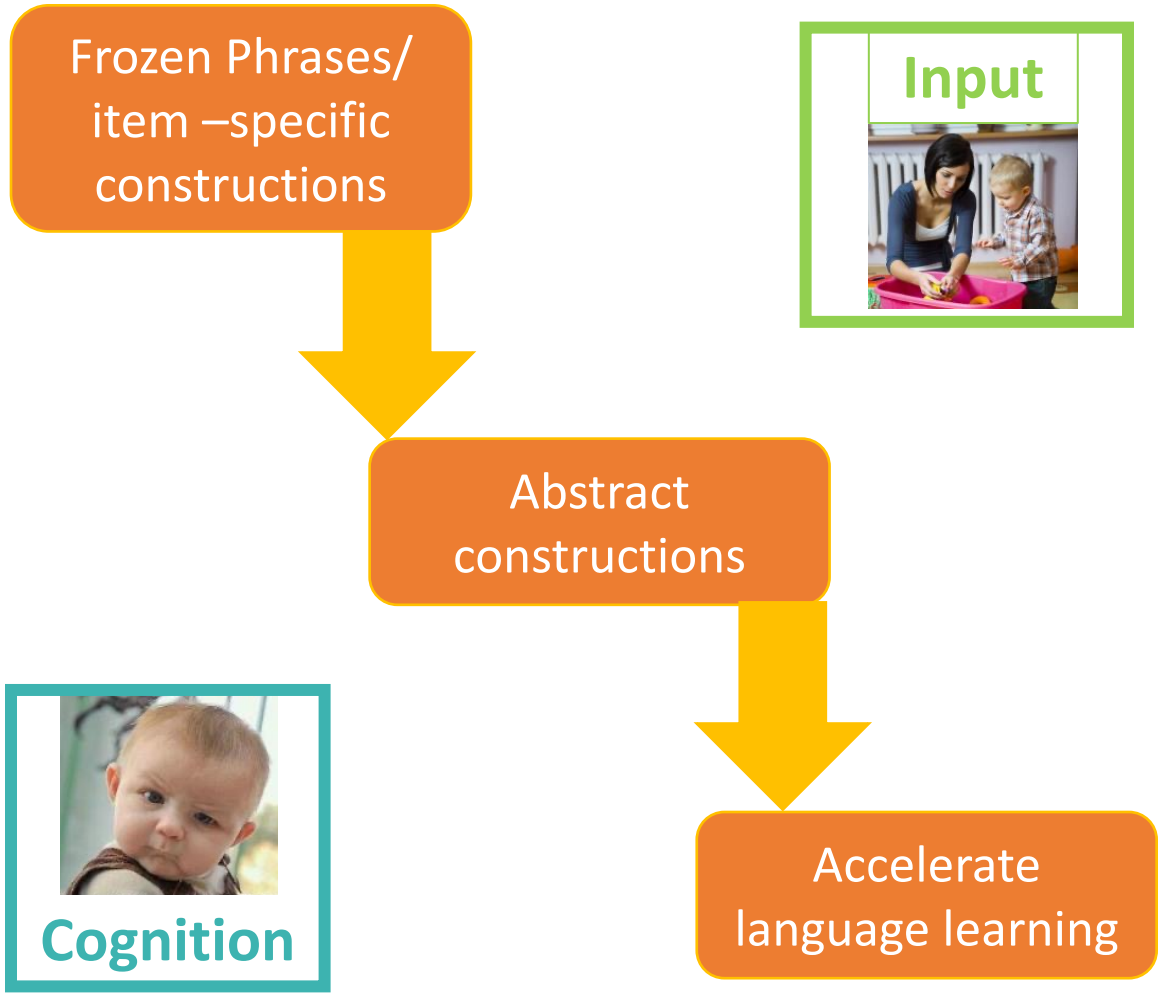
https://research.ncl.ac.uk/lively/interventions/best/



https://research.ncl.ac.uk/media/sites/researchwebsites/languageinterventionintheearlyyears/BEST_Manual.pdf

BEST….

- Is based on usage-based/ constructivist theories of language development
- Children move from ‘fixed’, rote-learned constructions to more abstract, flexible representations
- The drivers of this change are
  - Input
  - Cognitive tools
- Once abstract representations are formed then language learning accelerates



BEST…….

Mastery not required

Joint action routines

Actions with toys

Varying Ns in slots & frames

Input

Massed & distributed exposure

Aligning verbs with same PAS & morphological frames

Signing of both content & morphology

BEST……

- Is effective in improving production standard scores when compared to ‘Treatment as Usual’
- Large effect size *d* = 1.08
- Signing of content and morphology is an ‘active ingredient’

Trebacz, A., McKean, C., Pert, S., & Stringer, H. (in press). Piloting Building Early Sentences Therapy for pre-school children with low language abilities: an examination of efficacy and the role of sign as an active ingredient. *International Journal of Language and Communication Disorders*

DLS…..

- Is one of the most widely used intervention approaches in the UK
- Syllabus based on typical language development
- Uses structured play-based activities
- Moves children through stages increasing their understanding and use of sentences with 1, 2, 3 and 4, Information carrying words
- Individualised progression based on child's progress and language level

https://www.derbyshire-language-scheme.co.uk/105

DLS…..

- is effective in improving children's comprehension when compared to a waiting list control
- difference in Z score change .6

Broomfield, J., & Dodd, B. (2011). Is speech and language therapy effective for children with primary speech and language impairment? Report of a randomised control trial. *International Journal of Language & Communication Disorders*, *46*(6), 628-640.

Adapted DLS is

- A version of DLS which
  - can be delivered with high treatment fidelity and reliability in research context
  - 'matches' BEST as closely as possible in terms of dosage and delivery, whilst retaining key principles of ICW, play based activities, turn-taking, use of prompts etc.
  - is delivered in groups with children at 1, 2-3 or 3-4 WL
  - provides homework packs and guidance videos for parents

https://research.ncl.ac.uk/lively/interventions/dls/dls/

- A-DLS differs from traditional DLS
  - moves more rapidly through the range of DLS target sentences
  - is less individualised in terms of progression and modification of resources
  - more details of these differences are provided on the LIVELY website

https://research.ncl.ac.uk/lively/interventions/dls/theadapteddls/

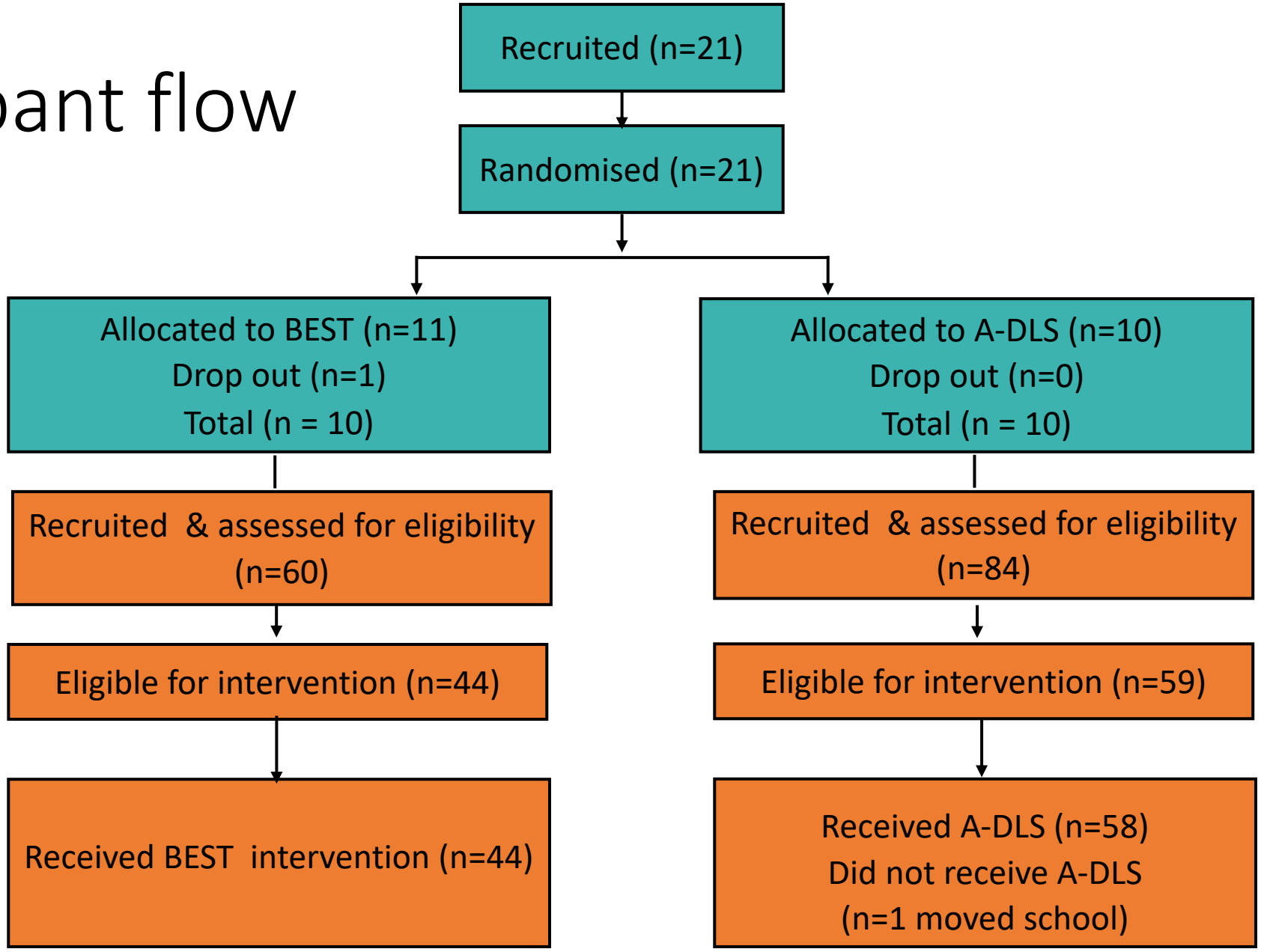
Methods

- Cluster randomised controlled trial
- Settings randomised by independent statistician
- Children eligible if
  - aged 3; 05 – 4; 05
  - monolingual speaker of English
  - no sensorineural hearing impairment, severe visual impairment or diagnosed learning disability
  - able to participate in small group
  - scored at or below the 16th centile for production and/or comprehension on NRDLS

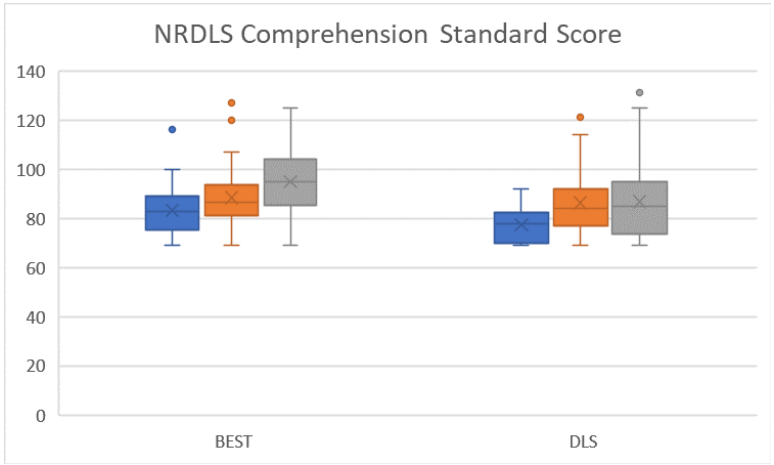
Methods

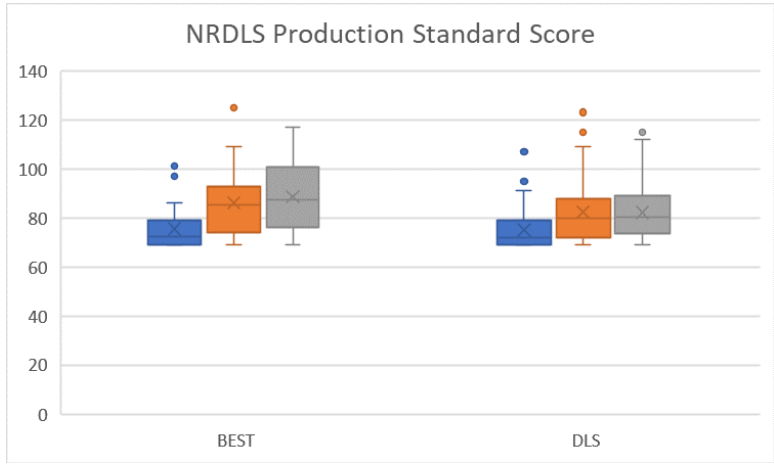
- Interventions manualised, standard therapy resources, fidelity checks
- Small group delivery - 16 x 15-minute sessions, 2x per week for 8 weeks
- All assessments completed masked to intervention arm
- At three time points - Baseline (T1) - Outcome (T2) - Follow-up (T3)
- Measures
  - Standardised measure of receptive & expressive language
    - New Reynell Developmental Language Scales (NRDLS)
  - Knowledge of language structures targeted in the interventions
    - BEST - picture description assessment
    - A-DLS - extended Rapid Screening test
  - Communicative participation
    - Teacher & Parent report Functional Outcomes in Children Under Six (FOCUS-34)

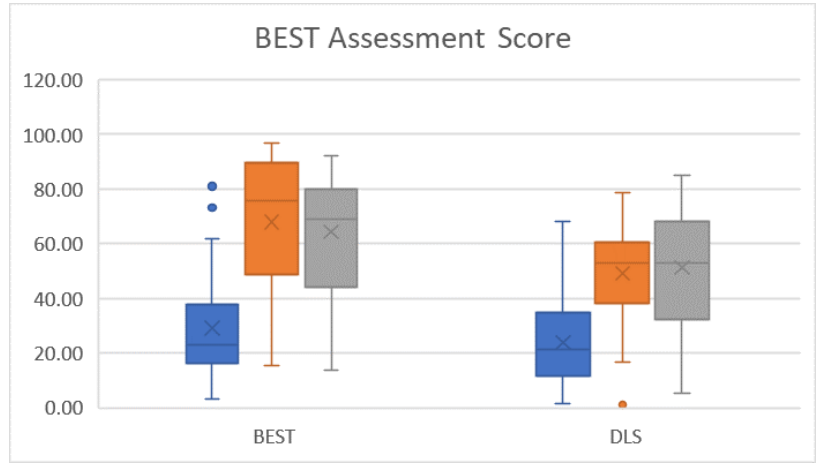
Participant flow

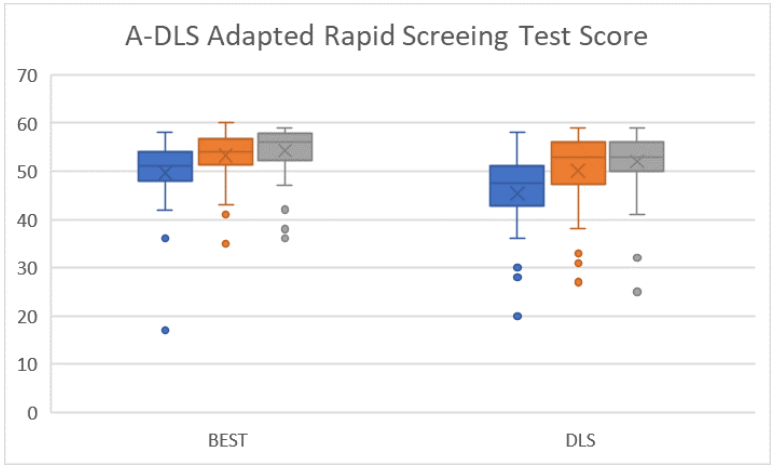


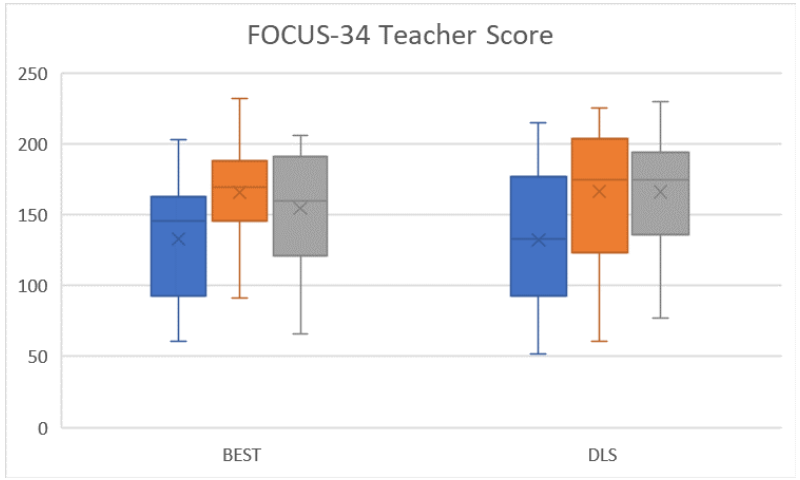
Results











Both interventions were associated with significant improvements in receptive and expressive language and communicative participation on all outcomes

Results – NRDLS Standard Score

	Full sample			BEST Intervention			A-DLS Intervention			Effect size	BEST - A-DLS		EEF ES
											Model		
	N	M	SD	N	M	SD	N	M	SD		F (df)	p	
NRDLS Comprehension SS													
T1	102	78.89	8.71	44	83.16	9.79	58	77.41	6.91				
T2	100	87.22	12.89	44	88.45	13.23	56	86.25	12.65				
T3	102	90.23	15.3	44	94.89	14.23	58	86.69	15.24				
T1 – T2										.06	0.10(1)	.748	
T2 – T3										.56	7.59(1)	**.007**	
T1 – T3										.26	1.63(1)	.205	
NRDLS Production SS													
T1	102	75.24	7.52	44	75.48	7.41	58	75.05	7.66				
T2	95	84.08	13.09	44	86.16	12.98	51	82.29	13.05				
T3	102	84.98	12.94	44	88.7	13.96	58	82.16	11.44				
T1 – T2										.31	2.16(1)	.145	
T2 – T3										.40	3.64(1)	**.059***	
T1 – T3										.55	7.56(1)	**.007**	

Analyses adjusted for baseline scores; * when adjust for wave and/or treatment delay becomes significant

Results – BEST and A-DLS RST

	Full sample			BEST Intervention			A-DLS Intervention			Effect size *d*	BEST - A-DLS		EEF ES
											Model		
	N	M	SD	N	M	SD	N	M	SD		F (df)	p	
BEST Assessment													
T1	98	26.12	16.82	41	29.21	18.70	57	23.89	15.11				
T2	100	57.41	22.49	44	67.93	23.47	56	49.14	17.93				
T3	102	56.82	21.91	44	64.29	21.51	58	51.16	20.63				
T1 – T2										.77	13.86(1)	**<.001**	
T2 – T3										.00	0.04(1)	.841	
T1 – T3										.44	4.60(1)	**.035**	
A-DLS Adapted RST													
T1	102	47.2	8.08	44	49.61	7.07	58	45.36	8.38				
T2	100	51.45	7.22	44	53.2	4.91	56	50.07	8.41				
T3	102	52.99	5.98	44	54.27	5.17	58	52.02	6.4				
T1 – T2										.21	1.09(1)	.299	
T2 – T3										.13	0.38(1)	.541	
T1 – T3										.14	0.48(1)	.489	

Analyses adjusted for baseline scores

Results – FOCUS

	Full sample			BEST Intervention			A-DLS Intervention			Effect size *d*	BEST - A-DLS		EEF ES
											Model		
	N	M	SD	N	M	SD	N	M	SD		F (df)	p	
FOCUS-34 score													
T1	98	132.5	44.39	44	132.9	38.17	54	132.1	49.24				
T2	93	166.2	39.37	40	165.7	35.64	53	166.6	42.31				
T3	77	162.6	41.21	23	154.6	41.6	54	166.0	40.96				
T1 – T2										.17	0.58(1)	.45	
T2 – T3										.23	0.89(1)	.348	
T1 – T3										.31	1.71(1)	.195	

Minimally Clinically Important Difference is a change of > 16

Average difference T 1 - T2 is **33** across both interventions

Both interventions associated with clinically important improvements in communicative participation

Conclusions

- Clinically meaningful improvements in communicative participation can be achieved from both interventions with relatively low dosage - caution is required!
- Creating change in non-targeted structures is vital for effective and efficient intervention
- BEST promotes greater generalisation beyond targeted structures than A-DLS with greater gains for both comprehension and expression in NRDLS standard scores (medium - large ES)
- BEST is associated with faster progress *after the end* of therapy for comprehension and production standard scores
- This supports our hypotheses that BEST promotes the creation of abstract representations which then can accelerate future learning

With thanks…….

- To the HvDL foundation for funding the study and their flexible and supportive approach during the COVID pandemic

- To the many Early Years Practitioners, Schools, Parents and Children for their participation in this study. Their enthusiasm, commitment and support for data collection and intervention delivery before and during COVID pandemic was truly humbling.

- I would like to acknowledge the enormous professionalism, flexibility and resilience of the RA team (CJ, EAr, KC, JS, NR, EAs) to continue to deliver the interventions during the pandemic and their commitment to providing high quality and safe intervention to the children in the study at a time when the needs were so high.

- Thank you.

Months' progress	Effect Size from …	… to	Description
0	-0.01	0.01	Very low or no effect
1	0.02	0.09	Low
2	0.10	0.18	Low
3	0.19	0.26	Moderate
4	0.27	0.35	Moderate
5	0.36	0.44	Moderate
6	0.45	0.52	High
7	0.53	0.61	High
8	0.62	0.69	High
9	0.70	0.78	Very high
10	0.79	0.87	Very high
11	0.88	0.95	Very high
12	0.96	>1.0	Very high

Effect Size interpretation guidance recommended by the Education Endowment Foundation (Coe et al 2013)

BEST…….

Retention

Schematisation

Categorisation

Cultural Learning

Cognition

Analogy

Intention Reading

Distribution analysis

Bootstrapping

Mapping