Correlates and Turning Points of Adaptive Functioning Trajectories & Longitudinal Associations with Autism Symptoms from Early Childhood to Adolescence

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PSYCHIATRY AND BEHAVIOURAL NEUROSCIENCES

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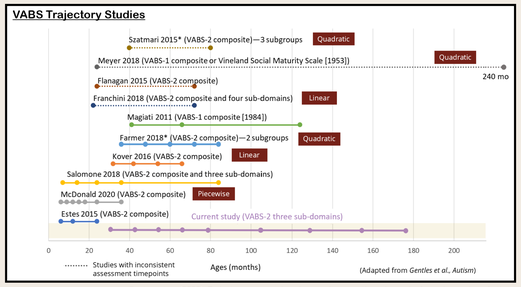
Background

Heterogenous adaptive outcomes in autism have been observed in previous longitudinal studies.



Gentles et al. (2023). Trajectory research in children with an autism diagnosis: A scoping review. *Autism*.

Evidence Gaps

- ***Associated characteristics beyond baseline*** (e.g., autism symptoms)
- ***Turning points of adaptive functioning trajectories*** to inform opportunities for change
- ***Family characteristics as covariates of trajectories*** (e.g., SES, immigrant status)
- ***Global vs. Domain Score as unit of analysis*** — Domain-level sources of variance were often ignored.
- ***Data Wave vs. Chronological Age as time metrics*** — Between-person age differences and within-person change were often conflated.

Research Questions

1. What is the ***best-fitting shape*** of the latent trajectories of VABS subdomains? Are there ***turning points*** at certain ages?
2. How many ***VABS trajectory subgroups*** can be identified? Is the subgroup membership associated with ***child and family characteristics***?
3. Do these VABS trajectory subgroups differ by ***the changes of autism symptoms*** from early to late childhood?

Methods

Participants

Across 5 provinces in Canada

pathways in autism spectrum disorder

406 children diagnosed with autism at ages 2-5
(with ≥ 1 timepoint of VABS data available)

> 15 years of follow-up
(Y2005-current)

Measures & Timeline

10 waves of data collection

Outcome Measures VABS-II ADOS
Domain-Level Standard Scores

Study Entry	Sequential Design: Dx	6mos	12mos							
Wave	1	2	3	4	5	6	7	8	9	10
Age (yrs)	2-5	2.5-5.5	3-6	5.5-7.5	7.5-8	8-9.5	9.5-10	10-12	12-14	14-17
VABS	X	X	X	X		X		X	X (12-17)	
ADOS	X	X	X	X				X		
FBIQ (Family Background)	X	X	X		X	X	X	X	X	

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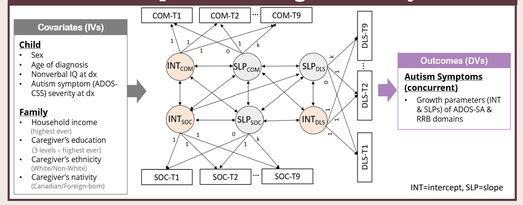
Analysis

Parallel-process latent growth analysis



*Repeated data were restructured by age (age intervals: 12-24 months) → **9 timepoints**

Latent growth curve modeling

Determine best-fitting functional form (linear, quadric, or piecewise)

(VABS, ADOS)

Latent class growth analysis

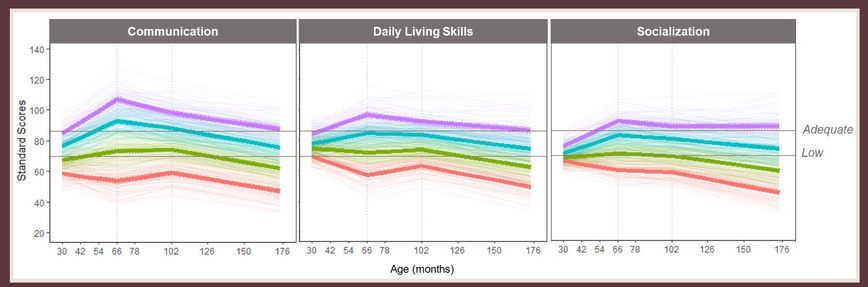
Identify trajectory subgroups

(VABS)

# of class	BIC	SABIC	Entropy	LMR-LRT	Class proportions (%)
2	40741.72	40652.88	.935	<.001	45/55
3	39778.86	39648.76	.914	.030	26/34/40
4	**39232.13**	**39060.78**	**.918**	**.054**	**16/21/28/35**
5	39100.50	38887.90	.893	.209	14/18/20/20/28
6	39016.08	38762.22	.876	.660	10/13/18/18/20/21

Key Findings

4 VABS trajectory subgroups with varying levels & change rates of functioning were parsed among 406 autistic children from ages 2 to 15.



Class 1 (n=87, 21%)
- Overall low functioning
- Early decrease + late catch-up after entering school age
- Lower NVIQ at dx
- More elevated autism symptoms at dx
- Lower family SES

Class 2 (n=113, 28%)
- Between low and adequate range
- Overall stable trajectories & autism symptoms until age 10
- Family SES similar to C1

Class 3 (n=140, 35%)
- Nearly adequate range of functioning
- Early improvement across domains
- Later diagnosed
- Autism symptoms at dx & family SES didn't differ from C4

Class 4 (n=66, 16%)
- Above adequate level & early improvement
- More adaptive social outcomes in adolescence
- Higher NVIQ at dx (*1/3 with IQ<70)
- Higher family SES

VABS change patterns

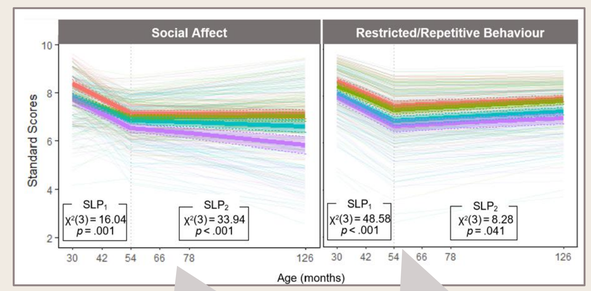
2 turning points at ages 5-6 and 9-10 (*Transitions* into school age and early adolescence).

NVIQ at diagnosis & household income are key correlates of VABS trajectories.

Covariates	C1 (n=87)	C2 (n=113)	C3 (n=140)	C4 (n=66)	Multinomial Logistic Regression
Child Characteristics at Diagnosis					
Male	75 (86%)	92 (81%)	120 (86%)	55 (83%)	No sig. group difference
Age of diagnosis (m)	36.01 (8.69)	37.96 (7.84)	39.89 (9.20)	38.92 (8.67)	C3>C1, **C4>C2, C3>C4**
NVIQ (Merrill-Palmer-R cog.)	34.85 (15.20)	52.36 (16.84)	65.49 (20.65)	82.54 (25.78)	**C2>C1, C3>C1, C4>C1, C3>C2, C4>C2, C4>C3**
ADOS-total CSS	8.49 (1.51)	7.30 (1.67)	7.38 (1.67)	7.21 (1.70)	C1>C2, C1>C3, C1>C4
Family Characteristics					
Household Income	8.45 (2.72)	8.56 (2.78)	9.44 (2.41)	10.49 (1.27)	C3>C1, **C4>C1**, C3>C2, **C4>C2**, C4>C3
Caregiver's Education (Bachelor's Degree+)	30 (34%)	42 (37%)	75 (54%)	38 (58%)	C3>C1, C4>C1, **C3>C2**, C4>C2
Caregiver's Race (White)	51 (59%)	68 (60%)	111 (79%)	51 (77%)	C3>C1, C3>C2, C4>C2
Caregiver's Nativity (Canada-born)	48 (55%)	69 (61%)	108 (77%)	50 (76%)	C3>C1, C4>C1, C3>C2, C4>C2

Bolded beta coefficient values represent significant effects ($p < .05$) in the adjusted model.

Differential associations with ADOS domains were observed across time.



Group differences in SA slopes ***increase*** over time.

Group differences in RRB slopes ***decrease*** over time.

Intervention targets may vary across developmental stages for better supporting autistic children's functional needs.

Implications

Who

"Doing Well"

~16% of our autistic participants showed good social adaptive outcomes by adolescence.

~21% were in the low-functioning range and more likely from a **low-SES** family.

Support for **early access to services**

When

Entering school age is associated with **challenge *or* opportunities** for improvement in functioning.

Various responses to transitions

Overall **decreasing trends** in adaptive functioning were observed in **adolescence** *despite* stable or decreasing ADOS-SA scores.

Environmental supportiveness