

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

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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 ≥ 50 , potentially clinically elevated T-score ≥ 60 , & clinically elevated T-score ≥ 65

Table 1

Descriptives of the research group

		Age M (SD)	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.J.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., Andries, 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 α 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