The effect of bilingualism on cognitive and affective perspective-taking in autistic adults

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Introduction

Perspective-taking (PT) development is stimulated by social interactions and linguistic inputs[1], and it can be a source of difficulties for autistic people[2].

Bilingualism seems to influence the development of cognitive and affective PT[3] in neurotypical adults, though:

- it is unclear which bilingualism feature[4] drives the effect
- it is unknown whether the same effect exists in autism

	Level 1	Level 2
Cognitive PT		
Affective PT		

1. Garfield, Peterson, & Perry (2001)
2. Velikonja, Fett, & Velthorst (2019)
3. Javor (2017)
4. Baum & Titone (2014)

Objectives

Identify the bilingualism features influencing level 1 and level 2 cognitive and affective perspective-taking processes.

Methods

- **Participants**: 39 autistic adults, aged 16-61, knowing more than 1 language
- **Bilingualism measures**: Demographic & Language History Questionnaires
- **Executive skills**: Test of Everyday Attention (TEA), tests 2 (attention), 3 (inhibition), 5 (switching)
- **Non-verbal IQ**: WASI II, PRI score
- **Perspective-taking**: Adult-Theory of Mind-extended task[5]

Predictors for regression models:
- Number of languages reported (N lang. R)
- Number of languages known at a medium / high proficiency (N lang. P)
- Age of acquisition of L2 (L2 age)
- L2 proficiency (L2 pro.)
- L2/L1 proficiency balance (L2/L1 bal.)
- Language switching habits (L switch)
- TEA attention, switching, inhibition
- Age
- Non verbal IQ (nv IQ)

Adult-Theory of Mind-extended task: 6 Social videos followed by 5 questions + 6 physical videos

Score	Range	Sub-scores	Range	Sub-scores	Range
Physical (6 videos)					0.00 – 2.00
Social (6 videos)	0.00 – 2.00	General			0.00 – 2.00
		Cognitive	0.00 – 2.00	Level 1	0.00 – 2.00
				Level 2	0.00 – 2.00
		Affective	0.00 – 2.00	Level 1	0.00 – 2.00
				Level 2	0.00 – 2.00

5. Surtees, Young, & Barnett (2017)

Results

1) Demographics & Language history

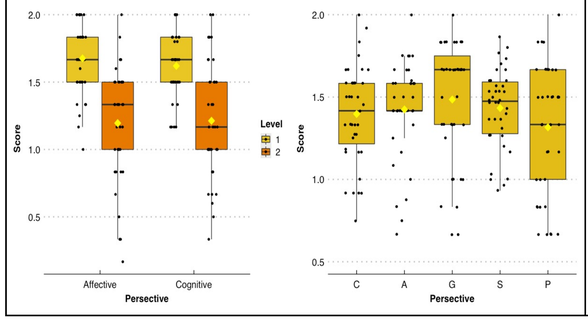
a. Demographics

Age in years, M (SD, range)	34.5 (12.8, 16 – 61)
Age at diagnosis in years, M (SD, range)	26.6 (14.4, 3 – 56)
Gender, N (%)	
Female	16 (41.0)
Male	14 (35.9)
Not listed / disclosed	9 (23.1)
nv IQ, M (SD, range)	119.8 (10.4, 101 – 140)
Education, N (%)	
Less than UG degree	12 (30.8)
UG degree or higher	26 (66.7)

b. Language history

Languages (N)	Age of acquisition in years, M (SD, range)	Proficiency, M (SD, range)
L1 (39)	0 (0, 0 – 0)	7.2 (1.4, 2.8 – 8)
L2 (39)	7.5 (9.7, 0 – 58)	5.8 (2.1, 0 – 8)
L3 (30)	13.1 (8.4, 0 – 36)	3.7 (2.2, 0.3 – 8)
L4 (15)	13.4 (7.3, 0 – 24)	3.3 (2.4, 0 – 7)
L5 (10)	22.8 (9.8, 5 – 38)	2.0 (1.7, 0.5 – 6)
L6 (5)	23.2 (11.8, 12 – 43)	2.7 (1.6, 1 – 4.8)
L7 (2)	27 (8.5, 21 – 33)	3.3 (1.4, 2.3 – 4.3)

c. PT Scores



2) Bilingualism & perspective-taking

Stepwise regression methods to build optimal models for each PT measure. Final models were analysed in terms of overall patterns of predictor selection.

	Predictors	L1C	L2C	C	L1A	L2A	A	G	S	P
Bilingualism	N lang. R							- 0.31		
	N lang. P					- 0.27				
	L2 age		- 0.03	- 0.03	- 0.02			- 0.03	- 0.01	
	L2 pro.									
	L2/L1 bal.									
	L switch									
Controls	Age	+ 0.01	- 0.01							
	nv IQ			+ 0.003	+ 0.003			+ 0.02	+ 0.002	+ 1.81
	TEA att.				+ 0.11			+ 0.28		
	TEA inh.									
	TEA swi.								+ 0.04	
	TEA tot.						+ 0.03			
Indicators	R^2 adj.	13%	24%	17%	14%	16%	12%	28%	21%	13%
	p	0.015	0.003	0.023	0.040	0.007	0.023	0.010	0.024	0.019
	f2	0.15	0.32	0.20	0.17	0.20	0.14	0.39	0.26	0.15
	pwr	64%	86%	59%	49%	76%	58%	75%	60%	60%

Beta values for each predictor are given in the predictor row.
Predictors in green: selected in optimal model and significant.
Predictors in yellow: selected in optimal model and non-significant.
Post-hoc power in grey < 50 %, in yellow > 50%, green > 80% .

Discussion

In an autistic bilingual and multilingual adult population, cognitive and affective PT seem to be influenced by bilingualism, above and beyond age, non-verbal IQ and executive skills.

The main driver of the bilingualism effect seems to be the age of acquisition of the 2nd language (predictor the most frequently selected). This suggests that bilingualism has a developmental influence on PT: in autism, early bilingualism seems to stimulate the development of PT in a long-lasting way, with effects visible in adulthood.

These findings suggest that bilingualism is not harmful for PT in autism, and even has social cognitive benefits. This has implications for parents, practitioners, and educators.

Contact

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