

# Executive dysfunctions in toddlers with ASD: a BRIEF-P profile

M.E. Buruma<sup>1</sup>, M.L. Bezemer<sup>1</sup>, & E.M.A. Blijd-Hoogewys<sup>1,2</sup>

<sup>1</sup> Autism Team, INTER-PSY, NL; <sup>2</sup> Developmental Psychology, University of Groningen, NL



m.buruma@inter-psy.nl

## Background

Executive functions = EF  
Behavior Rating of Executive Functions = BRIEF (parent questionnaire)

### EF problems in ASD school-age children

- BRIEF: problems with inhibition, emotional control, initiation, working memory, planning/organizing & monitoring
- Most profound problems with cognitive flexibility (shift)

### EF problems in ASD preschoolers

- Little research undertaken
- EF problems: linked to lower social, communication & daily living skills
- BRIEF-P: inconsistent EF profiles in smaller studies



**Objective:** Is there a specific BRIEF-P profile in autistic preschoolers?

## Methods

### Retrospective diagnostic data

- 210 preschoolers with ASD (see Table 1)
- BRIEF-P (n = 210) with ADOS-2 (n = 166, 79%)

### BRIEF-P

- Reference group: normative group from Dutch BRIEF manual
- Cut-offs: mean T-score  $\geq 50$ , potentially clinically elevated T-score  $\geq 60$ , & clinically elevated T-score  $\geq 65$

Table 1

Descriptives of the research group

		Age M (ASD)	ADOS-2 M (SD)
Boys	n = 155	3.63 (0.87)	15.86 (5.13)
Girls	n = 55	3.82 (0.95)	13.69 (5.18)

Note. There was no significant difference in age between boys and girls ( $t = 1.36(208)$ ,  $p = .174$ ).

Table 2

Mean T-scores of BRIEF-P clinical scales for autistic boys and girls

	Boys M (SD)			Girls M (SD)		
Inhibition	63.85	(13.43)	T > 60, $p < .001$ , Cohen's $d = .287$	68.22	(16.02)	T > 60, $p = .001$ , Cohen's $d = .513$
Shift	68.35	(15.90)	T > 60, $p < .001$ , Cohen's $d = .525$	75.24	(16.82)	T > 65, $p < .001$ , Cohen's $d = .609$
Emotional control	65.37	(14.28)	T > 60, $p < .001$ , Cohen's $d = .376$	76.76	(16.77)	T > 65, $p < .001$ , Cohen's $d = .701$
Working memory	63.27	(12.58)	T > 50, $p < .001$ , Cohen's $d = 1.055$	64.41	(16.81)	T > 50, $p < .001$ , Cohen's $d = .858$
Plan/Organize	62.02	(13.41)	T > 50, $p < .001$ , Cohen's $d = .896$	63.78	(14.67)	T > 50, $p < .001$ , Cohen's $d = .939$

Note. Yellow cells = significantly elevated BRIEF-P scores, orange cells = significantly potentially clinically elevated scores, red cells = significantly clinically elevated scores. Analyses were corrected for multiple testing.

Table 3

Pearson correlations of BRIEF-P T-scores of subscales with ADOS-2 total score

	Boys	Girls
Inhibition	$r = .08$ , ns	$r = -.14$ , ns
Shift	$r = -.01$ , ns	$r = -.28$ , ns
Emotional Control	$r = -.25$ , $p = .005$	$r = -.45$ , $p = .004$
Working memory	$r = .08$ , ns	$r = .07$ , ns
Plan/Organize	$r = .13$ , ns	$r = -.07$ , ns

## References

Blijd-Hoogewys, E.M.A., Bezemer, M., & P.L.C. van Geert (2014). Executive Functioning in Children with ASD. An Analysis of the BRIEF. *Journal of Autism & Developmental Disorders*, 44(2), 3089-3100.

Carotenuto, M., Ruberto, M., Fontana, M. L., Catania, A., Misuraca, E., Precenzano, F., ... & Smirni, D. (2019). Executive functioning in autism spectrum disorders: A case-control study in preschool children. *Current Pediatric Research*, 23, 112-6.

Gioia, G. A., Andrwes, K., & Isquith, P. K. (1996). *Behavior rating inventory of executive function-preschool version (BRIEF-P)*. Odessa, FL: Psychological Assessment Resources.

Lord C., Rutter M., DiLavore P. C., Risi S., Gotham K., Bishop S. (2012). Autism diagnostic observation schedule, second edition. Torrance, CA: Western Psychological Services.

Powell, K., Macari, S., Brennan-Wydra, E., Feiner, H., Butler, M., Goncalves Fortes, D., ... & Chawarska, K. (2022). Elevated symptoms of executive dysfunction predict lower adaptive functioning in 3-year-olds with autism spectrum disorder. *Autism Research*, 15(7), 1336-1347.

Smithson, P. E., Kenworthy, L., Wills, M. C., Jarrett, M., Atmore, K., & Yerys, B. E. (2013). Real world executive control impairments in preschoolers with autism spectrum disorders. *Journal of Autism & Developmental Disorders*, 43, 1967-1975.

## Results

### BRIEF-P Internal consistency = good

- All BRIEF-P scales: Cronbach's  $\alpha$  from .801 to .893

### BRIEF-P elevated scores for ASD preschoolers

- All BRIEF-P scales: elevated (see Table 2)
- Inhibition: potentially clinically elevated scores

### More EF problems in girls

- Boys: potentially clinically elevated scores
- Girls: clinically elevated scores (large ES) for
  - Shift ( $t = 2.70(206)$ ,  $p = .01$ ; Cohen's  $d = .427$ )
  - Emotional control ( $t = 4.81(205)$ ,  $p < .001$ , Cohen's  $d = .762$ )

### Negative correlation ADOS-2 & Emotional Control

- Boys: small negative correlation ( $r = -.248$ ,  $p = .005$ ; see Table 3)
- Girls: moderate negative correlation ( $r = -.447$ ,  $p = .004$ )

## Conclusions

### Specific BRIEF-P profile in autistic preschoolers

- Problems with inhibition, shift & emotional control
- Autistic girls: more pronounced problems on shift & emotional control
- Consistent with clinical practice: emotion regulation difficulties is often primary reason for referring preschool girls for ASD assessment

### ADOS-2 negatively correlated with Emotional Control

- Higher ADOS-2 scores = fewer BRIEF-P emotional control problems
- Hypothesis: higher ADOS-2 children interact less with environment. In contrast, more 'socially open' children are more sensitive to stimuli, thus more prone to emotion regulation difficulties.

### Clinical implications

- EF problems are present early in ASD
- BRIEF-P: useful for screening EF problems in autistic preschoolers
- Important to consider sex differences in ASD symptoms
- Further research needed on relationship ADOS-2 & BRIEF-P