INDIVIDUALIZING AND OPTIMIZING EARLY INTERVENTIONS FOR YOUNG CHILDREN ON THE AUTISM SPECTRUM

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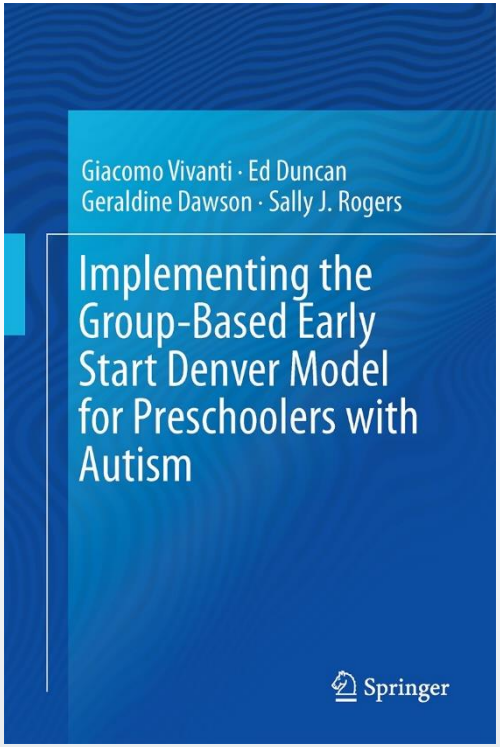
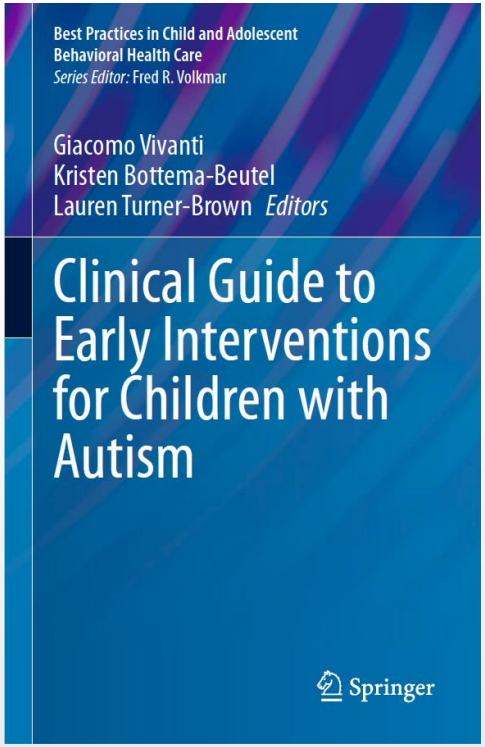
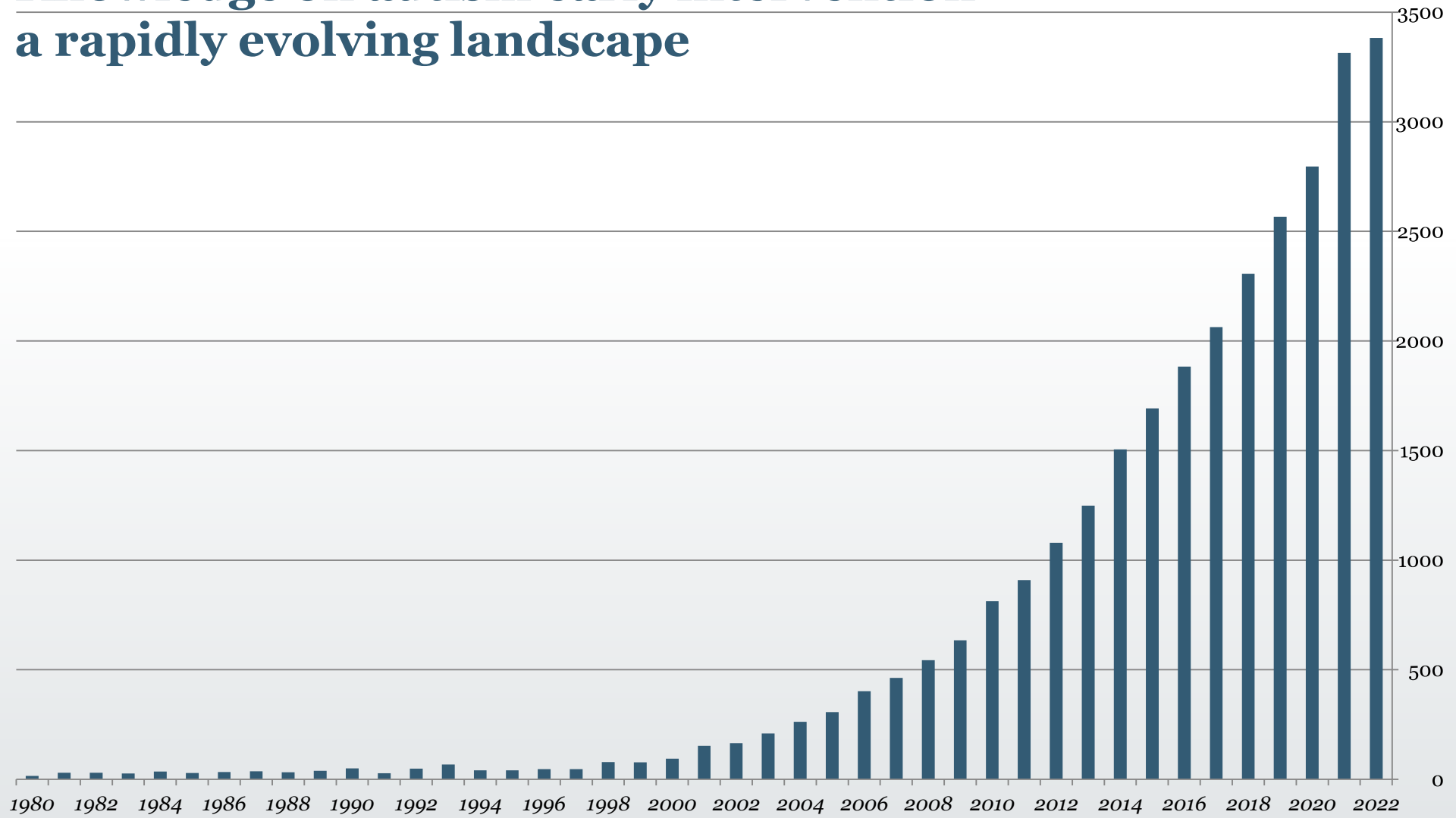
Disclosure of commercial interests

Giacomo Vivanti receives royalties from the books "Implementing the Group-based Early Start Denver Model for Young Children with Autism" and "Clinical Guide to Early Interventions for Children with Autism"



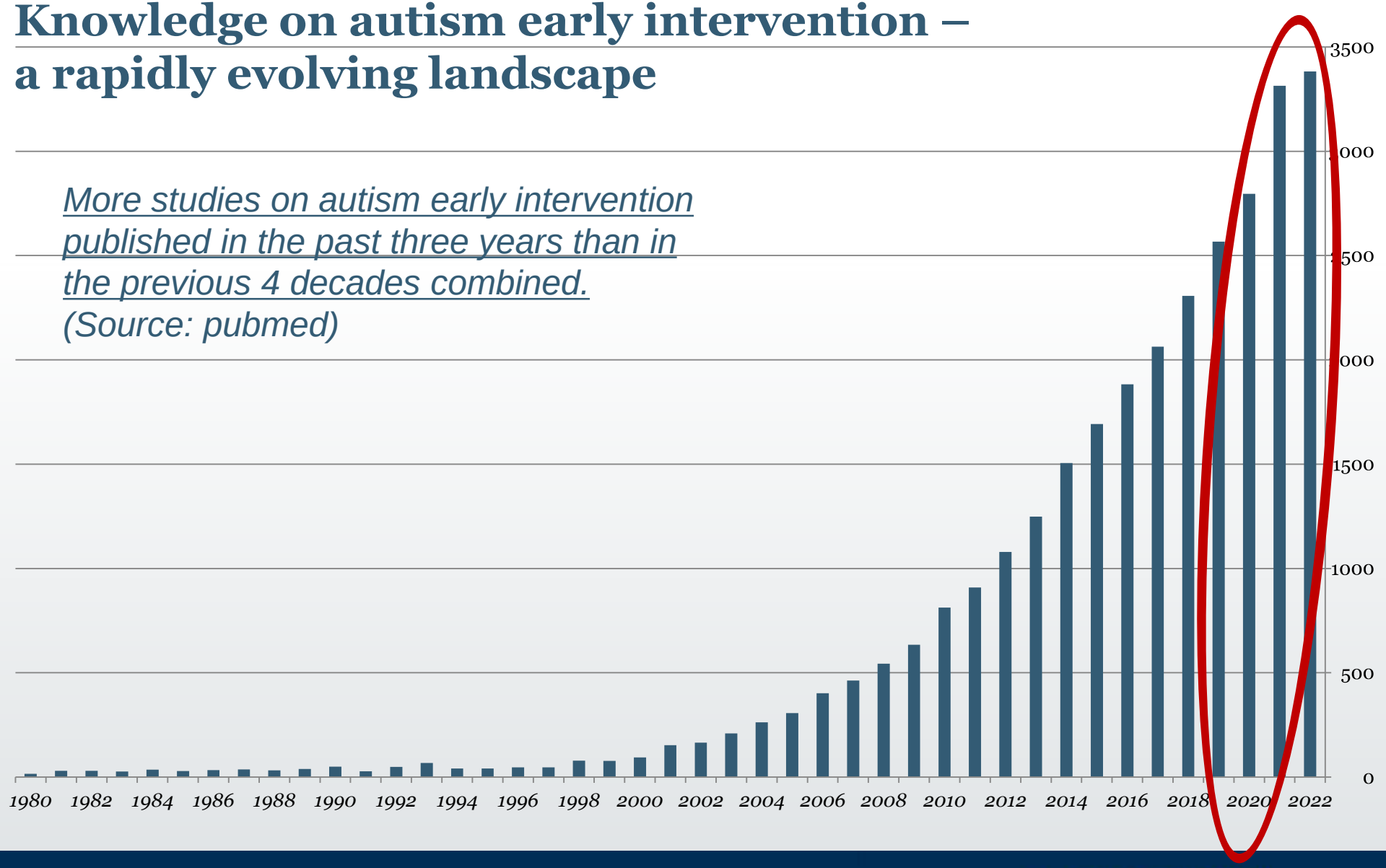


Knowledge on autism early intervention – a rapidly evolving landscape



Knowledge on autism early intervention – a rapidly evolving landscape

More studies on autism early intervention published in the past three years than in the previous 4 decades combined.
(Source: pubmed)



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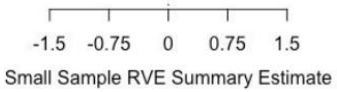
Individuals on the autism spectrum continue to experience barriers to effective service provision (health inequities) leading to preventable adverse outcomes

- Physical health
- Mental health
- Community participation
- Well-being
- Quality of life
- Self-reliance/ self-determination
- Educational opportunities
- Social opportunities
- Employment
- Self-realization

WHY? And what do we need to learn to change that?

Outcomes – no evidence of superiority for specific approaches or categories at the group level

Intervention and Outcome Type	Study N	Outcome N	Effect Size [95% CI]
Behavioral			
Adaptive*	21	51	0.38 [0.19, 0.56]
Cognitive*	21	39	0.29 [0.05, 0.54]
Language*	14	41	0.24 [0.01, 0.47]
Motor*	8	9	0.42 [0.13, 0.72]
Social Communication*	20	91	0.40 [0.18, 0.61]
Social Emotional/ Challenging Behavior*	13	60	0.46 [0.27, 0.66]
Diagnostic Characteristics of Autism*	8	13	0.45 [0.26, 0.63]
Developmental			
Language	8	26	0.06 [-0.08, 0.21]
Social Communication*	14	117	0.30 [0.11, 0.50]
NDBI			
Adaptive	6	12	0.16 [-0.24, 0.56]
Cognitive*	9	26	0.26 [0.01, 0.51]
Language*	19	80	0.20 [0.03, 0.38]
Play*	6	53	0.33 [0.13, 0.54]
Restrictive and Repetitive Behaviors	7	12	-0.01 [-0.34, 0.32]
Social Communication*	24	233	0.35 [0.18, 0.53]
Social Emotional/ Challenging Behavior	6	12	0.17 [-0.28, 0.61]
Diagnostic Characteristics of Autism	6	10	0.05 [-0.38, 0.48]



Sandbank et al (2020) Psych Bull

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But variability in intervention response is dramatic

Variability in intervention response – long history, but little research

- Lovaas (1973) "*children responded in vastly different ways to the treatment*"
- Schopler (1971) *"The most striking finding in this study is the difference in the individual children's [treatment response]"*
- Rutter (1985) *"huge individual differences in outcome and in response to language training"*

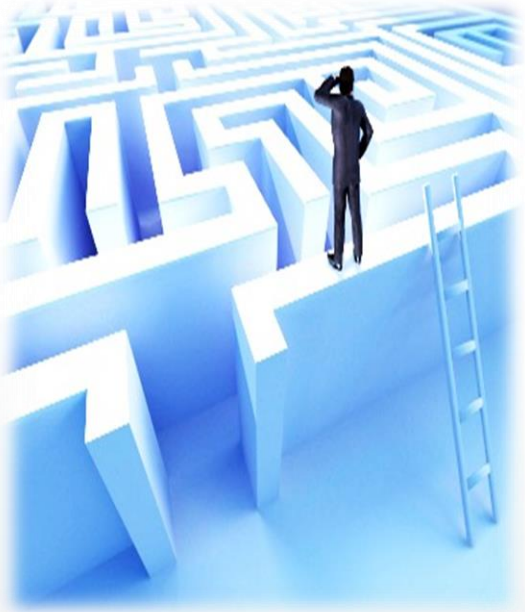
However little research on "non-response" to intervention. Issues

- Measurement/operationalization
- Dogma
- Ethical issues

Goals of examining suboptimal response to early intervention - improving child-treatment fit and context-treatment fit

Setting a research agenda on individual differences

- Even the most "evidence-based" interventions produce different levels of success across individuals and contexts (e.g. Smith et al., 2015).
- The Early Start Denver Model (ESDM; Rogers & Dawson, 2010), a Naturalistic Developmental Behavioral Intervention with a growing evidence base, is no exception

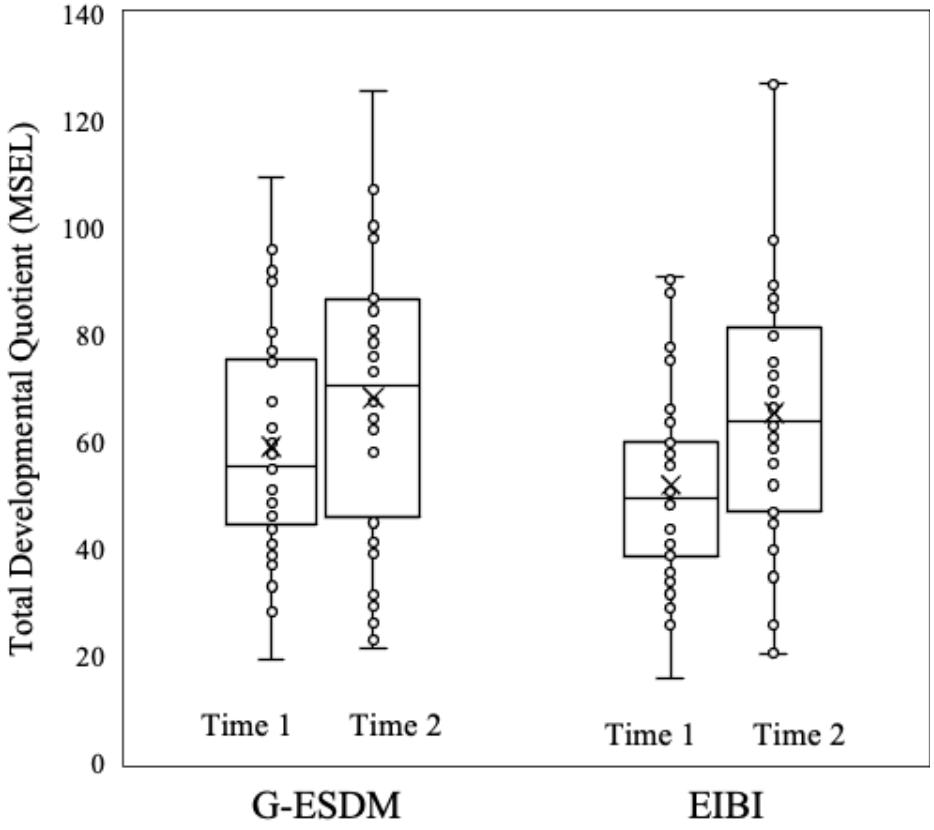


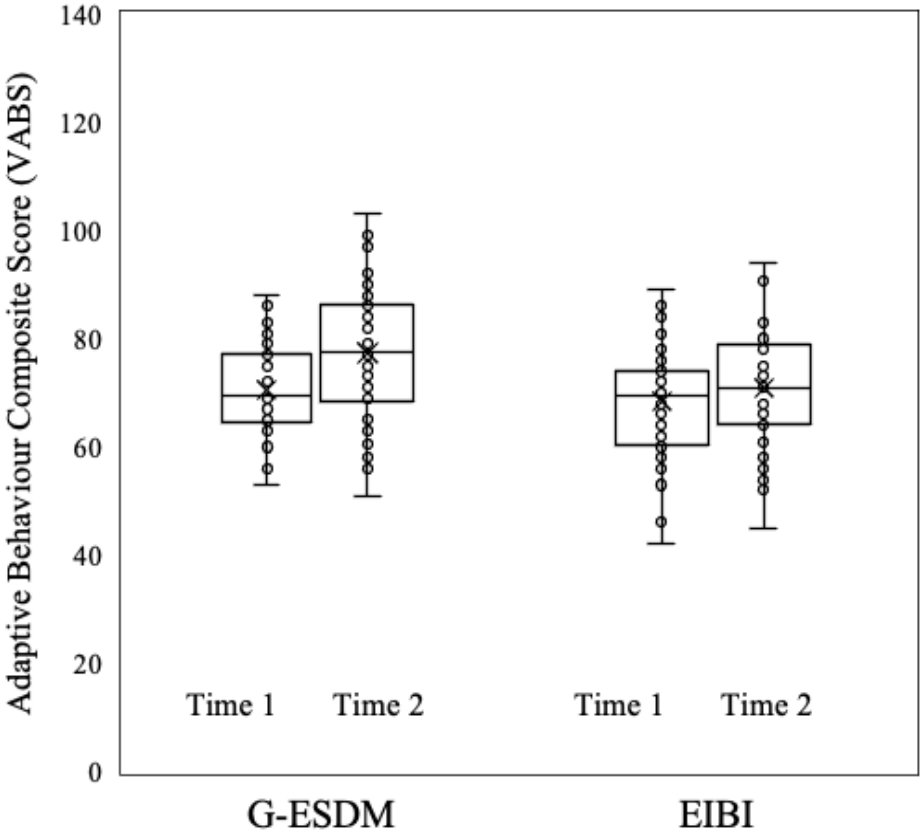
- Individual differences in intervention response are not merely 'noise' inherent in the evaluation of an intervention, but rather are a critical factor of interest that deserves evaluation in their own right
- Understanding for whom ESDM (and other interventions) is most beneficial and in what context is critical to proactively assign children to treatments based on child-intervention-context fit

Predictors of Developmental and Adaptive Behaviour Outcomes in Response to Early Intensive Behavioural Intervention and the Early Start Denver Model

Catherine Bent[1] · Susan Glencross[2] · Karen McKinnon[2] · Kristelle Hudry[1] · Cheryl Dissanayake[3] · The Victorian ASELCC Team · Giacomo Vivanti[3,4]

Outcomes for toddlers receiving 12 months of G-ESDM (n= 46) versus Early Intensive Behavioural Intervention (EIBI) based on a standard ABA 1:1 format (n= 43)





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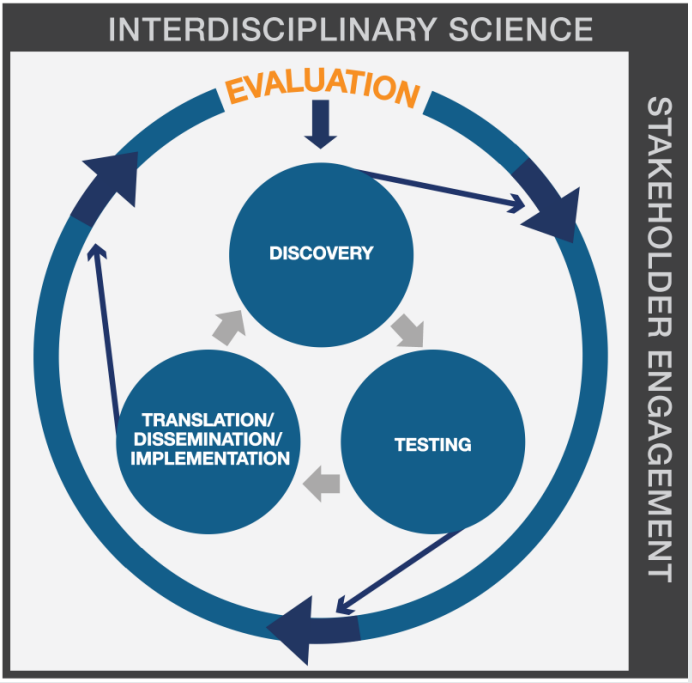
Applying a public health approach to autism research: A framework for action

Diana Schendel[1] | Anne M. Roux[1] | Elizabeth McGhee Hassrick[1] | Kristen Lyall[1] | Lindsay Shea[1] | Giacomo Vivanti[1] | Andrea Trubanova Wieckowski[1] | Craig Newschaffer[2] | Diana L. Robins[1]



- **Discovery - Gaps in knowledge**

Gaps in knowledge – documenting phenomena, generating testable hypotheses

- **Testing -**

Testing hypotheses/predictions, evaluating frameworks

- **Translation/Dissemination/ Implementation**

Community/services/policy

Cyclical vs Linear Process

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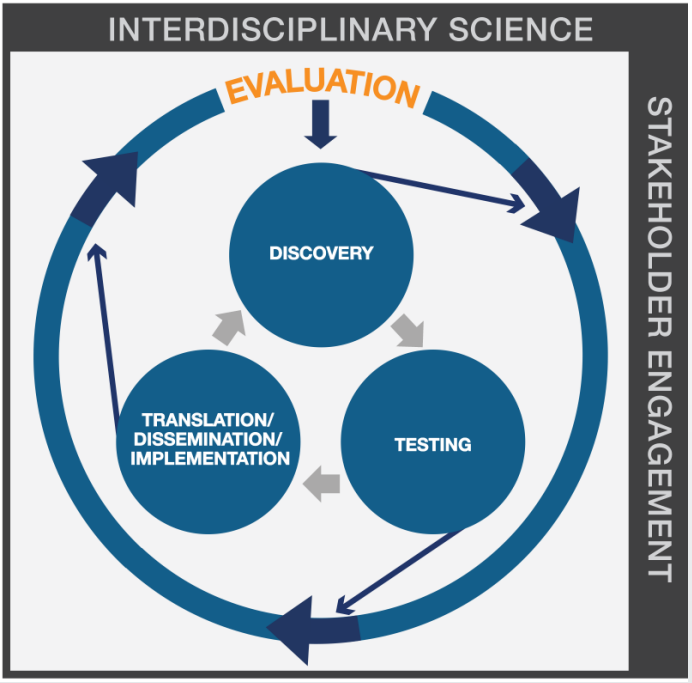

- **Discovery - Gaps in knowledge**

Gaps in knowledge – documenting phenomena, generating testable hypotheses

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NIDCD R01DC017181 - Prevalence and Profile of Treatment Non-Responders* In Autism Early Intervention (PI: Vivanti)

The MIRA (Minimal Intervention Responders in Autism) Consortium


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Suzannah Iadarola


Sally Rogers


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Linda Watson


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Joshua Plavnick


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Sophy Kim


Cathy Lord


Diana Robins


Ann Kaiser


Mike Lombardo

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Goals of MIRA consortium study

- Examining **the prevalence of preverbal or minimally verbal children who do not become verbal** despite receiving evidence-supported early intervention targeting language in an aggregate dataset of 1133 children who had received early intervention from a University-affiliated site. EIBI n=264, ESDM n=333, Other NDBI n= 218, OTHER =233
- Examining **factors that predict change in verbal status** for children receiving evidence-supported interventions.

	Mean (SD)	Range
Chronological Age (months)	37.04 (12.91)	13 - 72
Intervention Duration (months)	10.73 (2.99)	6 - 24
Intervention Intensity (weekly hours)	16.85 (8.65)	4 - 35
Verbal DQ	52.64 (27.71)	5 - 187
Non-Verbal DQ	69.75 (23.42)	9 - 171
VABS ABC	72.45 (13.83)	20 - 116
Gender	82% male	

Sample Characterization – Verbal Status

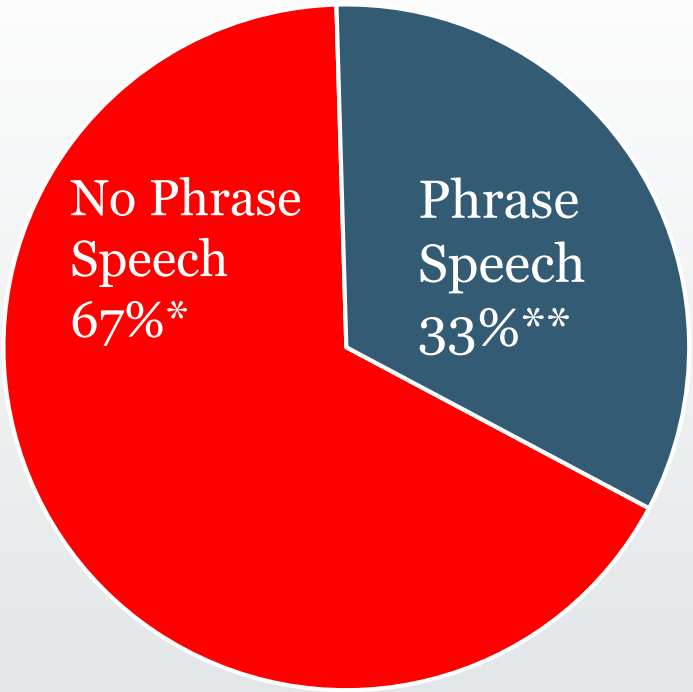
Participants' verbal status at baseline and post-treatment was characterized using the Assessment of Phase of Preschool Language (APPL; Flanagan et al. 2019). The APPL operationalizes verbal status according to the language development stages outlined by Tager-Flusberg et al. (2009)

Stage	Expressive Lang. Age Equivalent	Vocabulary	Number of participants in the MIRA sample for each stage (baseline)*
Preverbal (Stage 1)	0-14 months	<5 different words or <20 words used in 20 m	369
First Words (Stage 2)	15-23 months	5+ different words and 20+ words used in 20 m	232
Word Combination (Stage 3)	24-35 months	30+ different words in 20 m	216
Sentences (Stage 4)	36-47 months	70+ word roots in 50 utter.	64
Complex language (Stage 5)	48+ months	105+ word roots in 50 utter.	92

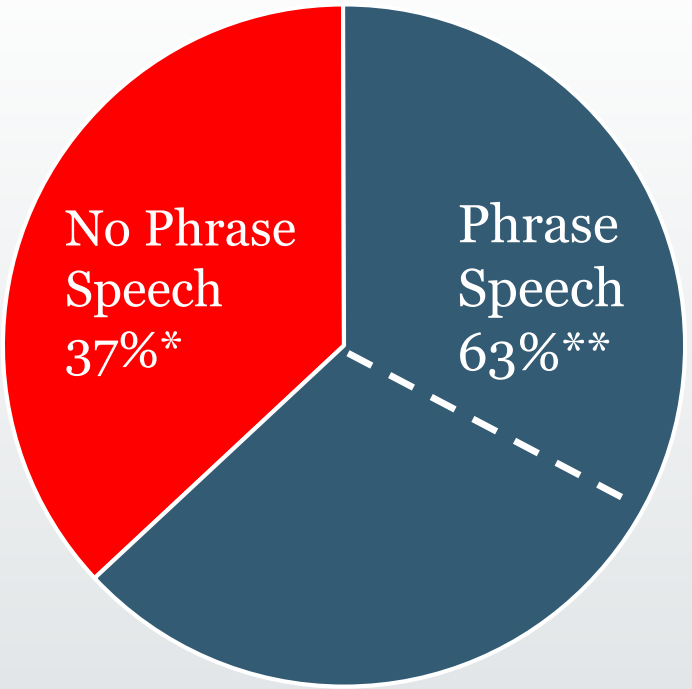
Who are the children who do not acquire phrase speech?

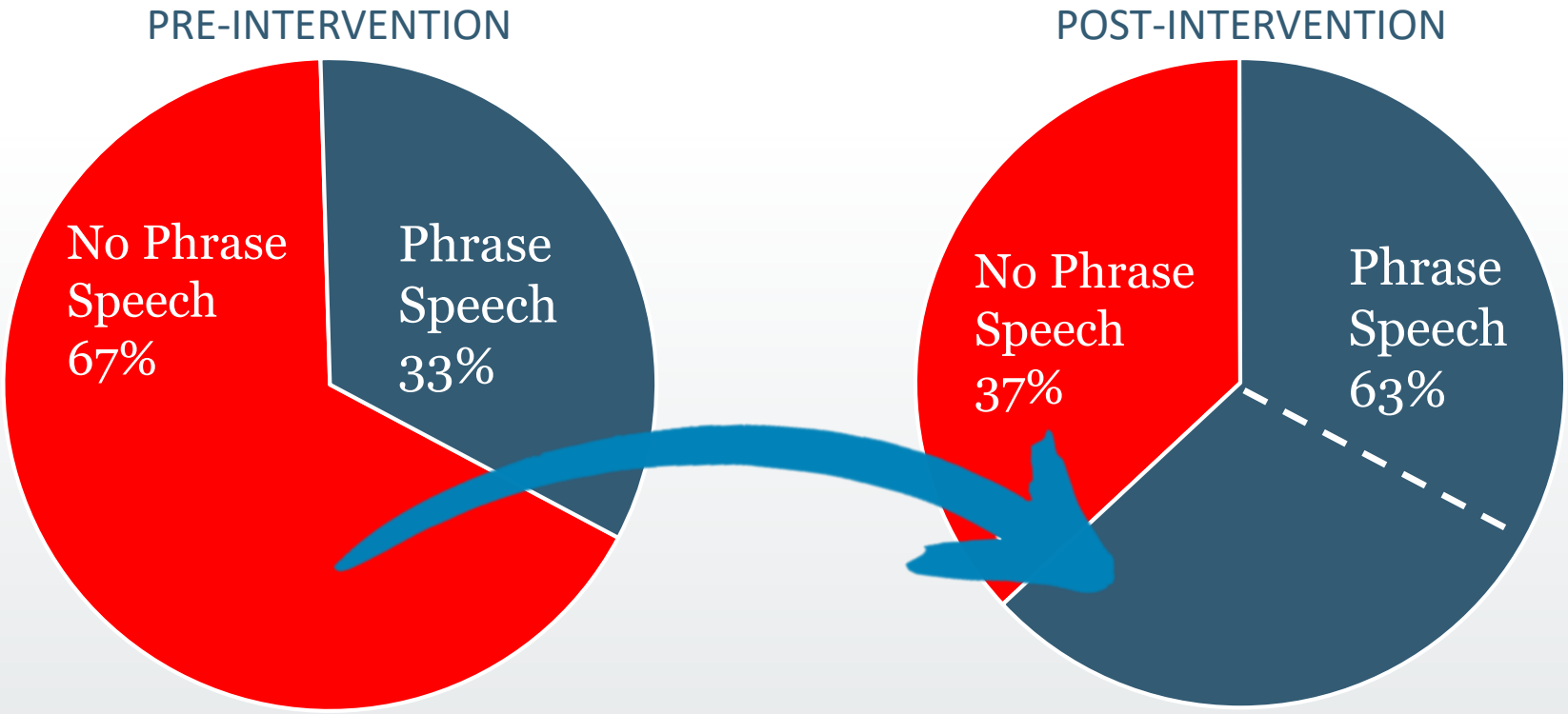
- Research question – Prevalence and predictors of 'minimal response', as defined as failing to acquire phrase speech – i.e., advancing from single words or no words (expr. lang. age equivalent <24 m) to 'word combination' or more advanced stage.

PRE-INTERVENTION



POST-INTERVENTION





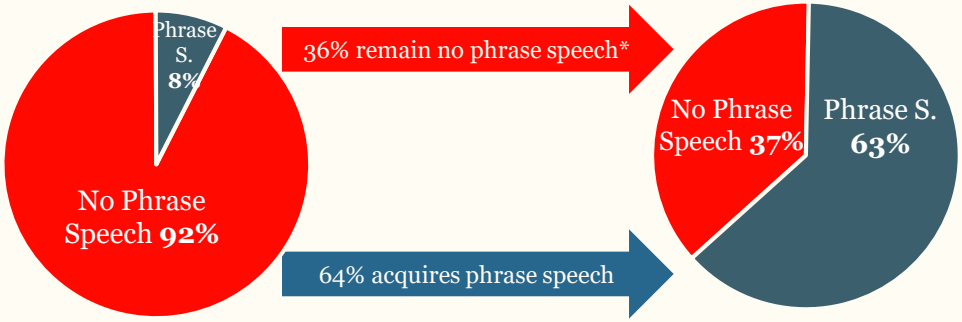
- Of those who have no phrase speech e at pre-intervention, approximately half advance to phrase speech after receiving intervention.

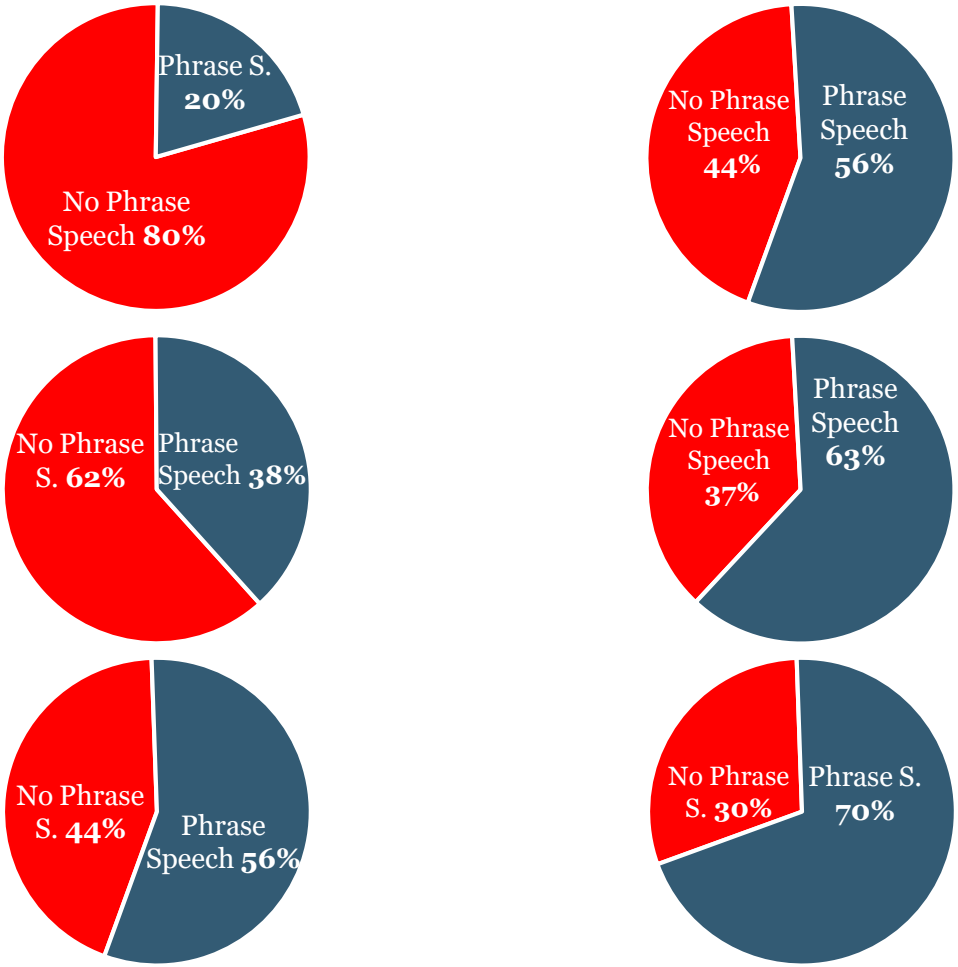
Children who do not acquire phrase speech – broken down by age group

PRE-INTERVENTION

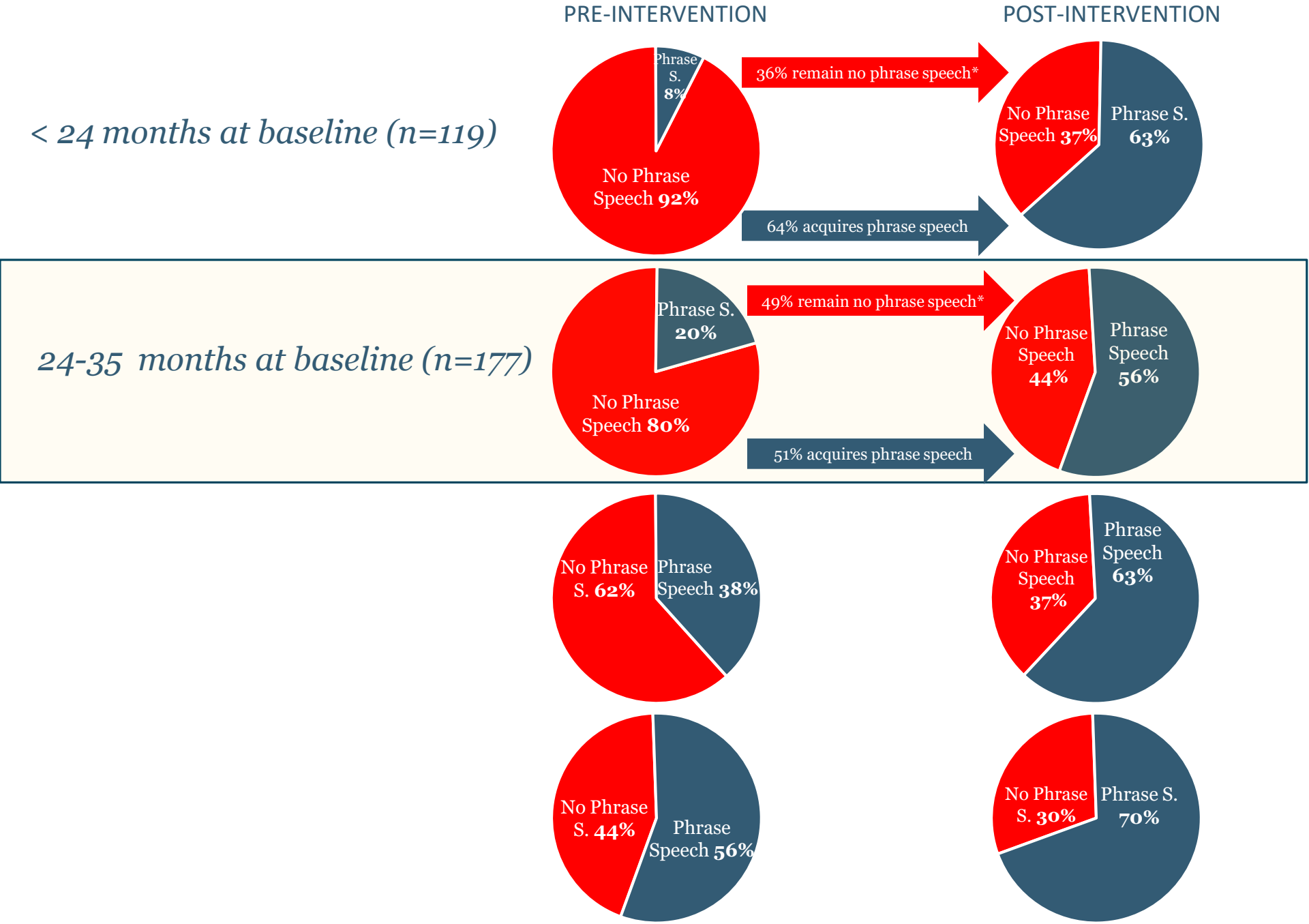
POST-INTERVENTION

< 24 months at baseline (n=119)





Children who do not acquire phrase speech – broken down by age group



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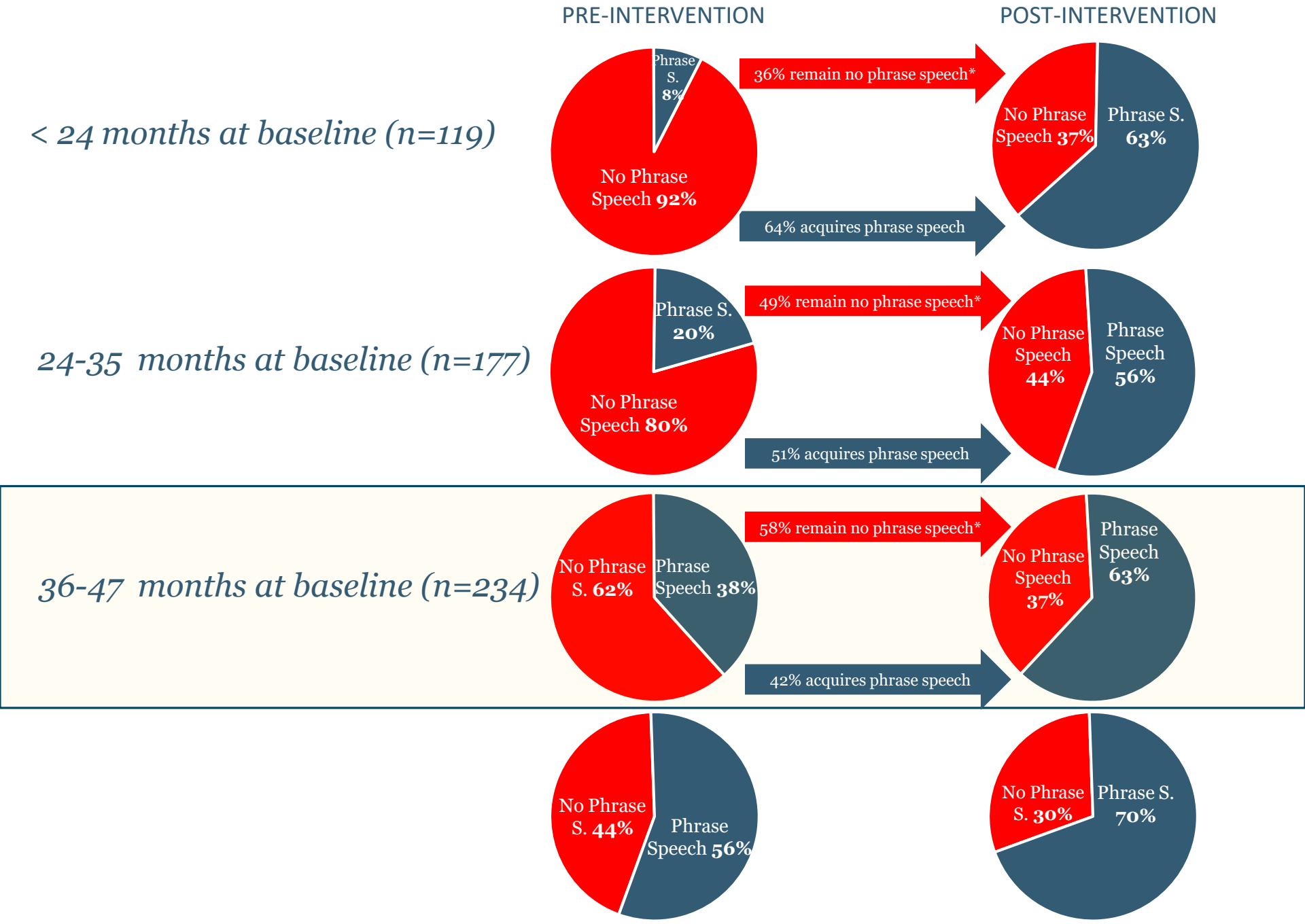

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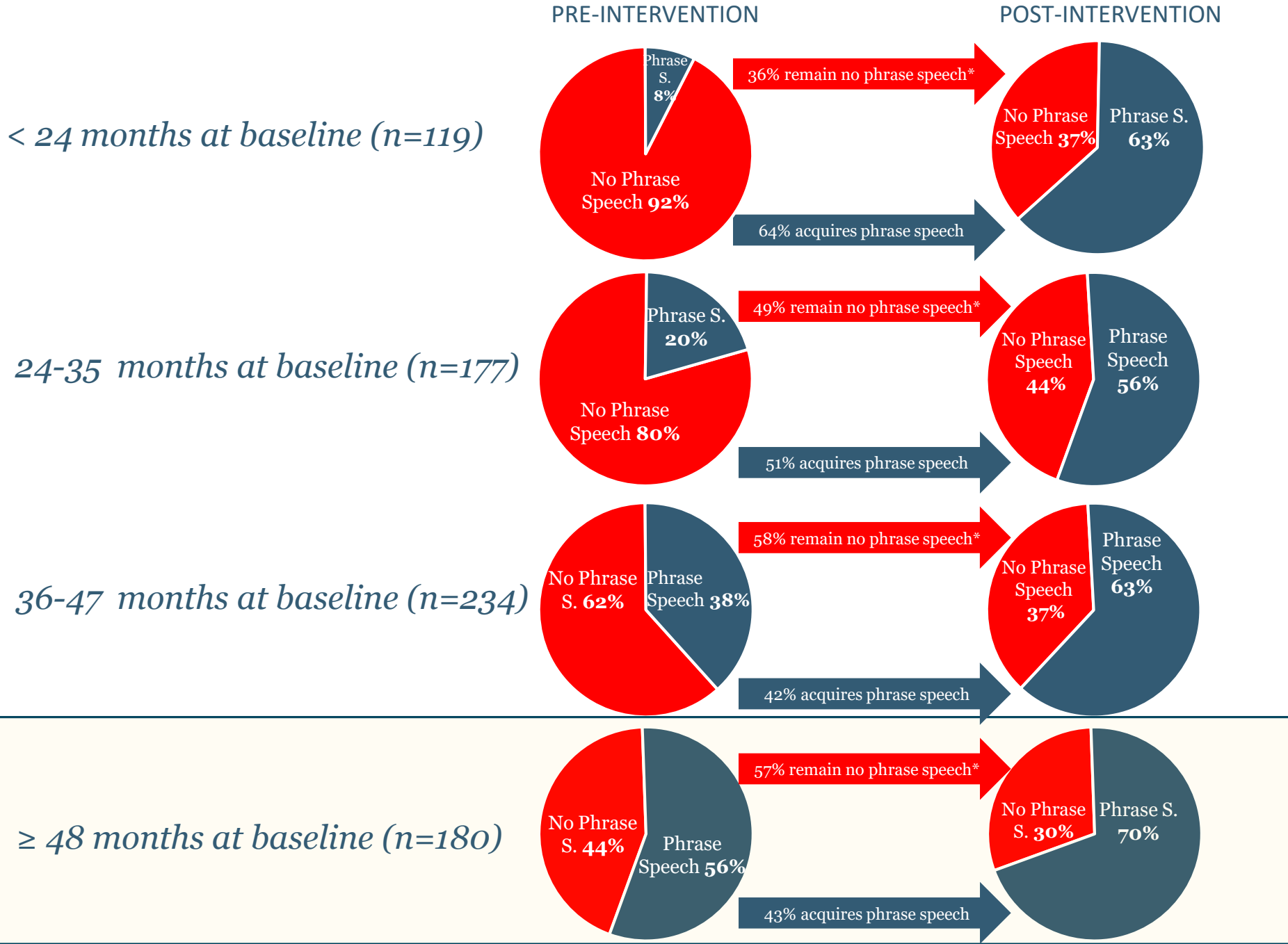
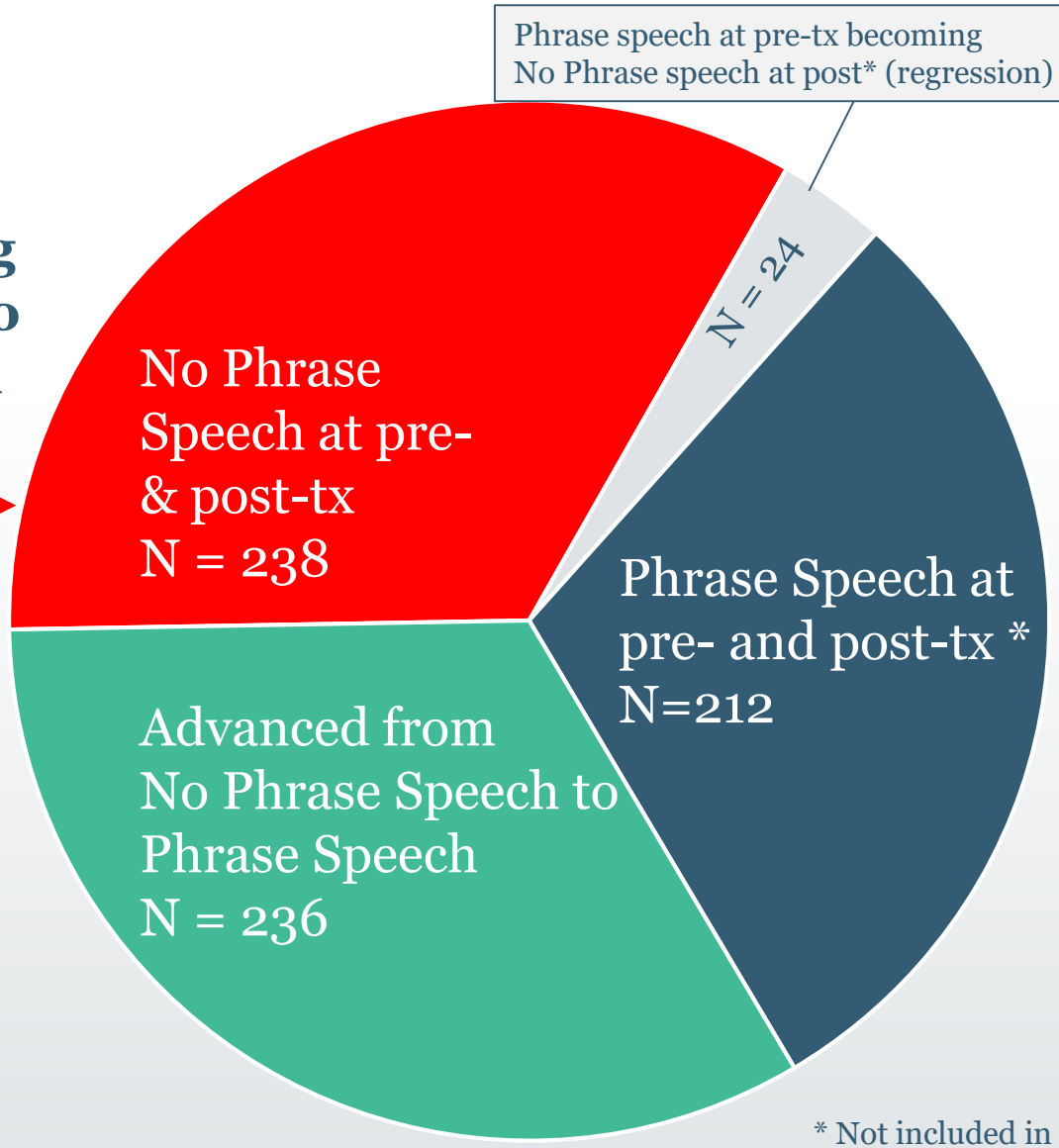


Research question- predicting whether children who have no phrase speech at baseline will remain in the same stage (no phrase speech) or will advance to phrase speech use during the tx period



* Not included in prediction model

mixed model predicting responder status

(single or no words to phrase speech stage)

	beta	ci.low95	ci.high85	OR	ci.OR.low95
(Intercept)	-0.48191892	-1.9385533	0.9747155	0.6175971	0.14391200
sexMale	0.44672117	-0.4826231	1.3760654	1.5631784	0.61716240
tx_broadEIBI	0.63065316	-2.3939624	3.6552687	1.8788374	0.09126733
tx_broadNDBI	-0.86940788	-2.8842817	1.1454659	0.4191997	0.05589493
tx_broadESDM	0.69719551	-0.9272496	2.3216406	2.0081131	0.39564039
PC1	-0.88842397	-1.3130657	-0.4637822	0.4113035	0.26899414
PC2	-0.82000104	-1.3016106	-0.3383915	0.4404312	0.27209322
PC3	-0.20766558	-0.7157257	0.3003946	0.8124787	0.48883721
PC4	0.05981975	-0.3747796	0.4944191	1.0616452	0.68744076
PC5	-0.31363182	-0.9486840	0.3214204	0.7307880	0.38725030

	ci.OR.high95	pval	fdr
(Intercept)	2.6504129	5.166910e-01	0.6458638029
sexMale	3.9592928	3.461204e-01	0.6043625493
tx_broadEIBI	38.6779129	6.827793e-01	0.7586436553
tx_broadNDBI	3.1439058	3.977033e-01	0.6043625493
tx_broadESDM	10.1923823	4.002290e-01	0.6043625493
PC1	0.6289005	4.119749e-05	0.0004119749
PC2	0.7129161	8.464298e-04	0.0042321489
PC3	1.3503916	4.230538e-01	0.6043625493
PC4	1.6395456	7.873286e-01	0.7873286436
PC5	1.3790852	3.330540e-01	0.6043625493

Note – fdr is the corrected p-value using false discovery rate

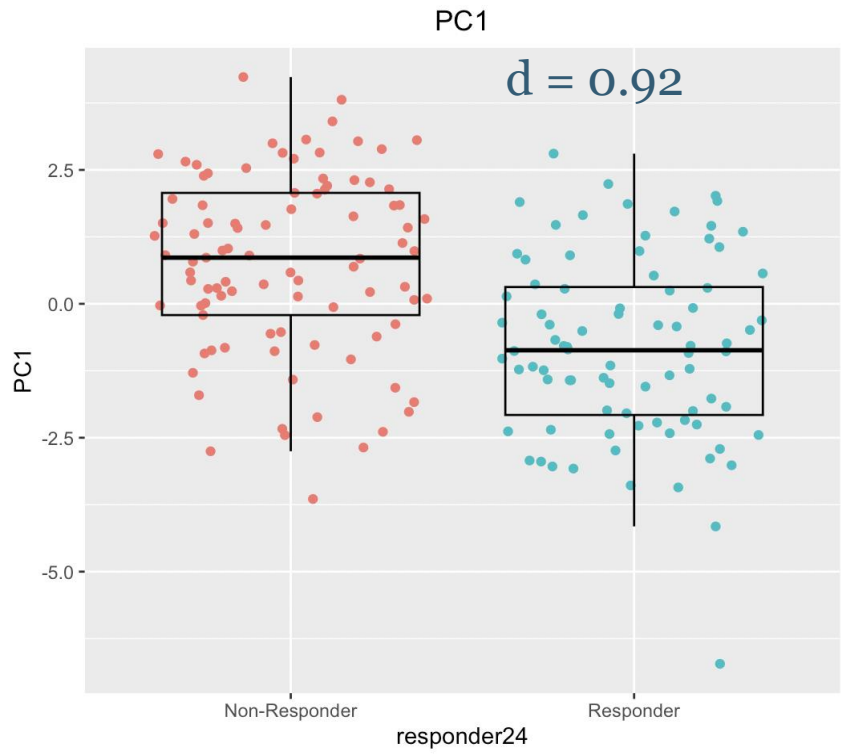
- Two latent factors ('principal components') are the main predictors of responder status.
- The first is composed of the correlated intervention age at start /ADOS/ VABS/ DQ/duration/ intensity/
- The second is composed of variance attributable to pre-treatment imitation and ADOS

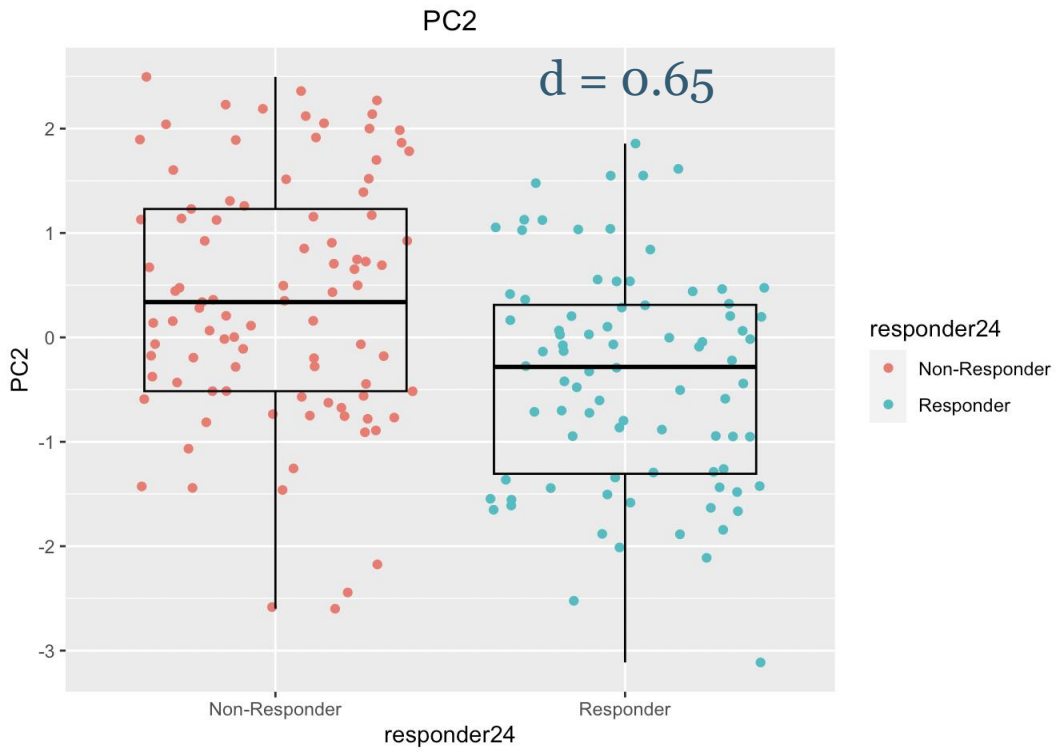
mixed model predicting responder status

(single or no words to phrase speech stage)

First Factor (Principal Component 1) accounts for 44.89%, large effect size

Second Factors (Principal Component 2) accounts for 17.54%, medium effect size





Impact of intervention on response status (advancing from no-phrase speech to phrase speech)

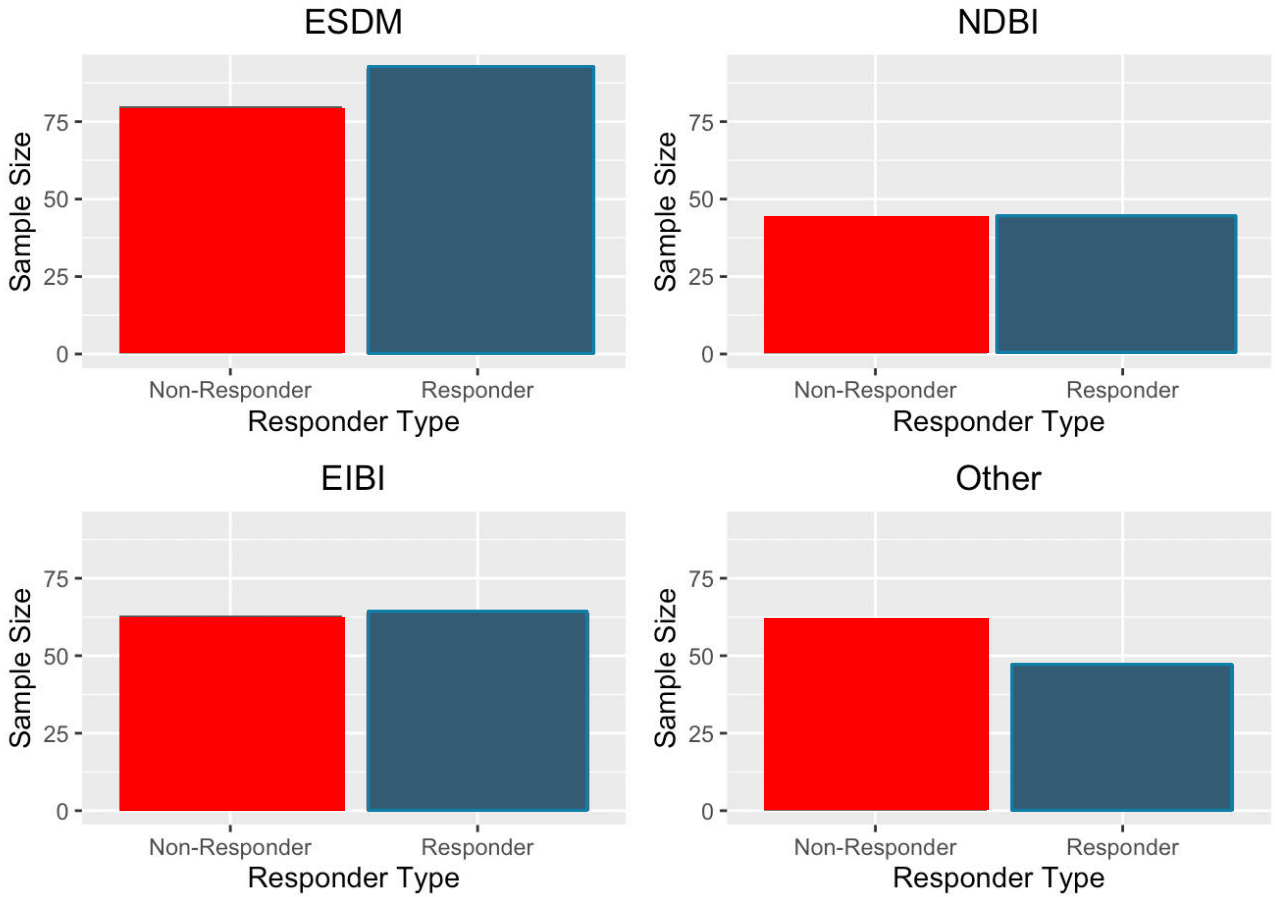
```
$emmeans
 tx_broad emmean    SE  df asymp.LCL asymp.UCL
 Other    -0.176 0.661 Inf    -1.471    1.1197
 EIBI      0.455 1.442 Inf    -2.372    3.2816
 NDBI     -1.045 0.519 Inf    -2.062   -0.0285
 ESDM      0.521 0.459 Inf    -0.377    1.4204

$contrasts
 contrast     estimate    SE  df z.ratio p.value
 Other - EIBI  -0.6307 1.543 Inf  -0.409  0.9770
 Other - NDBI   0.8694 1.028 Inf   0.846  0.8326
 Other - ESDM  -0.6972 0.829 Inf  -0.841  0.8348
 EIBI - NDBI    1.5001 1.555 Inf   0.965  0.7695
 EIBI - ESDM   -0.0665 1.497 Inf  -0.044  1.0000
 NDBI - ESDM   -1.5666 0.676 Inf  -2.317  0.0942

Results are averaged over the levels of: sex
Results are given on the log odds ratio (not the response) scale.
P value adjustment: tukey method for comparing a family of 4 estimates
```

- Pairwise comparisons between different treatment types, correcting for multiple tests, indicate that the type of intervention received does not predict responder status (i.e., does not predict who is going to acquire phrase speech)

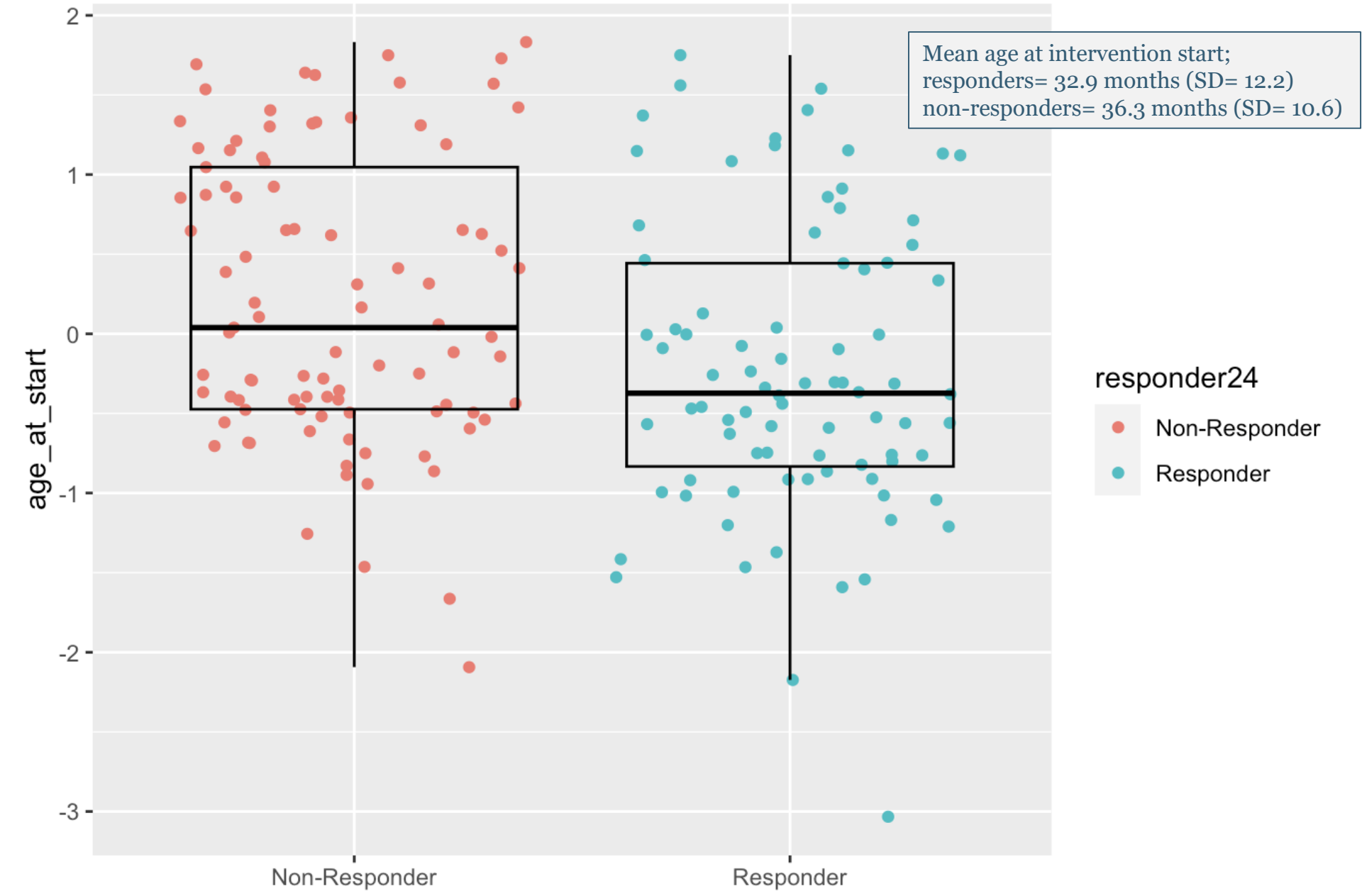
Impact of intervention on advancing from preverbal to verbal stage



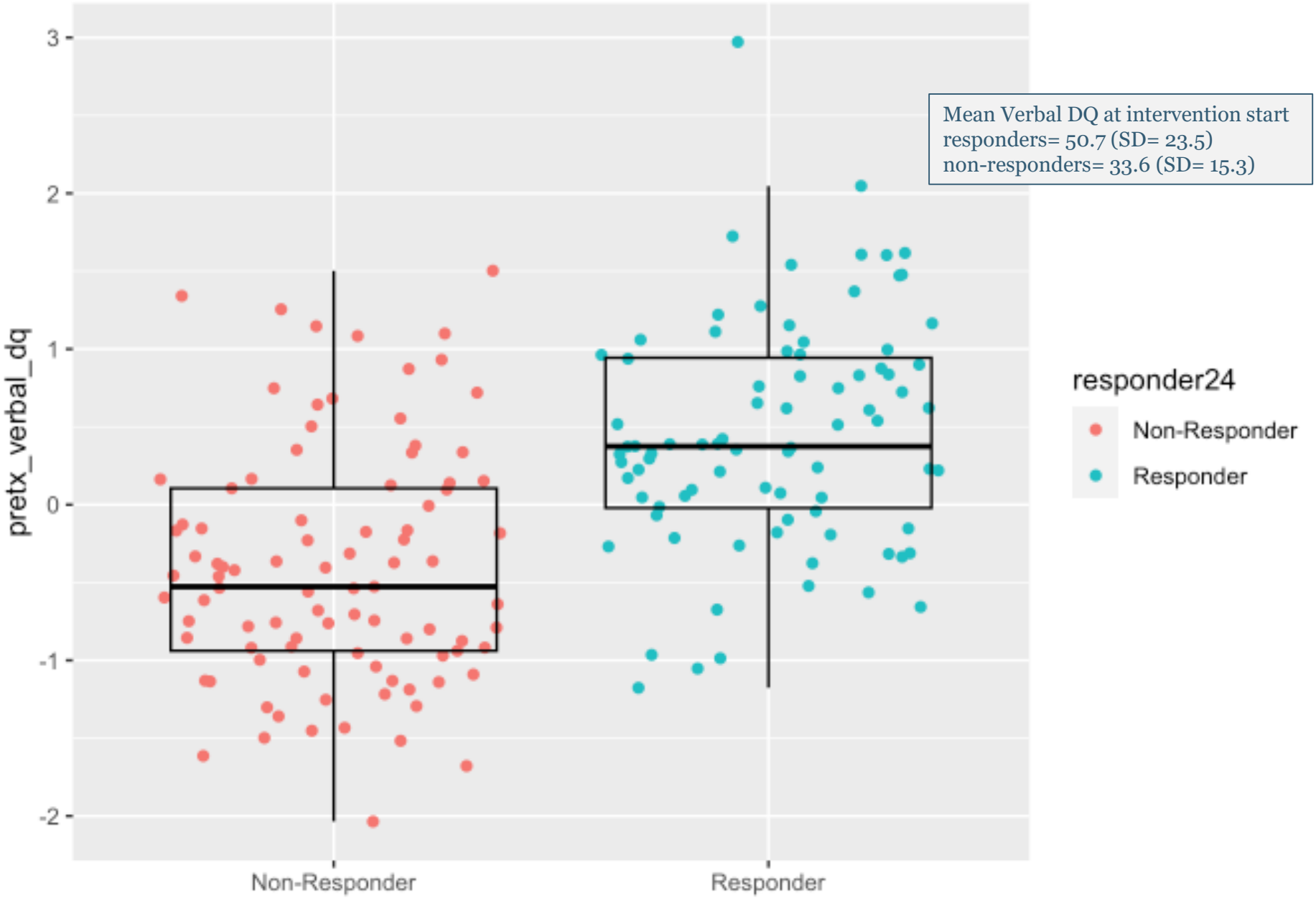
No differences in the proportion of responders/non-responders*

generated by the different interventions

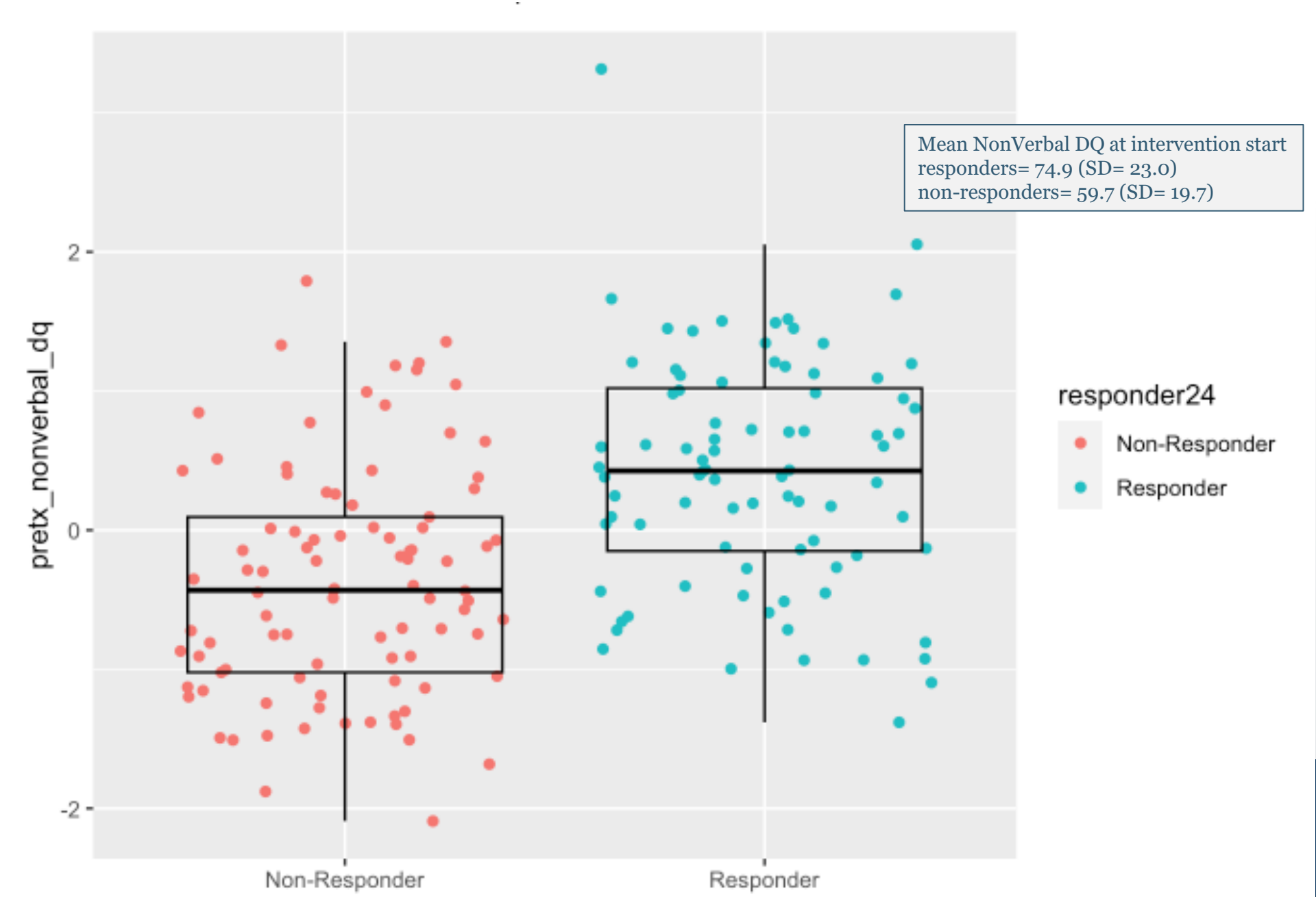
AGE at intervention start



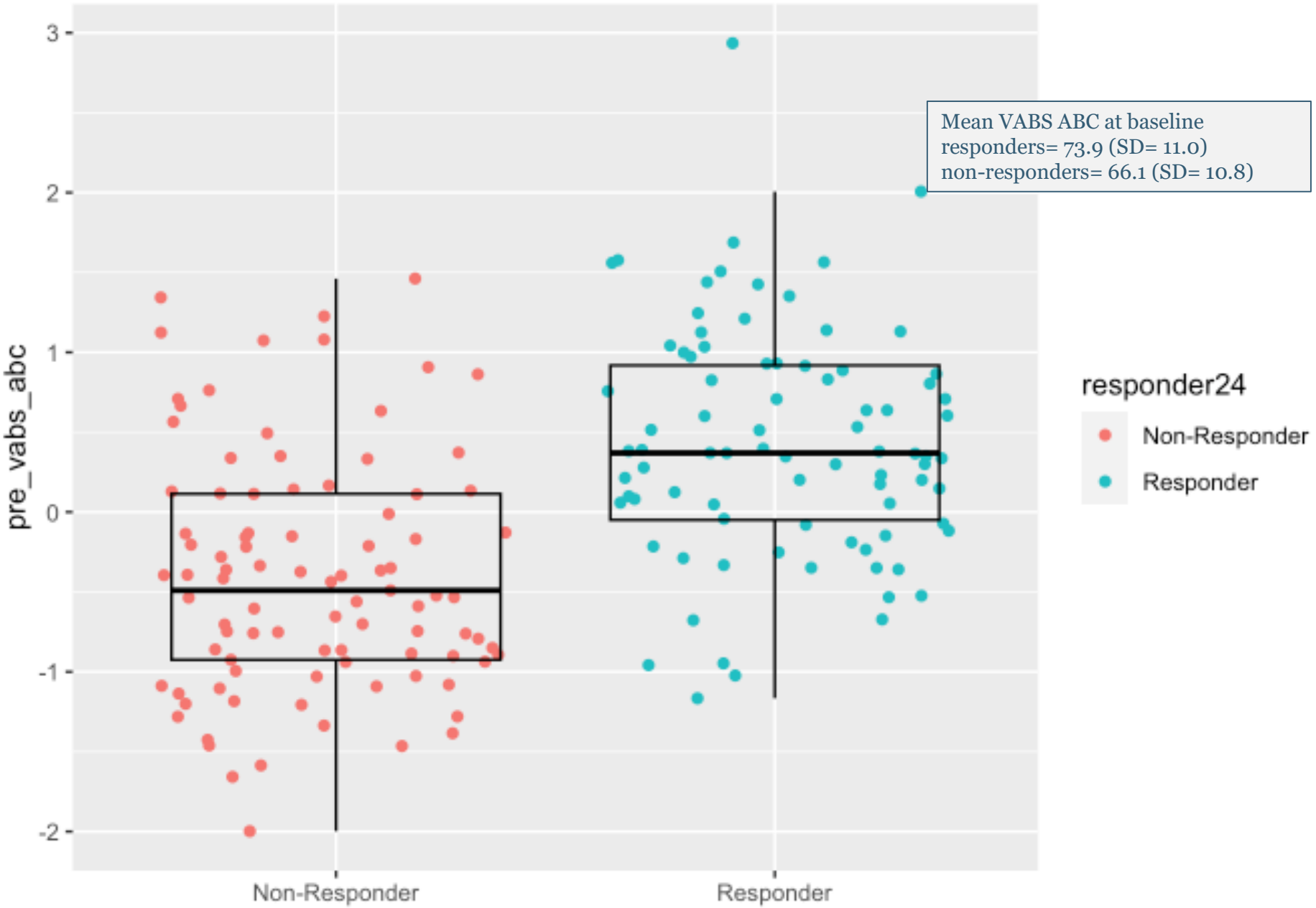
Baseline VERBAL DQ



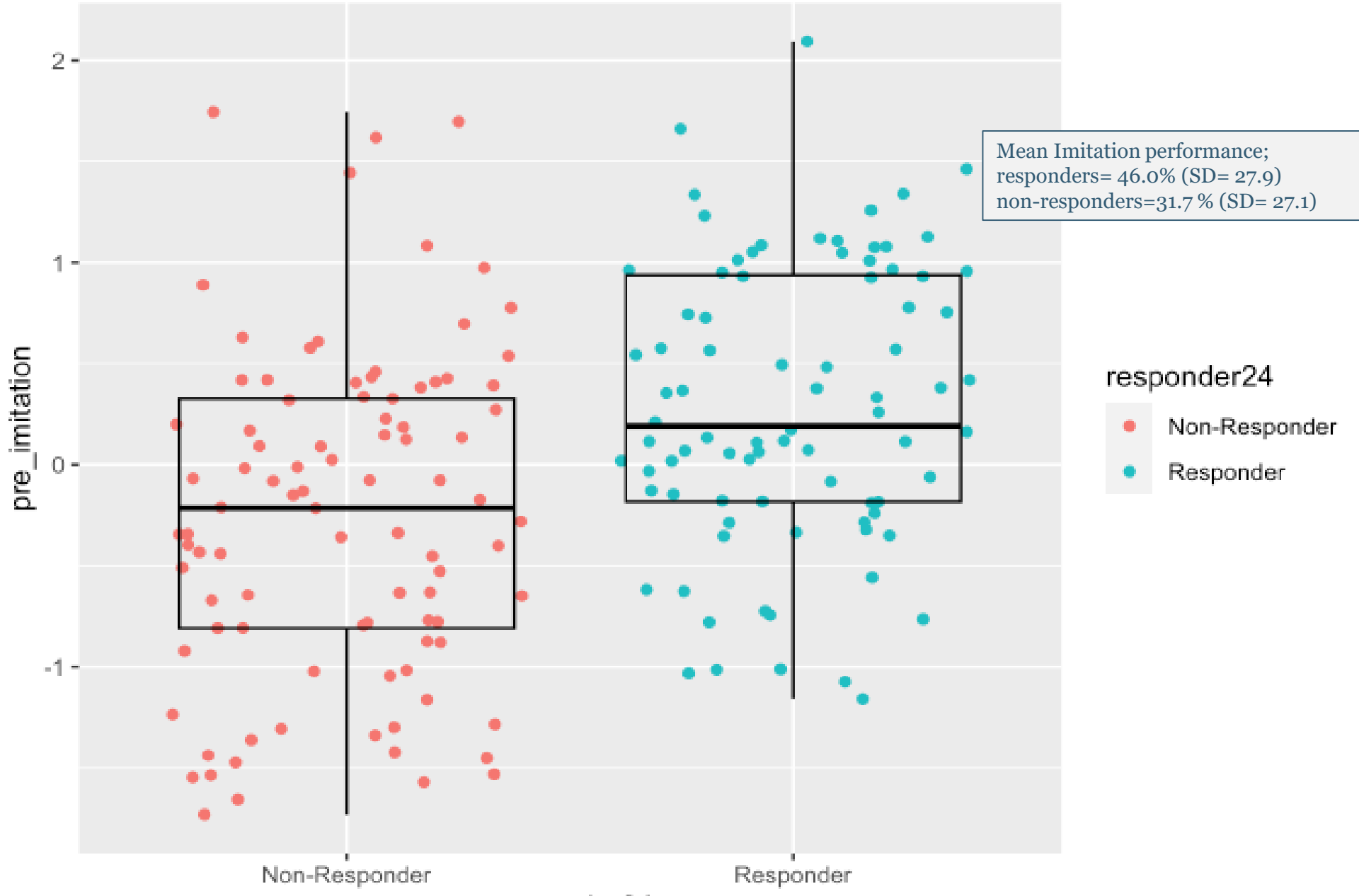
Baseline NONVERBAL DQ



Baseline VABS ABC

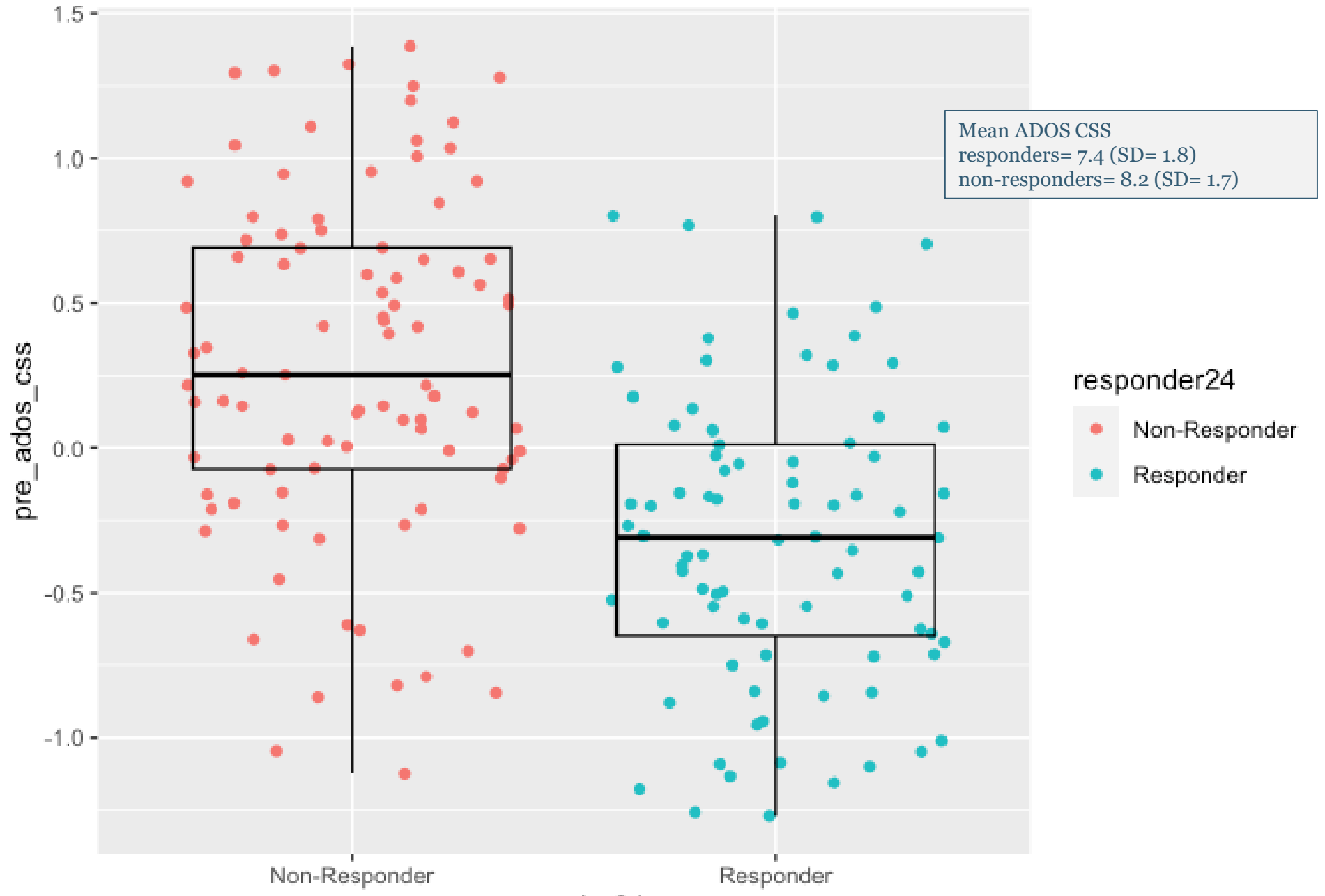


Baseline IMITATION

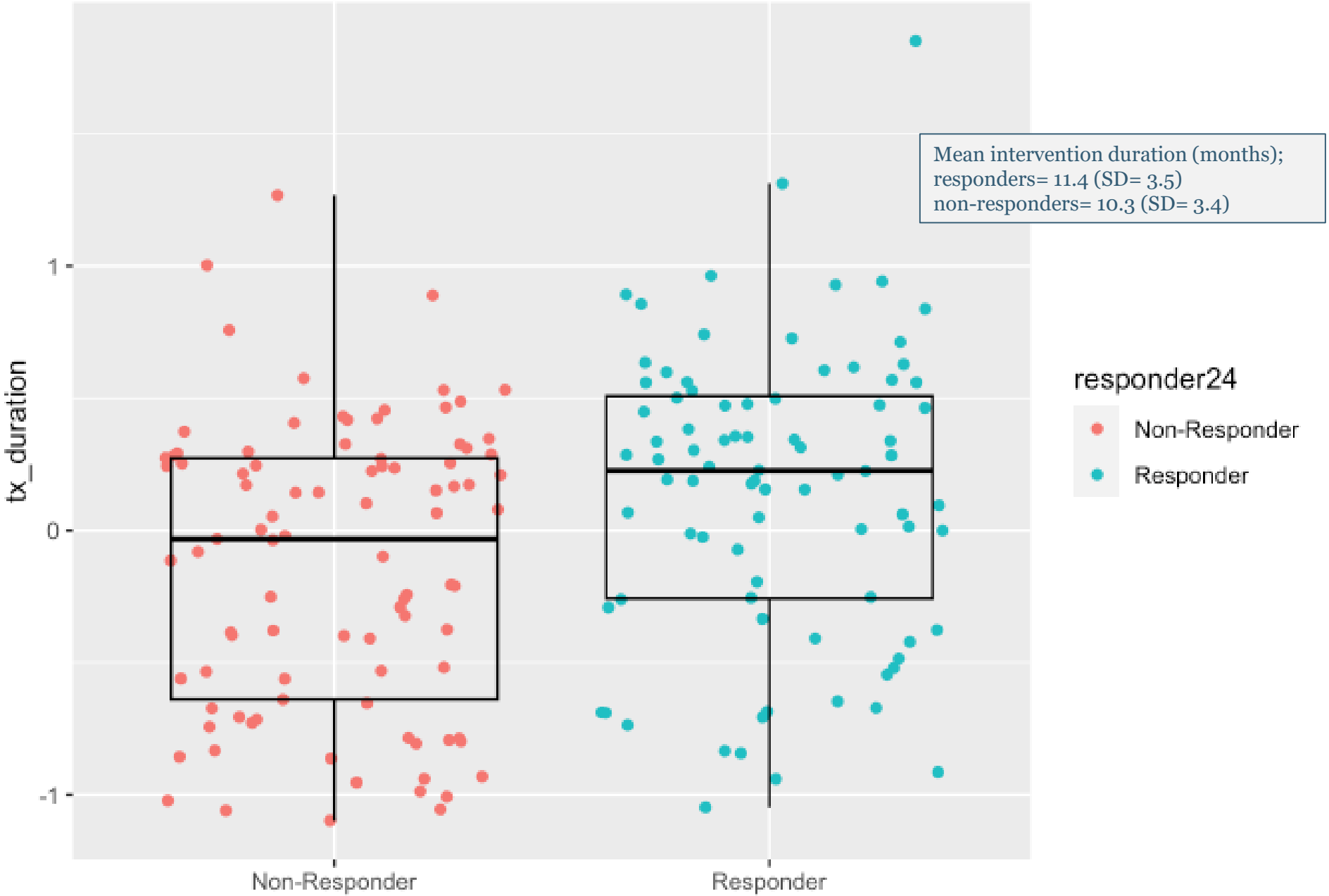


Mean Imitation performance;
responders= 46.0% (SD= 27.9)
non-responders=31.7 % (SD= 27.1)

Baseline ADOS



INTERVENTION DURATION



Summary

- Most children starting their intervention before age 4 have no phrase speech (i.e., minimally verbal). Approximately half of them will advance to phrase speech (up to 40% for 'older children') during the 12-month intervention period

- Type of intervention received was unrelated to outcome.

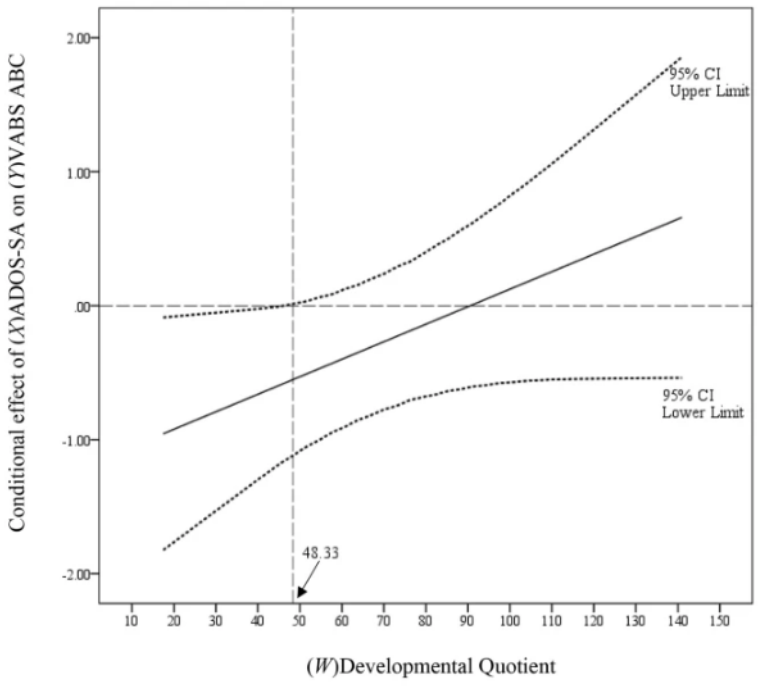
- The odds of not acquiring phrase speech were lower for children with lower age, higher cognitive and adaptive functioning, higher imitation skills, and lower symptom severity, as well as (to a lesser degree) longer intervention duration (as expressed in two latent factors composed of the correlated/combined variables capturing these constructs). Importance of identifying relevance of different factors for different subgroups

Developmental Skills Moderate the Association Between Core Autism Features and Adaptive Behaviour in Early Childhood

Daniel Berends[1] · Catherine A. Bent[1] · Giacomo Vivanti[2,3] · Cheryl Dissanayake[3] · Kristelle Hudry[1]

Moderation analyses on a subsample of R01 data (n=163)

- The association of time-1 ADOS-SA with time-2 VABS-ABC was significant for children with baseline DQ ≤ 48.33.



Lower-bound region of significance for conditional effect of ADOS-SA on VABS ABC as a function of MSEL DQ

Core social autism features are strongly associated with adaptive behavior specifically for children with very low developmental skills

For most children whose developmental skills are less impaired, cognitive functioning (rather than core features of their autism) that are more strongly associated with adaptive outcomes.

Cognitive compensation? Core social autism features may be predictive of adaptive outcomes when children cannot employ cognitive skills to compensate for core social differences

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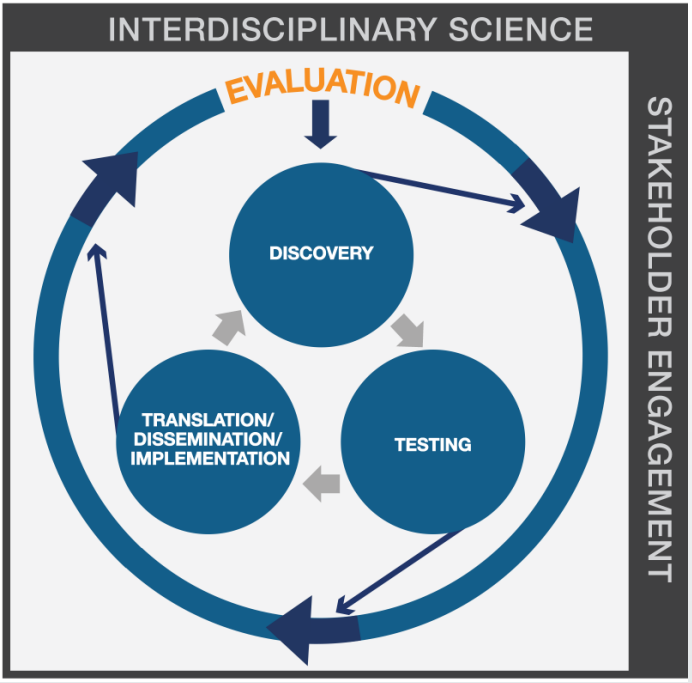
Applying a public health approach to autism research: A framework for action

Diana Schendel[1] | Anne M. Roux[1] | Elizabeth McGhee Hassrick[1] | Kristen Lyall[1] | Lindsay Shea[1] | Giacomo Vivanti[1] | Andrea Trubanova Wieckowski[1] | Craig Newschaffer[2] | Diana L. Robins[1]



- **Discovery - Gaps in knowledge**

Gaps in knowledge – documenting phenomena, generating testable hypotheses

- **Testing -**

Testing hypotheses/predictions, evaluating frameworks

- **Translation/Dissemination/ Implementation**

Community/services/policy

Cyclical vs Linear Process

Minimal responders to intervention – poor fit between child and program features?

Different programs/settings/ approaches differ in terms of how learning is promoted
(e.g. verbal vs visual instruction)

Different children differ in learning preferences and learning resources
(e.g. preference for visual vs verbal input)

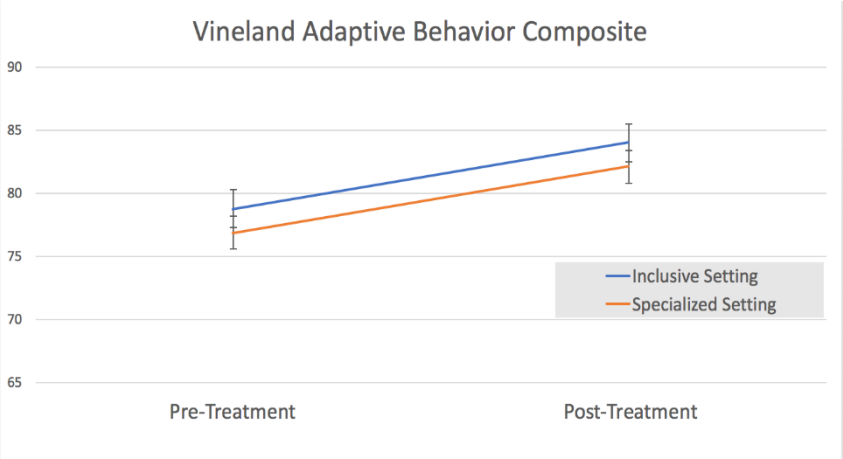
Suboptimal treatment outcomes might occur as the consequence of a poor **fit between child and program features**

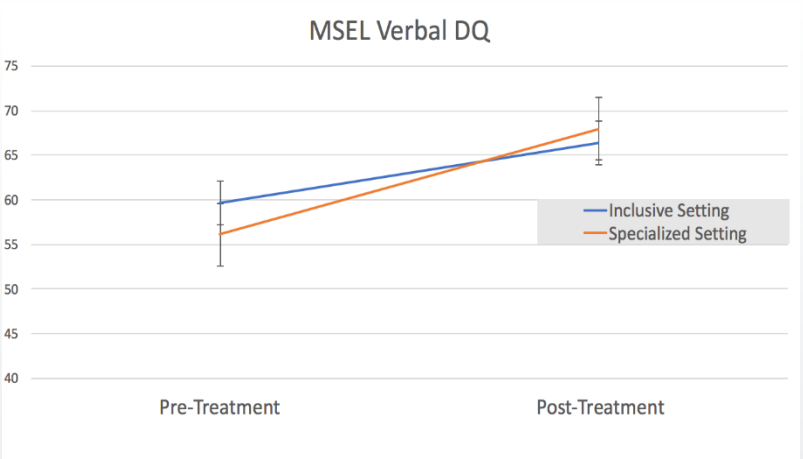
Vivanti, 2017, *Current Directions in Psych Science*
Vivanti, Kasari, Green, Mandell, Maye & Hudry, 2018 *Aut Research*

Outcomes of children receiving Group-Early Start Denver Model in an inclusive versus autism-specific setting: A pilot randomized controlled trial

Giacomo Vivanti[1,2], Cheryl Dissanayake[2], Ed Duncan[2], Jessica Feary[2], Kristy Capes[2], Shannon Upson[2], Catherine A Bent[2], Sally J Rogers[3] and Kristelle Hudry[2]; the Victorian ASELCC Team

58 children with ASD age 15-30 mo randomized to receive the Group-ESDM intervention in either specialized or mainstream classrooms for 1 year. No overall group differences in gains.





Moderators of outcomes – based on stakeholders' practices and assumptions, we hypothesized that children with higher social interest and higher cognitive skills at baseline may make more gains if they receive ESDM within a mainstream classroom, as they are better equipped to gain advantage from the richer social environment

Autism Research

Characteristics of children on the autism spectrum who benefit the most from receiving intervention in inclusive versus specialized early childhood education settings

DOI: 10.1002/aur.2815

Who are the children who benefit the most from receiving intervention in inclusive versus specialized early childhood education settings?

Outcome Measures

- Spontaneous Vocalizations via Language ENvironment Analysis (LENA) automated data extraction
- Social Interaction via M-COSMIC

Putative moderators

- Social interest via eye-tracking
- Developmental Quotient (MSEL)

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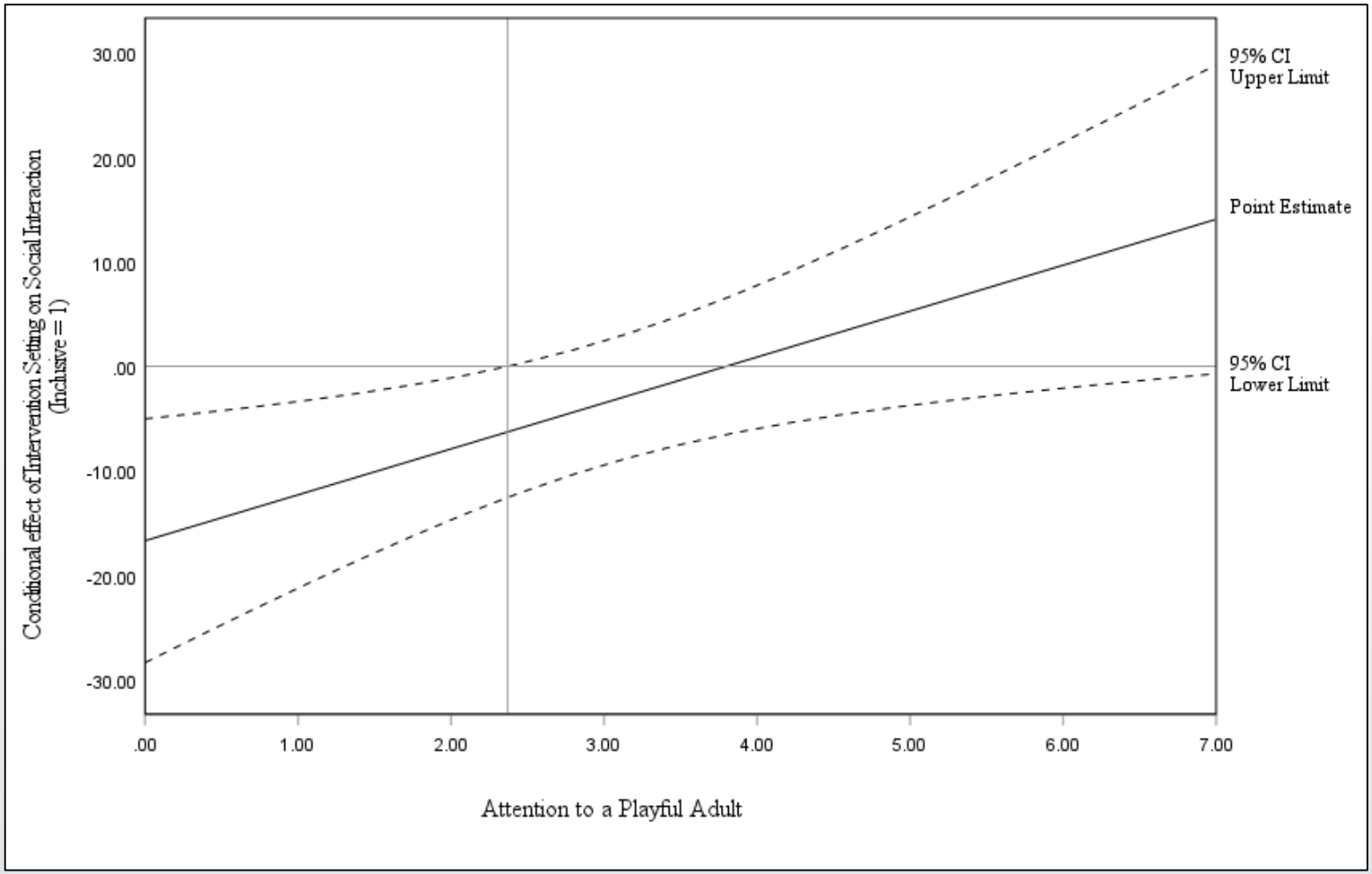
Social attention (eye-tracking) associated with Social Interaction outcomes for children in inclusive classrooms (b=2.84, p=.02) but not for those in autism-specific classrooms (b= -1.56, p=.22)

Children who attended to the person in the video for <2.37 seconds (out of 10) had lower outcomes



Vivanti, Bent, Capes, Upson & Dissanayake, 2022, *Autism Research*

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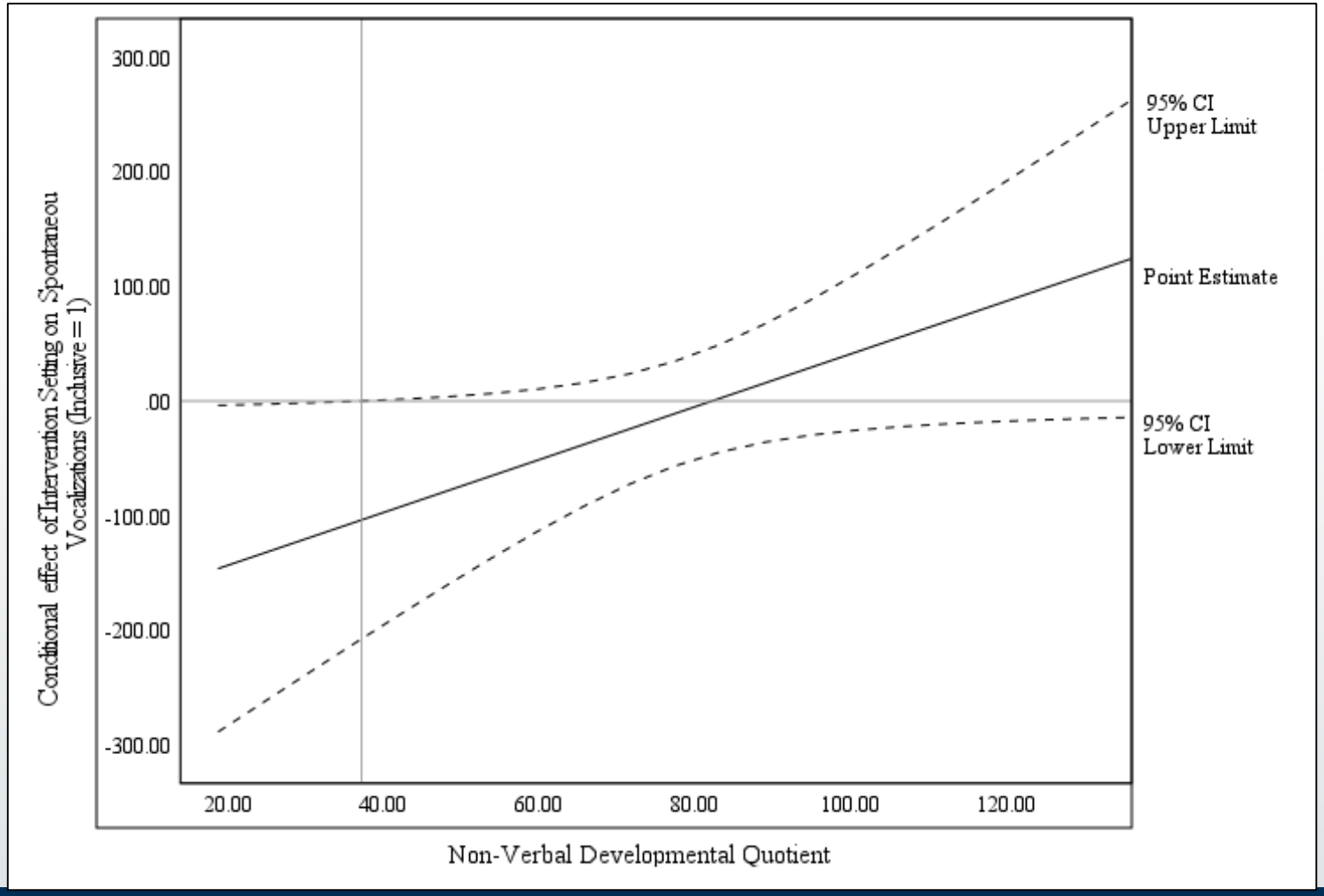
Non-Verbal DQ positively associated with language (LENA) outcome for children in inclusive classrooms (b=2.34, p=.013), but not those in autism-specific classrooms (b=0.04, p=.10). Children with Non-Verbal DQ <37 had lower outcomes



Vivanti, Bent, Capes, Upson & Dissanayake, 2022, *Autism Research*

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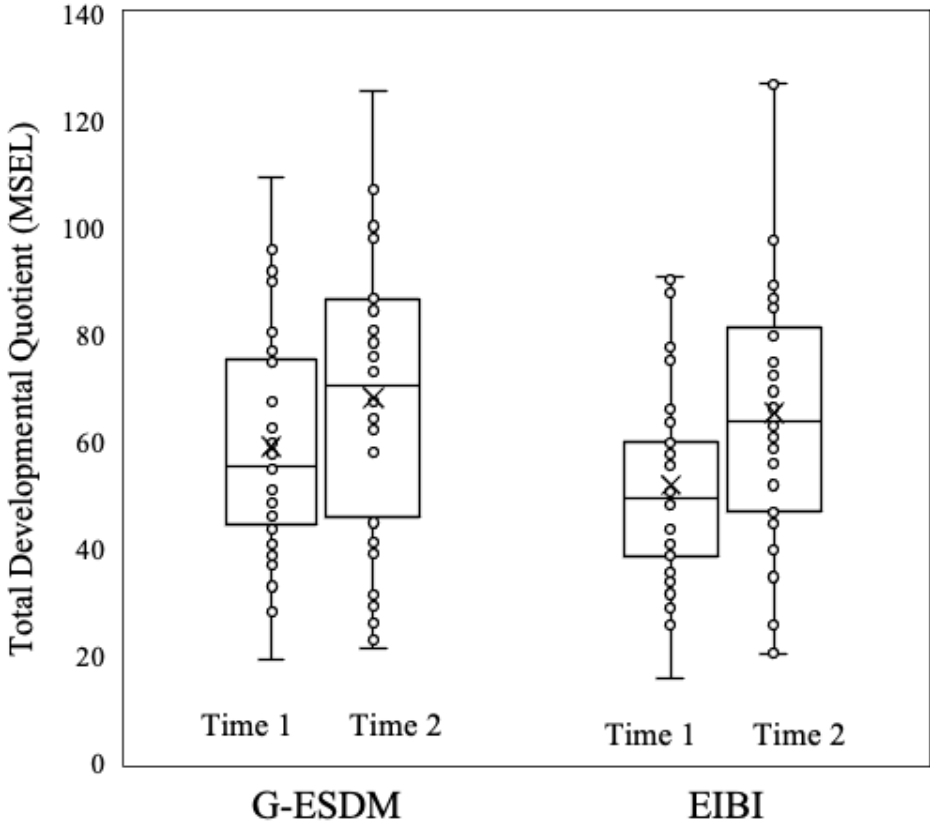
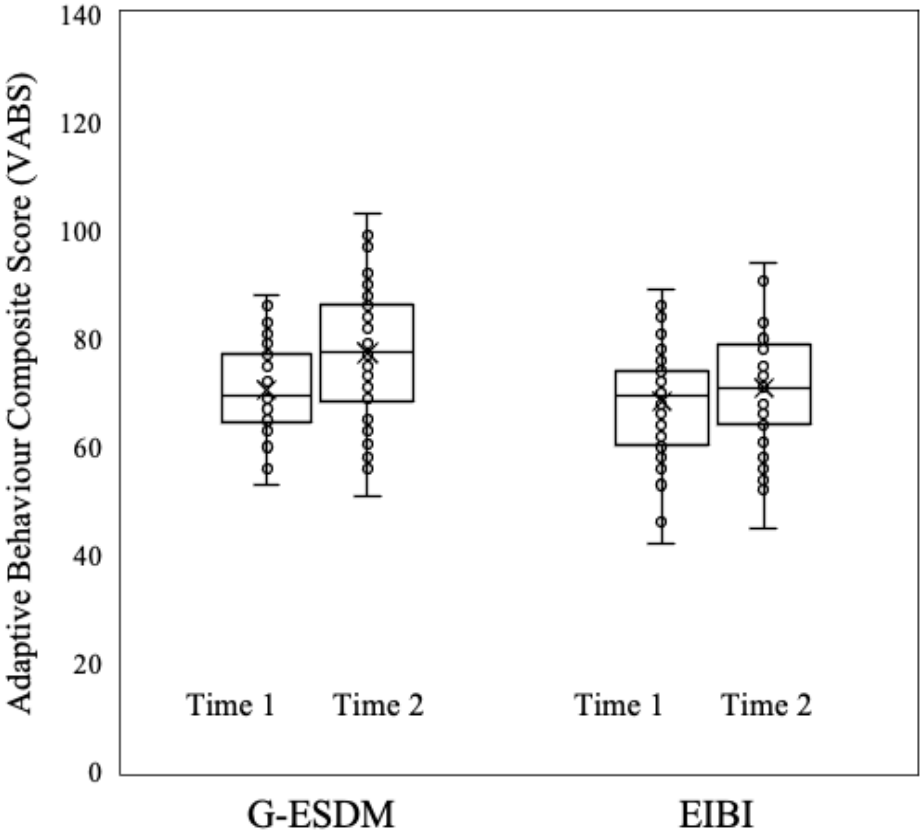
Predictors of Developmental and Adaptive Behaviour Outcomes in Response to Early Intensive Behavioural Intervention and the Early Start Denver Model

Catherine Bent[1] · Susan Glencross[2] · Karen McKinnon[2] · Kristelle Hudry[1] · Cheryl Dissanayake[3] · The Victorian ASELCC Team · Giacomo Vivanti[3,4]

Outcomes for toddlers receiving 12 months of G-ESDM (n= 46) versus Early Intensive Behavioural Intervention (EIBI) based on a standard ABA 1:1 format (n= 43)





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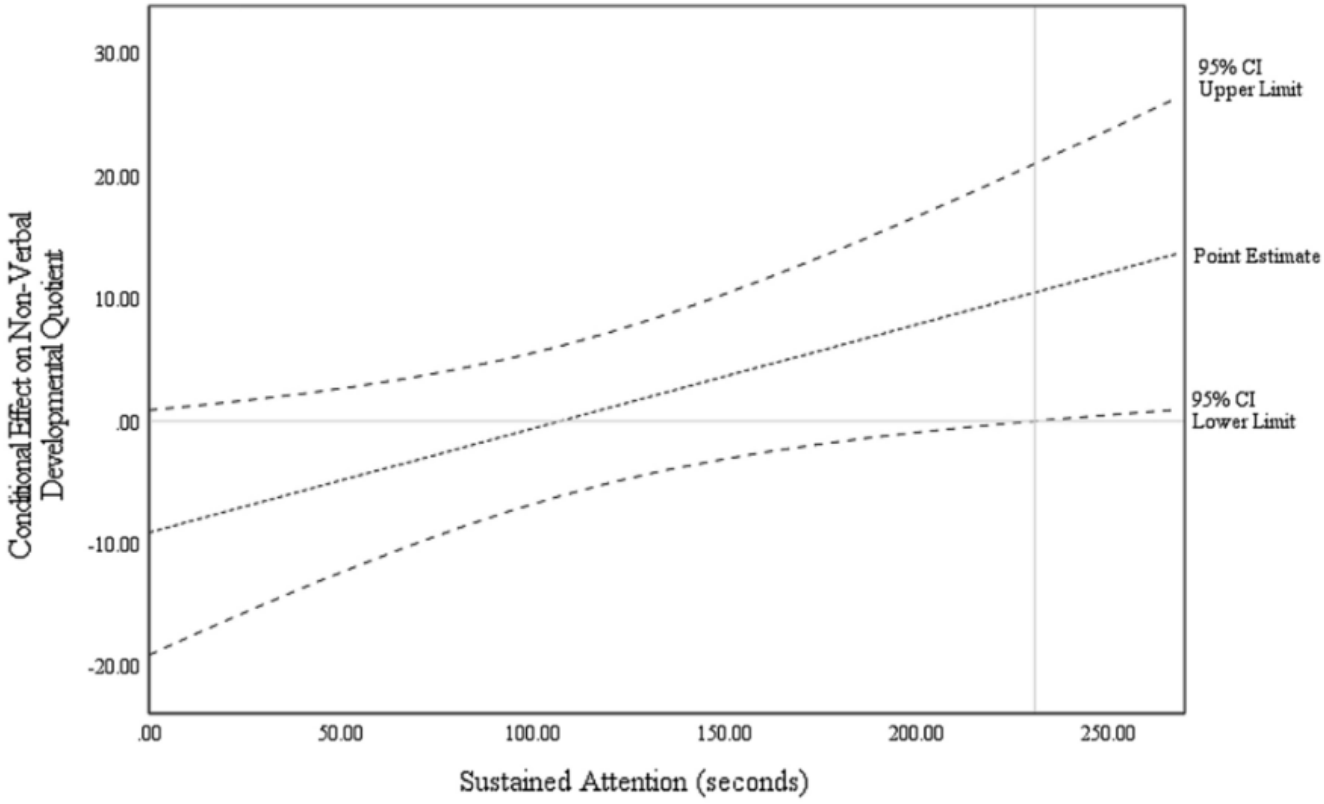
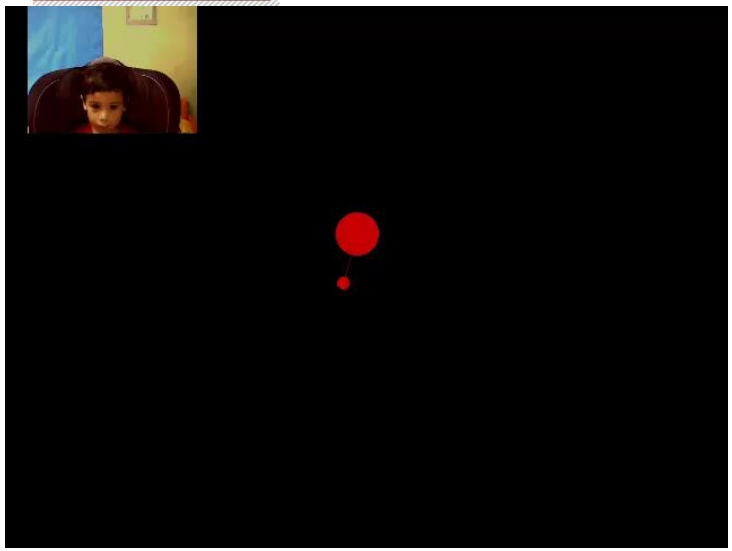
Similar gains across groups – sustained attention associated with gains in G-ESDM only having sustained attention > 230 (out possible total 300) helped children in the G-ESDM group with NVDQ improvements (that was not the case for those in the EIBI group

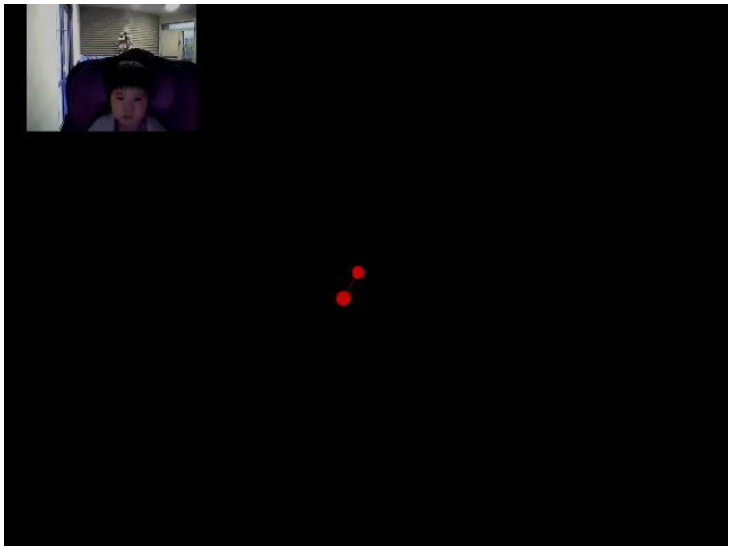


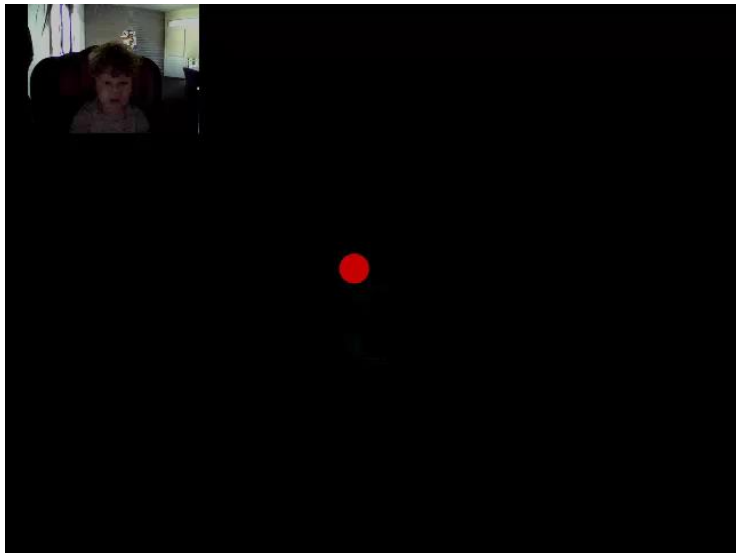
And who are the children who benefit the most from naturalistic verbal instruction n vs Augmentative Alternative Communication?

Accurate or Assumed: Visual Learning in Children with ASD

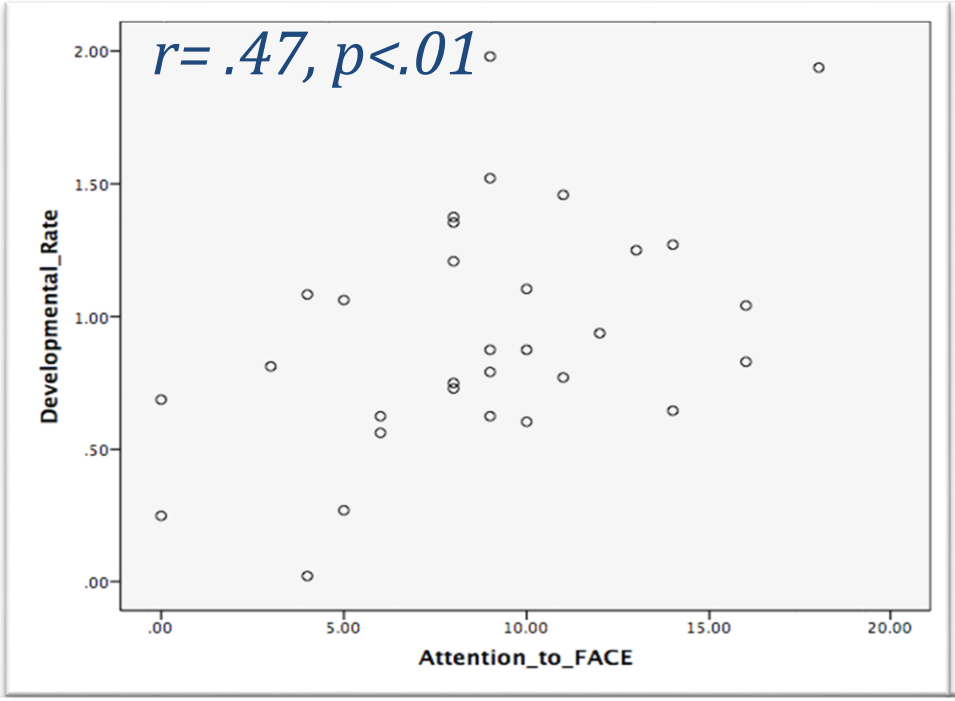
David Trembath[1,2] · Giacomo Vivanti[2,3] · Teresa Iacono[4] · Cheryl Dissanayake[2]

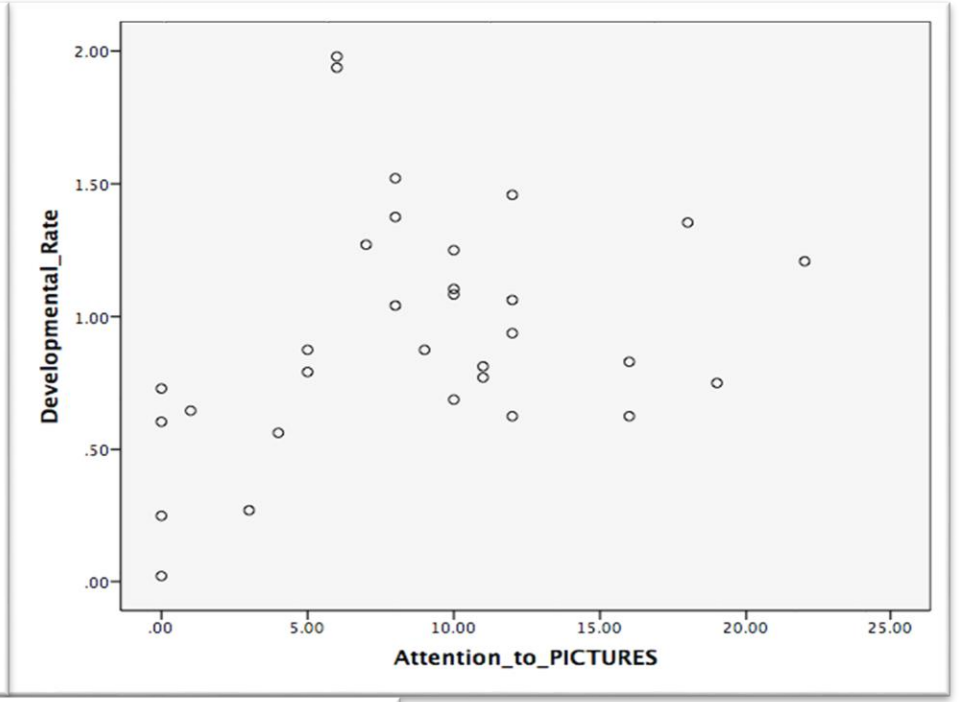






ESDM Group





Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	.475	.241		1.966	.059
	Baseline IQ	.007	.003	.356	2.054	.049
2	(Constant)	.320	.254		1.263	.217
	Baseline IQ	.006	.003	.297	1.719	.097
	Attention to Pictures	.012	.007	.279	1.615	.117
3	(Constant)	.184	.246		.748	.461
	Baseline IQ	.003	.003	.164	.948	.351
	Attention to Pictures	.010	.007	.249	1.526	.139
	Attentio to Face	.038	.018	.374	2.181	.038

a. Dependent Variable: Developmental_Rate

Model	R	R Square
1	.356[a]	.127
2	.449[b]	.201
3	.567[c]	.321

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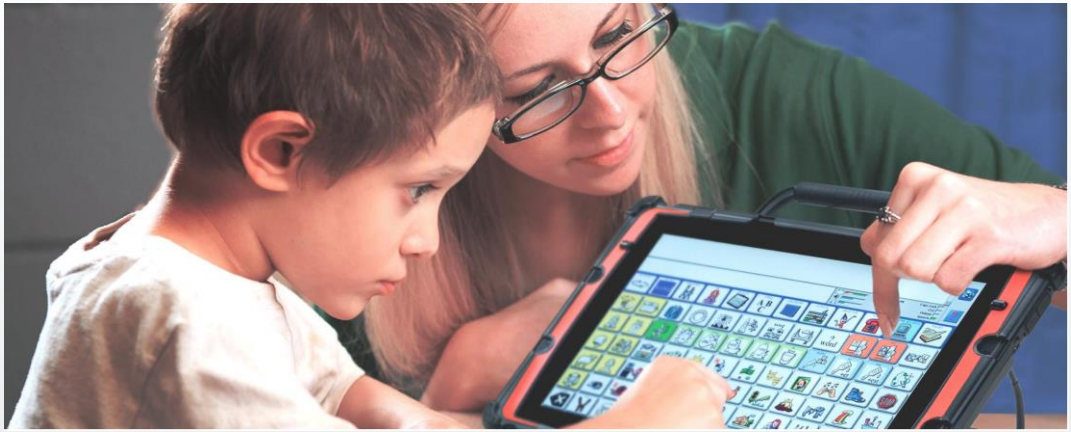
Predictors of Expressive Language Change for Children with Autism Spectrum Disorder Receiving AAC-Infused Comprehensive Intervention

Veronica Rose[1,2,6,7] · Jessica Paynter[3] · Giacomo Vivanti[4] · Deb Keen[5] · David Trembath[1]

- Group of children receiving AAC-infused intervention (pictures and other visually-based instructional techniques)



- Children who developed phrase speech at T2 visually attended significantly more to AAC pictures at pre-treatment than those who remained minimally verbal (p= .01, d= 1.42)

Applying a public health approach to autism research: A framework for action

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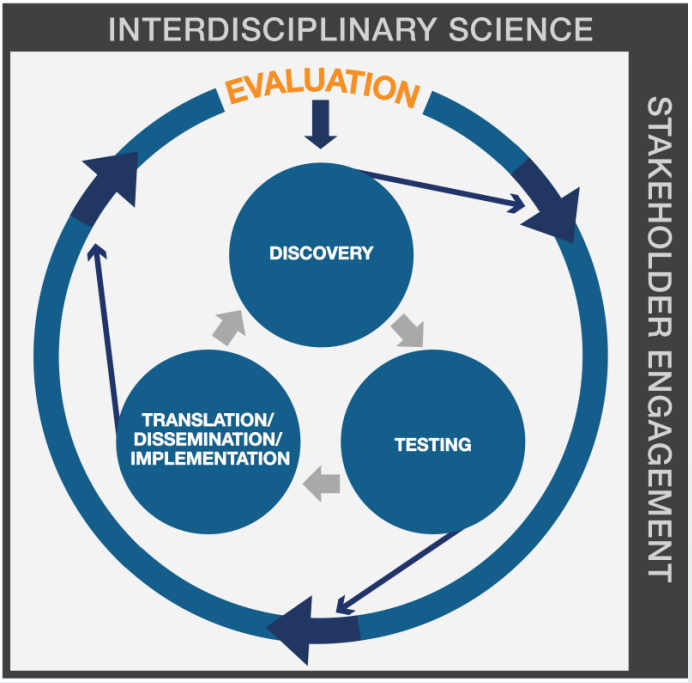


- **Discovery - Gaps in knowledge**
  Gaps in knowledge – documenting phenomena, generating testable hypotheses
- **Testing -**
  Testing hypotheses/predictions, evaluating frameworks
- **Translation/Dissemination/ Implementation**
  Community/services/policy

Cyclical vs Linear Process

Received: 10 June 2022 | Accepted: 2 August 2022

DOI: 10.1002/aur.2792

What does it mean for an autism intervention to be evidence-based?

Giacomo Vivanti

Gap between research and practice

→ Implementation standards in the community

→ Disagreements on intervention goals

Does Treatment Fidelity of the Early Start Denver Model Impact Skill Acquisition in Young Children with Autism?

Ashley Zitter[1] · Hezekiah Rinn[1] · Zofia Szapuova[2] · Vanessa M. Avila-Pons[4] · Kirsty L. Coulter[3] · Aubyn C. Stahmer[4] · Diana L. Robins[1] · Giacomo Vivanti[1,5]

Fidelity matters. A lot.

- Even within highly resourced settings, the degree to which prescribed elements of an intervention are implemented as intended varies

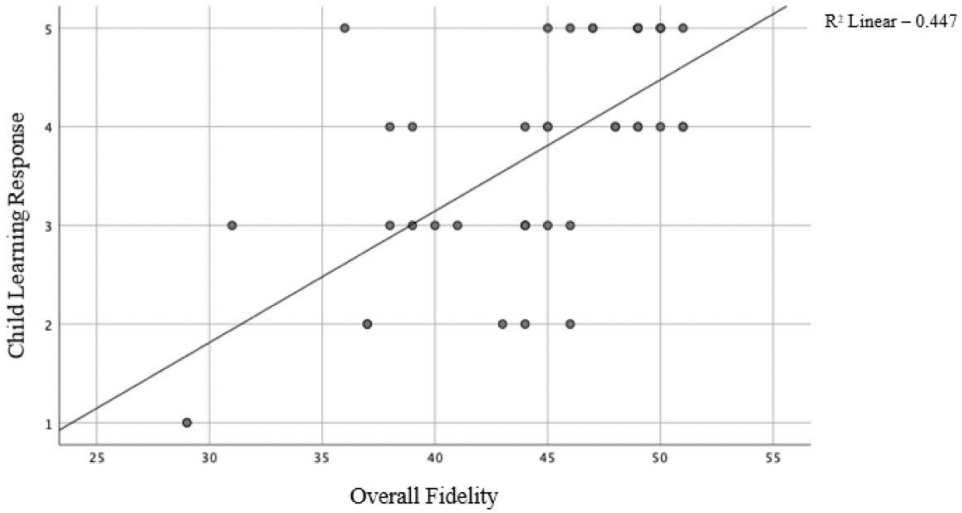
- Children with better outcomes
→ those whose therapists implement the intervention to a higher degree of fidelity

Table 1.
Intercorrelations, Means, Standard Deviations, and Range of all variables tested.

Variable	1.	2.	3.	4.	5.	6.
1. Child Learning Response	-					
2. Overall Fidelity	.67**	-				
3. Child's Age (months)	.37*	.49**	-			
4. Time in Treatment (days)	.14	.19	.63**	-		
5. MSEL CS	.39	.04	-.18	-.37*	-	
6. Vineland3 ABC (SS)	.08	.01	-.36*	-.36*	.61**	-
Mean	3.69	44.10	29.10	133.43	70.43	72.64
Standard Deviation	1.18	5.92	4.65	104.47	16.31	12.42
Range	1-5	29-51	20-39	8-354	49-102	45-90

* = p<.05, ** = p<.01, MSEL CS= Mullen Scale of Early Learning Composite Score, Vineland3 ABC (SS) = Vineland3 Adaptive Behavior Composite (Standard Score)

Figure 1.
Relationship between Overall Fidelity of ESDM Implementation and Child Learning Response



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Predictor variables	B	SE B	β	95% CI
Overall fidelity	.14	.03	.65**	0.07–0.20
Management of child attention	1.31	.22	.66**	0.86–1.76
ABC format (quality of behavioral teaching)	.67	.21	.46**	0.24–1.09
Instructional techniques application	.65	.22	.49**	0.20–1.10
Quality of dyadic engagement	.72	.24	.43**	0.25–1.20
Optimize child motivation to participate in activity	.94	.25	.55**	0.43–1.44
Use of positive affect	.89	.50	.29	−0.12–0.70
Sensitivity and responsivity to child comm. cue	.56	.27	.31*	.002–1.11
Appropriate adult language for child language level	.49	.24	.35*	−0.01–0.98
Joint activity structure and elaboration	.56	.28	.34*	0.004–1.12
Transition between activities	.34	.26	.23†	−0.17–0.85

Each row represents separate regression analyses. All regression analyses adjusted for chronological age, as well as specific child and therapist featured in the teaching episode. The complete regression model for each fidelity item is reported in the supplementary materials. All significant results remained significant after false discovery rate analyses

ABC antecedent-behavior-consequence

*$p < .05$, **$p < .01$, †$p = .05$

Disagreements on intervention goals

- **Perception of behavioral interventions as prioritizing conformity/compliance** at the expense of **neurodiversity** (i.e., variations in neurological functioning to be recognized and respected as other human variations)
- **Lack of universal metric of "successful outcome" for autism interventions**
- **Need for clarity on intervention goals**, and increasing focus on intervention targets, measures, and **language** centered around quality of life, self-reliance, well-being, freedom from distress and societal barriers to community participation
- But layers of complexity related to what quality of life means and how it should be measured at different ages (e.g., compliance in toddlerhood versus adulthood), and the **overlap between some measures of autistic symptoms and dimensions of quality of life/self-reliance** (e.g., the ability to communicate)

Vivanti, 2022, Autism Research

Human Development

Article

Human Development
DOI: 10.1159/000526416

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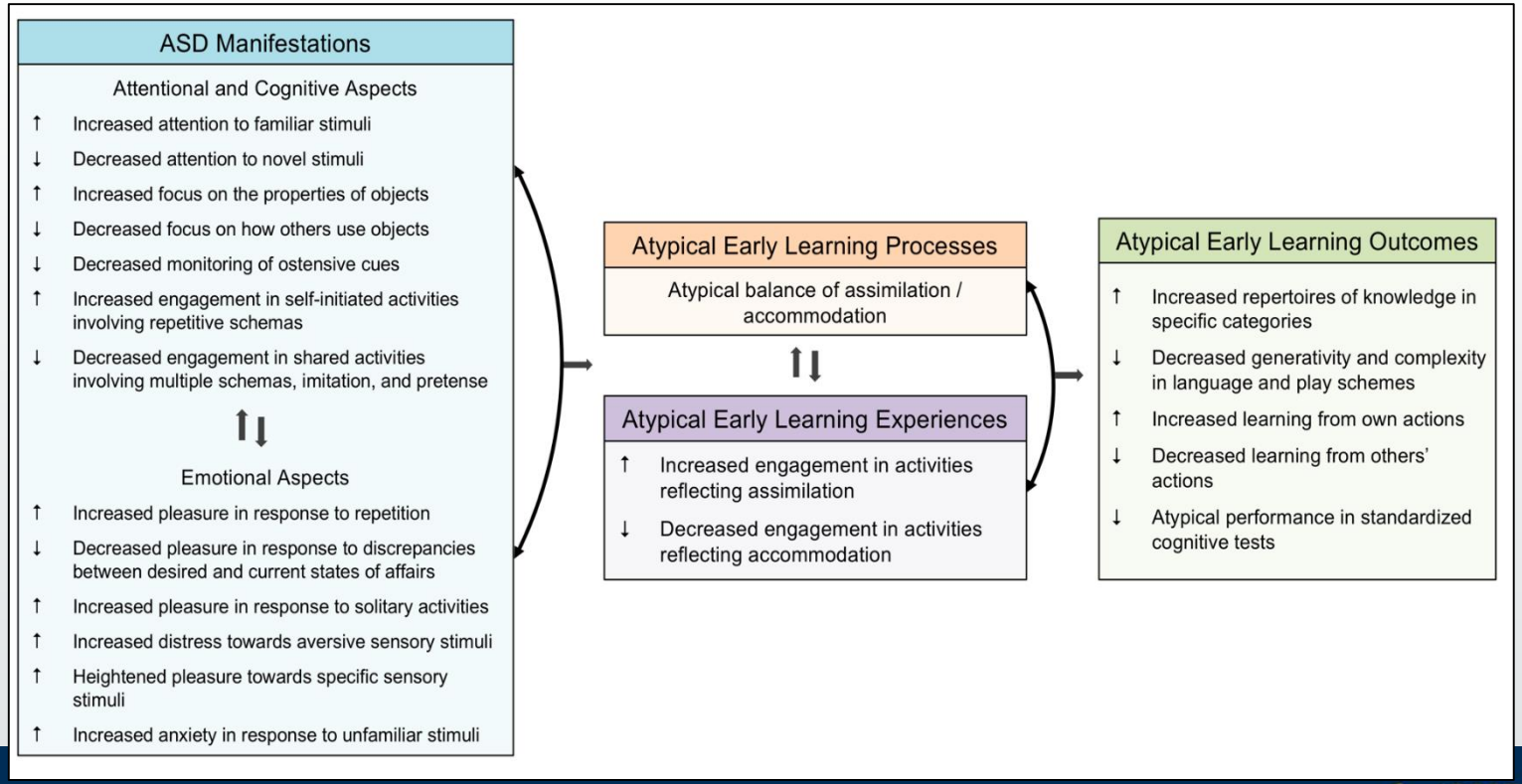
Accepted: May 7, 2022
Published online: August 9, 2022

Early Learning in Autism as an Atypical Balance between Assimilation and Accommodation Processes

Giacomo Vivanti[a] Sally J. Rogers[b] Patrick Dwyer[c, d] Susan Rivera[b, c, d]



Vivanti, Rogers, Dwyer & Rivera, 2022, *Human Development*

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TOWARDS A NEURODIVERSITY-AFFIRMING MODEL OF EARLY LEARNING AND EARLY INTERVENTION IN AUTISM

Early intervention practices informed by this model emphasize

- **Agency** - construction of new knowledge from child's self-initiated behavior
- Learning through **positive interactions** that are built on the **learner's motivation/goals**
- Promoting engagement in novel schemas through well calibrated variations on **familiar** schemas
- Alternating between familiar schemas and variations allows for **interplay of comfort and challenge** and for management of **anxiety** in the face of novelty

responders

non-responders

responders

responders

responders

responders

Thank you for your attention!

The MIRA Consortium, Victorian ASELCC team, OTARC team and Drexel EDI team

Diana Robins

Sally Rogers

Cheryl Dissanayake

Tristram Smith

Joshua Plavnik

Cathy Lord

Ann Kaiser

Sophy Kim

Isabel Smith

Aubyn Stahmer

All the children who took part in their research and their families !

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No need to translate slides from here on

Contemporary Goals of intervention in ASD

- Removing barriers to self-determination, social participation
- Addressing unmet needs, freedom from distress
- Empowerment - opportunity to take advantage of what the society can offer, plus contributing to the society
- Addressed through a combination of teaching skills to the individual and promoting an autism-friendly society

MANUALIZED EARLY INTERVENTIONS SUPPORTED BY AT LEAST ONE RANDOMIZED CONTROLLED TRIAL

Early Intensive Behavioral Intervention (EIBI, Lovaas model) (Smith et al., 2000)

Pivotal Response Training (Hardan et al., 2015; Gengoux et al., 2019; Vernon et al., 2019)

Early Start Denver Model (Dawson et al., 2010; Vivanti et al., 2019; Rogers et al., 2020)

ESI/SCERTS (Wetherby et al., 2014, 2019)

JASPER (Kasari et al., 2010, 2014; Shire et al., 2017)

Early Achievements (Feuerstein & Landa, 2020)

LEAP (Strain & Bovery, 2011)

PACT (Green et al., 2010; Pickles et al., 2016)

TEACCH (Turner-Brown et al., 2016, 2019)

Project ImPACT (Ingersoll et al., 2016)

Enhanced Milieu Teaching (Roberts & Kaiser, 2015)

PLAY (Solomon et al., 2014)

...

Vivanti et al (2020). *Clinical Guide to Early Interventions for Children with Autism.* Springer

CONCEPTUAL TAXONOMY OF ASD EARLY INTERVENTIONS FOR ASD

EARLY INTENSIVE BEHAVIORAL INTERVENTION

EIBI (Smith et al., 2000)

LEAP (Strain & Bovery, 2011)

PECS (Bondy & Frost, 1994)

NATURALISTIC DEVELOPMENTAL BEHAVIORAL INTERVENTIONS

Pivotal Response Training (Hardan et al., 2015; Gengoux et al., 2019; Vernon et al., 2019)

Early Start Denver Model (Dawson et al., 2010; Vivanti et al., 2019; Rogers et al., 2020)

ESI/SCERTS
(Wetherby et al., 2014, 2019)

JASPER (Kasari et al., 2014; Shire et al., 2017)

Early Achievements
(Feuerstein & Landa, 2020)

TEACCH? (Turner-Brown et al., 2016, 2019)

Project ImPACT (Ingersoll et al., 2016)

Enhanced Milieu Teaching
(Yoder & Stone, 2006; Roberts & Kaiser, 2015)

DEVELOPMENTAL INTERVENTIONS

PACT
(Green et al., 2010; Pickles et al., 2016)

PLAY (Solomon et al., 2014)

Vivanti et al (2020). *Clinical Guide to Early Interventions for Children with Autism.* Springer

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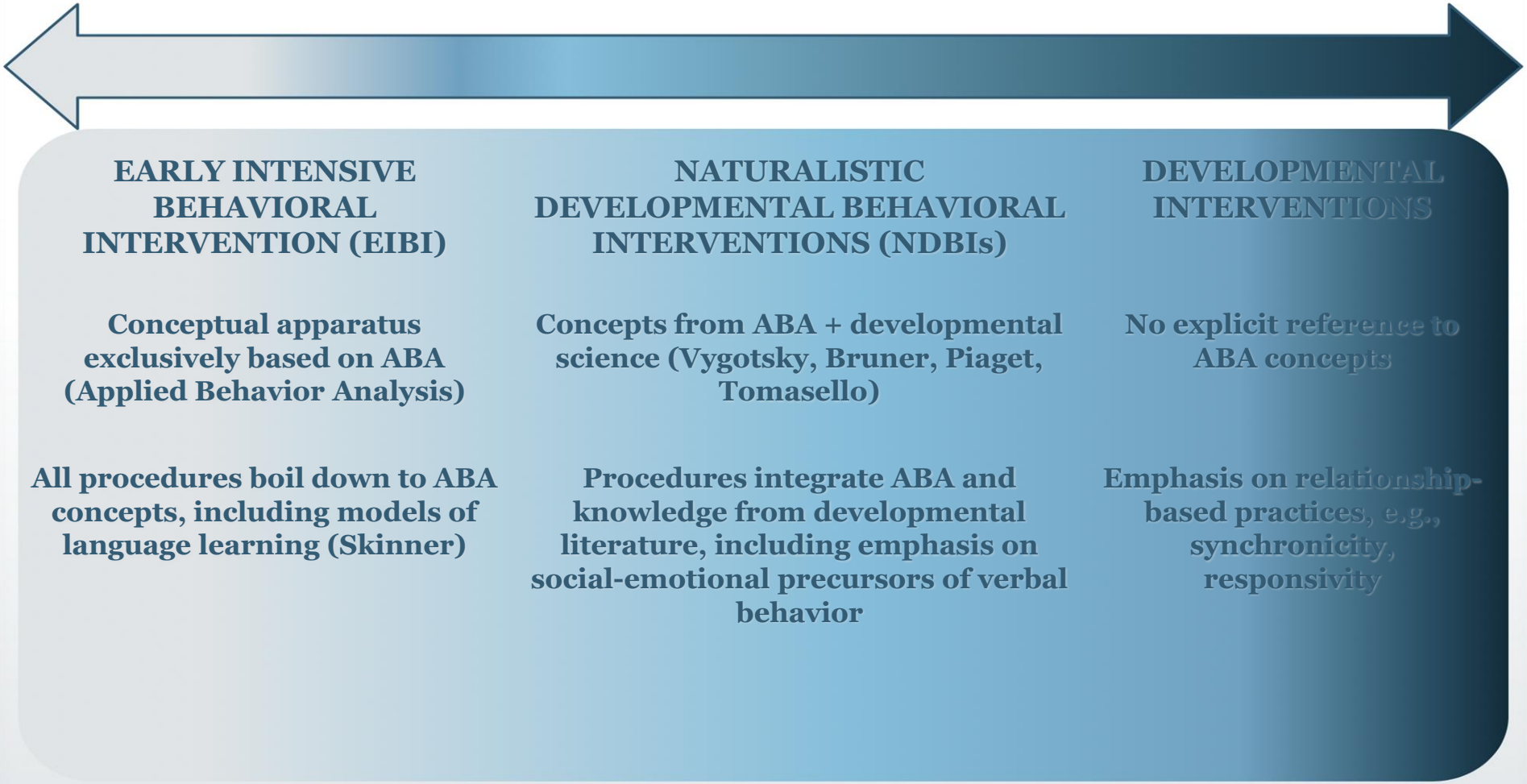
BETTER CHARACTERIZED AS A CONTINUUM RATHER THAN MUTUALLY EXCLUSIVE CATEGORIES



EARLY INTENSIVE BEHAVIORAL INTERVENTION (EIBI)	NATURALISTIC DEVELOPMENTAL BEHAVIORAL INTERVENTIONS (NDBIs)	DEVELOPMENTAL INTERVENTIONS
Conceptual apparatus exclusively based on ABA (Applied Behavior Analysis)	Concepts from ABA + developmental science (Vygotsky, Bruner, Piaget, Tomasello)	No explicit reference to ABA concepts
All procedures boil down to ABA concepts, including models of language learning (Skinner)	Procedures integrate ABA and knowledge from developmental literature, including emphasis on social-emotional precursors of verbal behavior	Emphasis on relationship-based practices, e.g., synchronicity, responsivity

Vivanti et al (2020). *Clinical Guide to Early Interventions for Children with Autism.* Springer

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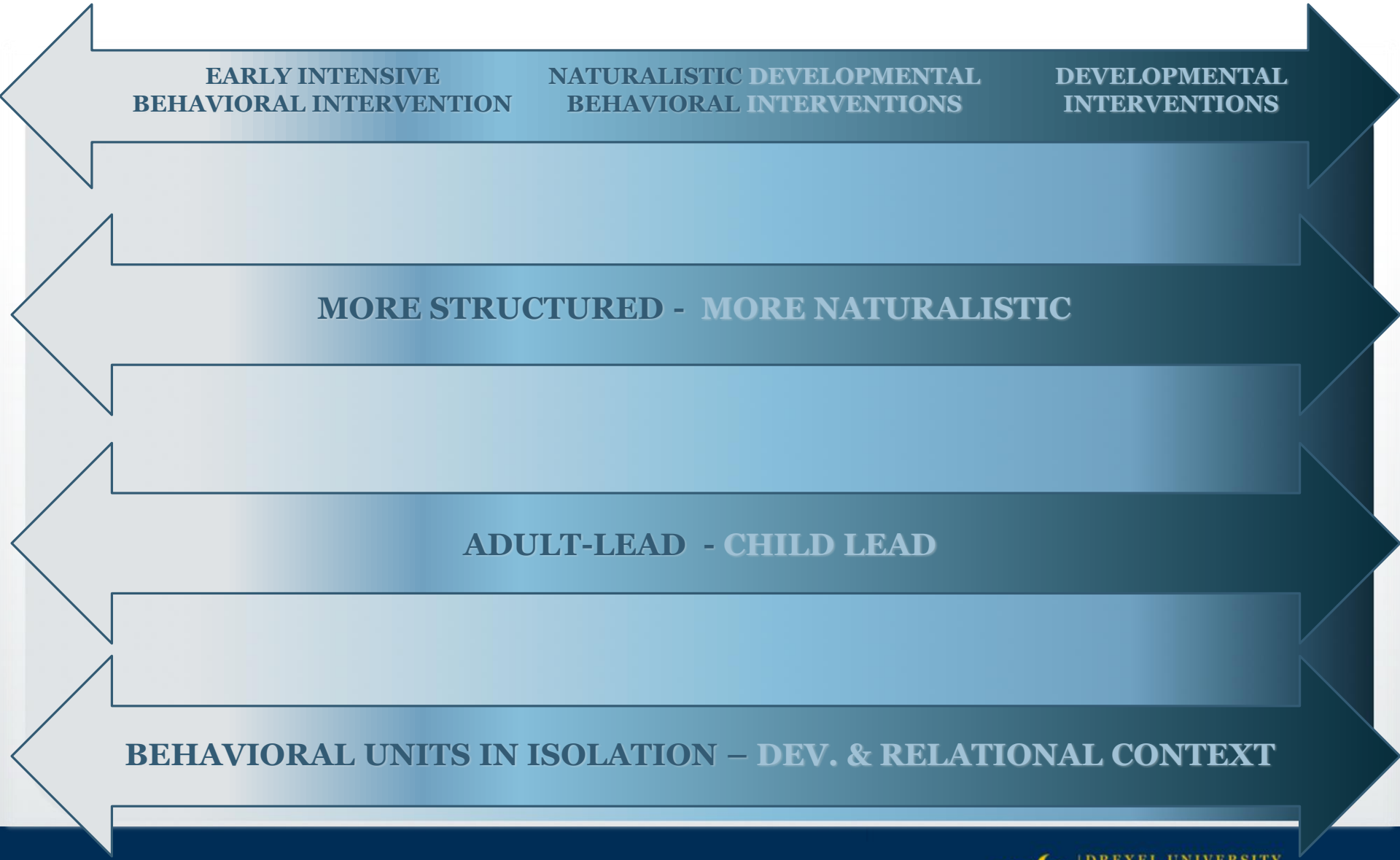
Three dimensions across the continuum of evidence-supported models



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