

Are hypospadias associated with differences in gender role behavior and sex typical cognitive abilities?

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- Hypospadias is a common malformation of male external genitalia with different and sometimes multifactorial background.
- As male genital development is dependent on androgen function, the question has been raised whether hypospadias is associated with differences in psychosexual development or cognitive abilities.
- We compared men with hypospadias to male and female controls on cognitive tests yielding sex differences, and self reported gender role behaviour in childhood.
- The results revealed no significant differences between men with and without hypospadias.
- Comparing men with different severity of hypospadias, there were no differences on self reported gender role behaviour. There were differences in cognitive performance with men with proximal performing overall lower.

Background

Hypospadias is a common malformation of male external genitalia, resulting in urethral displacement with different severity. Male genital development takes place during early fetal development, a critical period for brain development. It is a process involving several genetic events taking place in temporally typical sequences but it is also an endocrine driven development dependent on adequate levels of and receptivity to androgens.

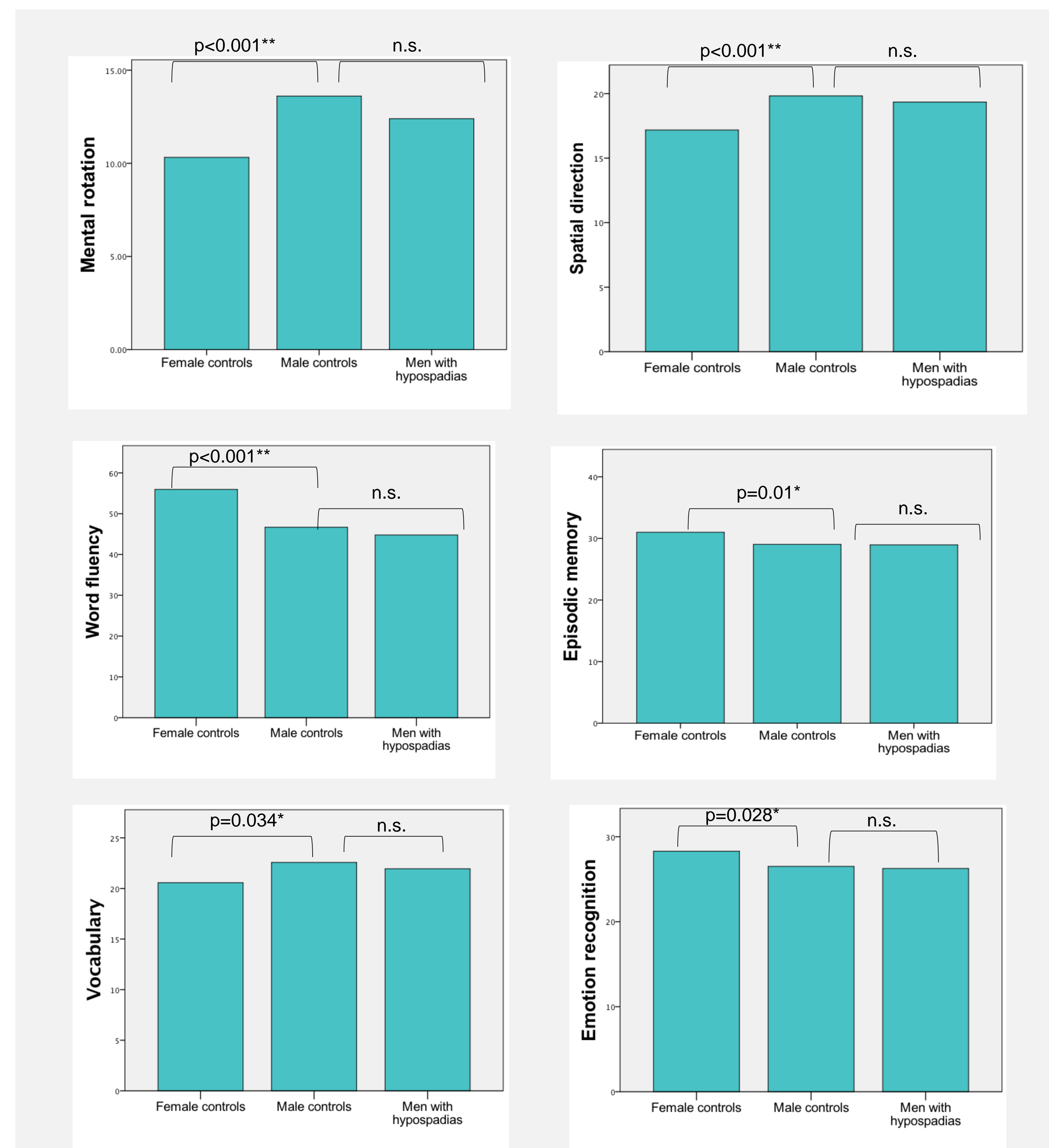
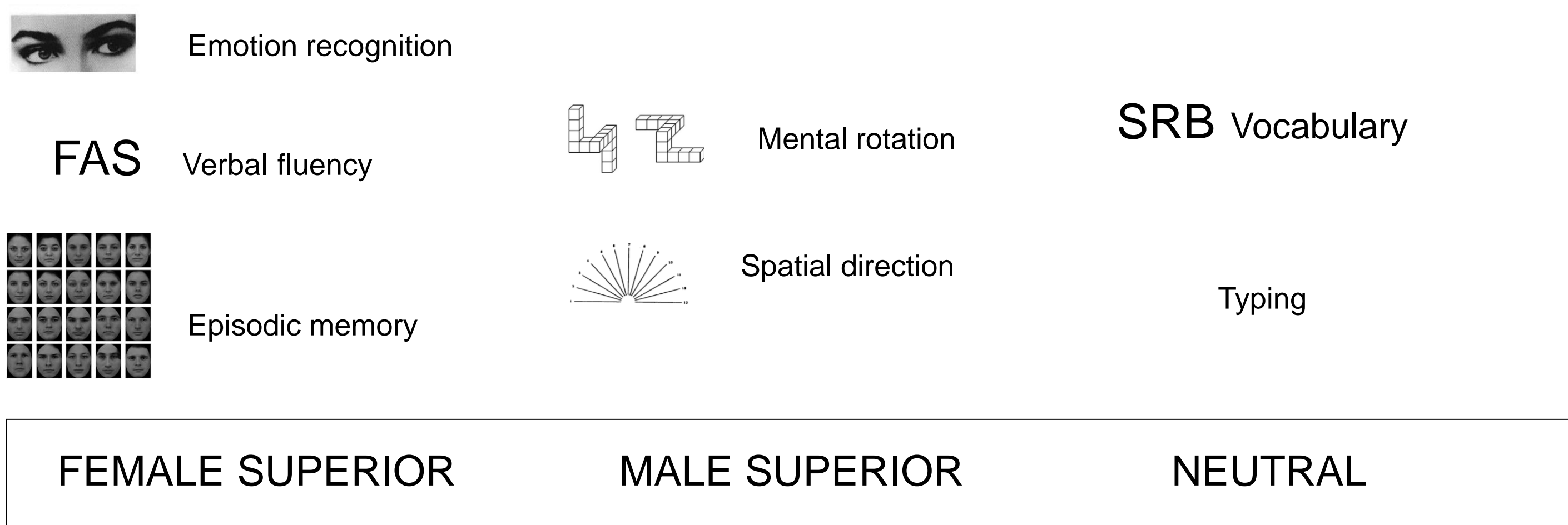
Since early androgen exposure have been shown to have an impact on aspects of gender development such as gender role behaviour, we investigated whether a developmental arrest such as hypospadias is also associated with variation in sex typical development and cognitive abilities.

Gender role behaviour

There are group level differences between men and women in preferences, behaviour and relations. We assessed recalled childhood gender role behaviour with questions regarding toy and activity preferences in childhood, sex of best friend and self assessment of being "girlish" or "boyish".

Sex differences in cognitive abilities

Men and women perform similar on many cognitive tasks, yet there are well replicated differences in performance on some. We used a web based test battery assessing spatial reasoning, memory and verbal fluency tasks where previous research had confirmed sex differences.



	Female controls n=80	Male controls n=89	Men w distal hypospadias n=73	Men w proximal hypospadias n=10	Female vs male controls p	Men with vs without hypospadias p	Men with proximal vs distal hypospadias p
Vocabulary	Mean (SD) 20.6 (4.6)	Mean (SD) 22.6 (4.3)	Mean (SD) 22.3 (4.5)	Mean (SD) 18.7 (7.6)	.034*	n.s.	n.s.
Spatial direction	17.2 (4.2)	19.8 (3.7)	19.3 (3.9)	17.3 (4.5)	.000**	n.s.	n.s.
Mental rotation	10.3 (4.3)	13.6 (4.2)	12.3 (5.2)	10.4 (4.7)	.000**	n.s.	n.s.
Episodic memory	31.0 (4.1)	29.0 (3.8)	29.1 (3.5)	25.8 (3.3)	.011*	n.s.	.03*
Word fluency	55.6 (11.0)	46.6 (11.2)	45.3 (12.6)	37.8 (14.0)	.000**	n.s.	.04*
Typing	24.9 (5.7)	23.8 (7.5)	21.6 (7.0)	19.5 (4.6)	n.s.	n.s.	n.s.
Emotion recognition	28.3 (3.7)	26.5 (3.7)	26.3 (4.4)	26.3 (1.5)	.028*	n.s.	n.s.

Results: Comparisons between men with and without hypospadias showed no significant differences neither on the cognitive tasks nor on the gender role behaviour questions. In comparisons between men with distal (mild) and proximal (severe) hypospadias, there were no differences in recalled childhood gender role behaviour but men with proximal type performed overall lower on the cognitive tasks.

Conclusion: Hypospadias, in general is not associated with differences in performance on cognitive tests that typically yield sex differences, or with altered gender role behavior in childhood. Further studies in boys and men with proximal hypospadias on broader aspects of cognitive functioning is warranted.

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