

# **Getting in Early: Detecting and Intervening in children with Autism in the early years.**

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# Core-deficit Linked Behaviours

- The behavioral manifestations indicative of a diagnosis of AD may be either directly or indirectly related to the neurological origins of AD.
- Core-deficit linked behaviors - direct manifestations of the underlying neurological abnormalities.
- These behaviors are present in very young children with AD, but may be modified or disappear as the child grows older.
- Secondary behaviors may develop, perhaps as a way to compensate for underlying neurological deficits (Young et al., 2003).



- It is argued then that the ideal time to make a diagnosis of AD should therefore be at a young age, preferably before the age of 2 years, when core-deficit linked behaviors are most conspicuous and in their purest form (Mundy & Sigman, 1989; Siegal, 1994; Sigman et.al., 1995).
- We know a lot about how older children present with autism but still need to learn more about how AD presents in the very early years.
- Early diagnosis provides the opportunity to intervene and prevent secondary deficits such as repetitive behaviors, preoccupations, compulsions and rituals developing (Mc Eachin, et.al., 1993).



# SUMMARY

While there are a number of tools on the market to facilitate diagnosis they often:

- are not suited for very young children
- require too much training and time to administer
- depend on the clinical skills of the examiner



# What is required in terms of recognition?

- more accurate clinical impression of early years
- train professionals to identify these signs
- identification of core deficit-linked behaviours
- operationalise them with precision
- determine their primacy and the impact they have on subsequent development and behaviour.



# Autism Detection in Early Childhood

## ADEC

- An eclectic measure that combines existing measures and research to identify and operationalise behaviours considered to be the core deficit-linked behaviours
  - focuses on pre-verbal behaviour
  - behaviours are not dependent on receptive language
  - behavioural orientation that is associated with objective measurement
  - each behaviour of interest is operationalised in terms of overt behaviours and therefore the role of clinical interpretation is minimised.



# ADEC Behaviours

- Nestling into caregiver
- Response to name
- Upset when line of blocks is disturbed
- Gaze switching (Tigger or car)
- Eye-contact in game
- Functional play (toy telephone/car)
- Reciprocity of a smile
- Pretend play
- Response to everyday sounds
- Gaze monitoring – follow point
- Imitation
- Respond to verbal command
- Demonstrates use of words
- Anticipatory posture picked up
- Use of Gestures: wave/blow kiss
- Ability to switch to new task



## 2. Response to name

Failing to orient to name has been continually observed in children later diagnosed with autism. Observers include, Osterling, Dawson,, Baranek, Clifford, DiLavore, Lord & Rutter).



# Response to Name

Child turns to tester's face when his / her name is called.



# Response to Name

Child turns to tester's face when his / her name is called.



# 4. Gaze-switching

Joint attention behaviours include attempts to direct the attention of another by eye gaze or pointing behaviours

JA behaviours show a child's attention alternates between the object or event and the adult

The two joint attention behaviours of interest in the ADEC-R include: gaze switching, gaze-monitoring (item 10).

When a child is presented with a stimulus with which they are not familiar they typically check an adult's facial expression as a guide to see how they should react. Studies have shown that children with Autistic Disorder are less likely to switch gaze.



# Gaze Switching

Child shows an attempt to engage the tester's / caregiver's attention to an object / event (bouncing Tigger)



# Gaze Switching

Child shows an attempt to engage the tester's / caregiver's attention to an object / event (bouncing Tigger)



- Participants
- 269 participants
- 149 participants diagnosed as having AD (131 male, 18 female)
- 60 typically developing (39 male, 21 female) (TYP),
- 60 a language disorder or other disorder (42 male, 18 female) other developmental disability” group (ODD).
- CARS scores were collected from trained professionals
- ADEC score were collected following referral to the EIRP



# Materials

- ADEC
- CARS
- ADI-R
- CHAT



# Inter-rater reliability

- 179 assessments over a 2.5 year period.
- 12 raters participated in these assessments.
- The correlation between the first and second ADEC administered, irrespective of rater was very high ( $r=.97$ ,  $p<.001$ ).
- Similarly a high inter-rater reliability was found for the CARS using 216 participants over a 2.5 year period involving the same 12 raters ( $r=.90$ ,  $p<.001$ ).
- CHAT scores were collected from 167 participants on two occasions. Once again the interval ranged from two weeks to 2.5 year using 12 raters and a high inter-rater reliability was obtained ( $r=.95$ ,  $p<.001$ ).



# Internal Consistency

- ADEC - Cronbach's  $\alpha = .85$ .  
Cronbach's  $\alpha$  did not differ significantly with the removal of any specific item.



# RESULTS

- CARS provided the best discrimination between groups
- Both the CARS and the ADEC were shown to not only discriminate autistic children from non-autistic children but also to discriminate between the “other disability” group and the typically developing children implying that both instruments not only assess autism but may also tap into the broader construct of disability, more generally.
- The CARS provides greater information about discrimination between all three developmental groups as evidenced by the greater effect size ( $\eta^2 = .75$  .59).
- Nevertheless the greater effect size associated with the CARS appears to come at a cost where those with other disabilities may be over-diagnosed as having Autistic Disorder.



# RESULTS.

Table 1

*Descriptive statistics and ANOVA results of ADEC, CHAT and CARS scores comparisons across developmental Category for all participants.*

TOOL	Developmental Category	<i>M</i>	<i>SD</i>	ANOVA statistics
ADEC	Autistic	15.32 <sup>a</sup>	6.76	$F(2,265) = 69.15$ $p < .001$ $\eta^2 = .34$
	Typically developing	4.54 <sup>c</sup>	4.27	
	Other disability	9.00 <sup>b</sup>	6.68	
CHAT	Autistic	2.22 <sup>a</sup>	1.79	$F(2,151) = 16.43$ $p < .001$ $\eta^2 = .18$
	Typically developing	0.49 <sup>b</sup>	0.89	
	Other disability	1.54 <sup>b</sup>	1.60	
CARS	Autistic	34.12 <sup>a</sup>	5.20	$F(2,2389) = 168.8$ $p < .001$ $\eta^2 = .59$
	Typically developing	16.54 <sup>c</sup>	2.08	
	Other disability	27.50 <sup>b</sup>	6.24	

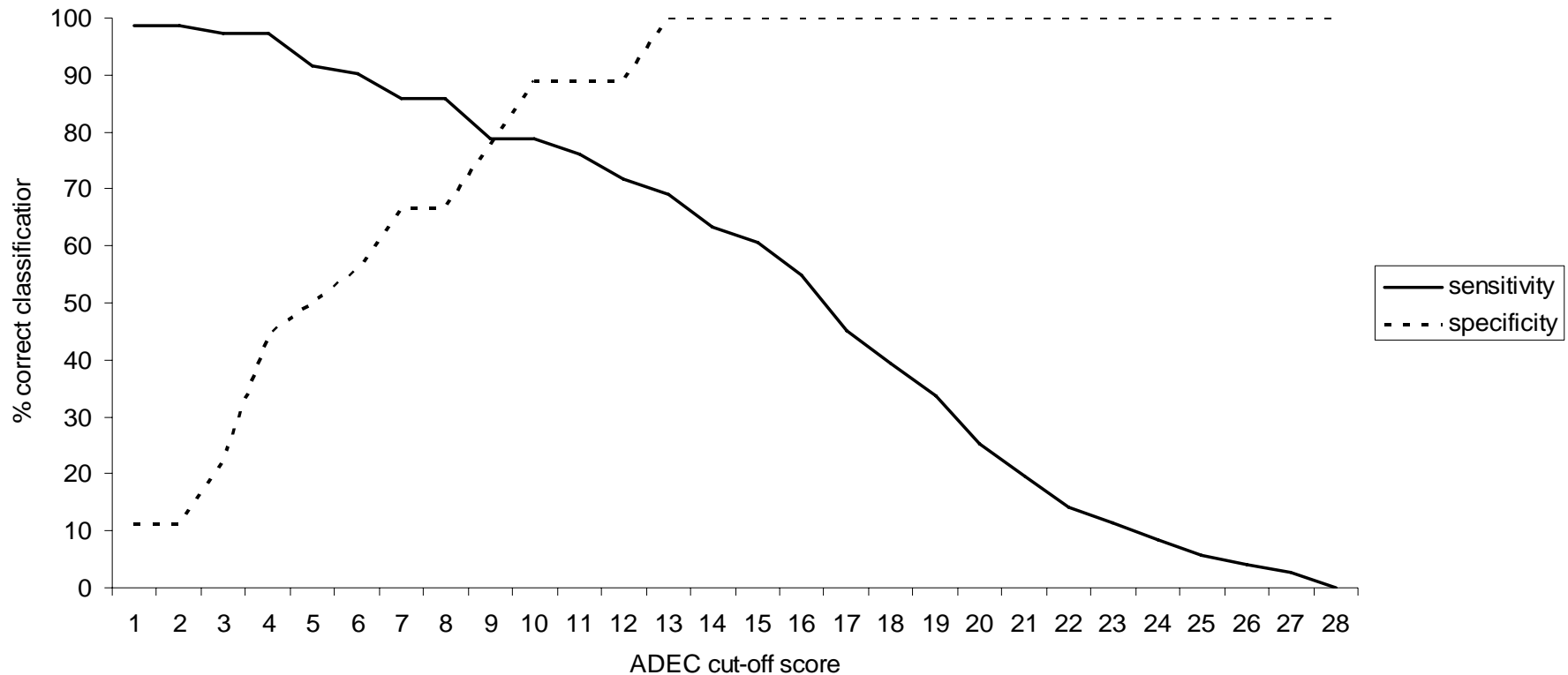


*Descriptive statistics and ANOVA results of ADEC, CHAT and CARS scores comparisons across developmental category for children younger than 42 months of age*

*Table 2*

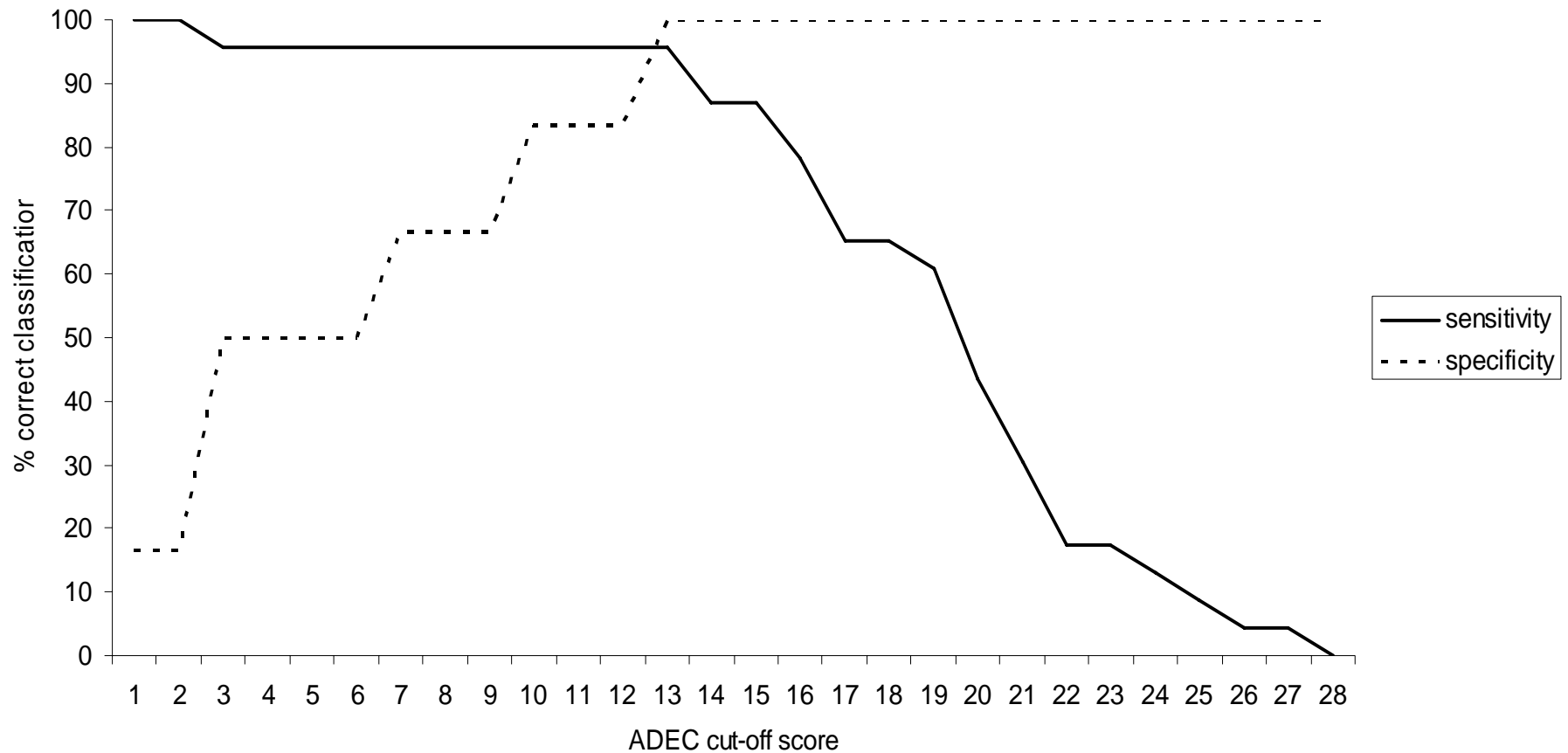
		M	SD	
ADEC	Autistic	15.11 a	6.44	$F(2,102) = 19.89$ $p < .001$ $\eta^2 = .28$
	Typically developing	5.65 b	3.90	
	Other disability	9.52 b	6.33	
CHAT	Autistic	1.75 a	1.56	$F(2,34) = 1.87$ $p = .17$ $\eta^2 = .10$
	Typically developing	0.50 a	1.00	
	Other disability	2.40 a	1.34	
CARS	Autistic	34.18 a	5.18	$F(2,87) = 26.26$ $p < .001$ $\eta^2 = .38$
	Typically developing	15.88 b	1.18	
	Other disability	29.87 a	5.66	





- We can see from the Figure, if we use a cut-off score of 13 using the ADEC, the specificity (correctly identifying people who have autism) is around 80 %. The sensitivity (correctly identifying children who are not affected) is also high at 70%.





- These percentages improve to 90% and 88% respectively when we consider only younger children (less than 30 months).



Table 3a. Correlations between ADEC and ADI-R total and subscales and CARS at time of diagnosis

	ADEC	ADI Total (N=85)	ADI Soc.	ADI Com.	ADI Rep.	CARS
ADEC		.		.		
ADI R Total	.48**	.				
ADIR Soc.	.51**	.87**				
ADI Com.	.56**	.81**	.69**			
ADI Rep.	.077	.50**	.34**	.23*		
CARS	.34**	.33**	.43**	.36*	.27*	
CHAT <sup>a</sup> (N=14)	-.62*	-.46	-.53	-.69*	.33	-.33

\* denotes  $p < .05$

\*\* denotes  $p < .01$



Table 3b. Correlations between ADEC and ADI-R total and subscales and CARS at assessment for Early Intervention Program

	ADEC	CARS
CARS	.57**	
CHAT	-.74**	-.40*

\* denotes  $p < .05$

\*\* denotes  $p < .01$



# Discussion

- The data presented show that the ADEC is an excellent screening tool .
- The ADEC has high sensitivity and specificity, is reliable and valid.
- The data reported here are consistent across all age cohorts
- The ADEC was found to reliably discriminate autistic children from typically developing children and children with other disabilities.
- Of more importance was the finding that the most discriminating tool, the CARS, over-identified autism among children diagnosed with other disabilities, casting some doubt on using the CARS as the sole tool for autism diagnosis.



# What do we do at the EIRP?

- Intensive intervention within solid research focus
- Specifically we :
  - teach behavioural techniques for parents in the home.
  - trains therapists
  - teach techniques for maintaining the behaviours



# Therapy and Assessment Stages

- **Design**
- A within subjects quasi experimental staggered baseline repeated measures design was used
  - Diagnostic assessment
  - Initial Assessment 2 weeks prior to intervention
  - Assessed immediately prior to intervention
  - Intervention on campus 10 x 3 hour sessions
  - Reassessed
  - 18 week home-based therapy under the supervision of EIRP
    - follow ups every fortnight
  - Re-assessed.
  - 2 year`follow-up



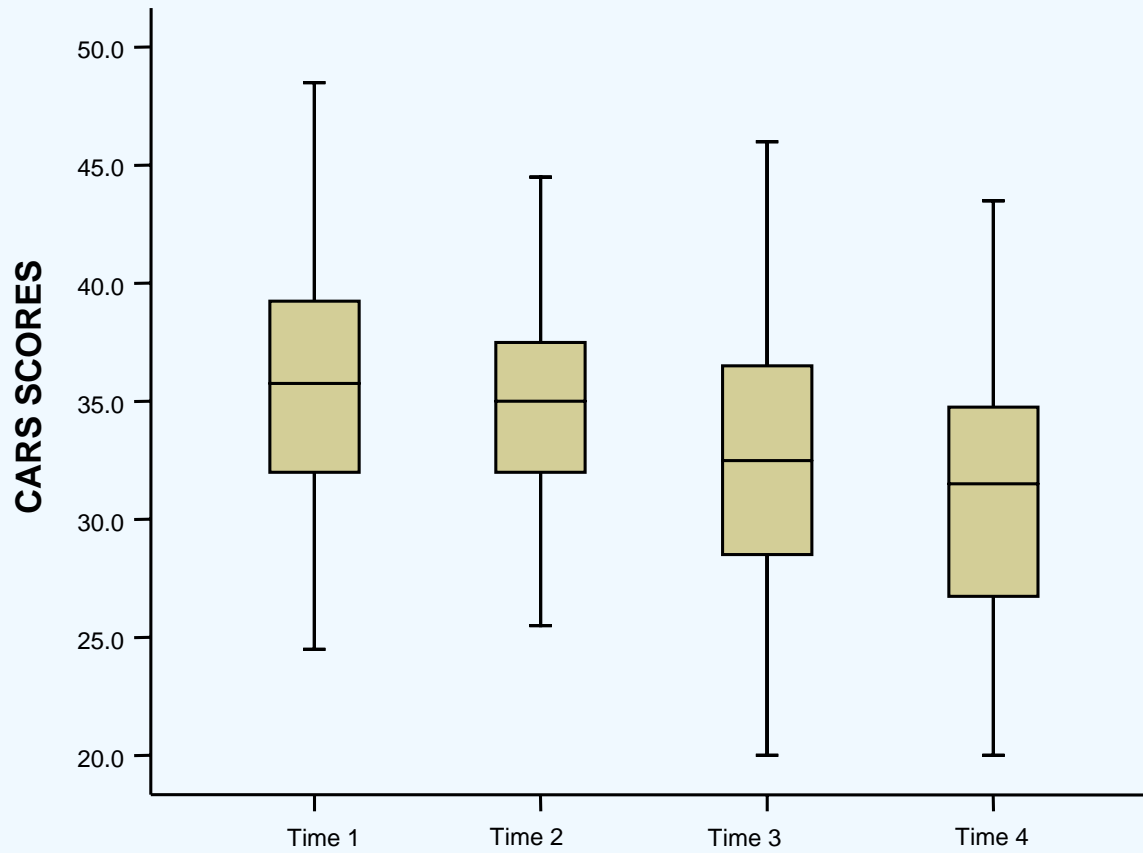
- Analyses of the data using Mixed Model Analysis shows that for the majority of variables (1355) that Times 1 and 2 are significantly greater than the scores at Time 4. The scores at Time 3 are for the majority of variables are significantly greater than at time 4 .
- I will only present data from two tests( CARS and Vineland) but the data is consistent across all measures.



# Trend of CARS Total Scores over Time

- A plot of the CARS total raw scores suggests that the development of inappropriate secondary behaviours as measured by the CARS decreased for participants involved in the EIRP over time (Figure 1). There was no significant difference between both baseline measures, that is Time 1 and Time 2 ( $t=.705$ ,  $p=.483$ ).





**Figure 1. CARS scores across 4 data points.**



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