INDIVIDUAL DIFFERENCES IN COGNITIVE AND LANGUAGE CONTROL IN ADVANCED AGE

AMONG DUTCH-ENGLISH BILINGUALS[1]

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Background:

- cognitive resources decline with age: processing speed, WM, attention span and inhibition mechanisms become less effective (e.g. Wingfield & Grossman, 2006)
- lifelong bilingualism can build up a cognitive reserve which counteracts or delays the effects of cognitive aging (Bialystok, Craik, Klein & Viswanathan, 2004; Bialystok, Craik & Luk 2008)
- it is unclear what the role is of age at onset: some studies find no, or different, executive function advantages for late bilinguals than for simultaneous/early bilinguals (Tao et al., 2011, Luk et al., 2011)
- it is unclear how other language-related factors, such as language experience, language habits (e.g. code-switching density) and proficiency in both L1 and L2 contribute to the cognitive reserve

⇒will elderly late Dutch-English bilinguals have a cognitive reserve, making them more efficient on EF tasks than monolinguals?

⇒what factors will impact on this cognitive reserve?

Participants:

- **late bilingual group**: 29 Dutch immigrants in Australia (16 males), mean age 77.93 (71—86), AoA 27.23 (13-61), LoR 55 (25-61)
- **monolingual groups**: 17 Dutch 'monolinguals' (8 males), mean age 78.35 (71—85); 16 Australian English monolinguals (5 males),

Materials:

- MMS: mini-mental-state examination (Folstein, Folstein & McHugh, 1975)
- RTT: eneral processing speed: auditory RT task (Welford, 1980)
- RST: reading span task (English & Dutch) (Daneman & Carpenter, 1980)
- BDST: backward digit span task
- WCST: modified Wisconsin Card Sorting Test (Grant & Berg, 1948)
- Simon task (Simon & Wolf, 1963)

		Dutch-English bilinguals	Dutch monolinguals	English monolinguals
MMS (max=30)	N (SD)	27.64 (1.682)	27.76 (1.855)	27.88 (1.500)
	Range	23-30	22-30	25-30
RTT (ims)	N (SD)	421.67 (341.71)	350.46 (125.52)	429.57 (452.96)
	Range	181.36-1843.93	207.86-626.43	159.14-1999.10
RST NL (max=60)	N (SD)	31.00 (7.41)	31.41 (6.5)	-
	Range	14-51	18-41	
RST EN (max =60)	N (SD)	30.21 (6.42)	-	33.88 (8.11)
	Range	18-46		18-49
BDST (max=10)	N (SD)	6.30 (1.90)	5.12 (1.58)	6.13 (2.03)
	Range	3-10	2-7	3-10
WCST	N (SD)	110.96 (16.479)	107.65 (18.947)	111.50 (16.387)
	Range	72-145	73 - 132	67-133
Simon effect (ms)	N (SD)	85.47 (102.72)	68.23 (51.71)	64.29 (59.06)
	Range	-163.00-348.60	-34.63 - 137.30	-18.83-179.40
Stroop effect NL (ms)	N (SD)	124.15 (258.06)	223.50 (188.81)	-
	Range	-514.83-845.83	-34.38-733.94	
Stroop effect EN (ms)	N (SD)	181.73 (182.70)	-	147.51 (168.86)
	Range	-203.49-759.25		-211.07-401.71

Group and individual factors:

- general linear model (full factorial Type IV model) did not find a main effect for group ($F(12,72) = .904$, $p = .547$)
- covariates (gender, education, IQ, active lifestyle) did not improve model fit
- the ranges in the bilingual groups were larger than those of the monolinguals
- for the executive function tasks, both the highest and the lowest performing individuals were found in the bilingual population (for both RTs and accuracy)
- what is it that makes a bilingual individual perform very well or very poorly when it comes to EF tasks?

Best and worst performers on EF tasks:

Part.	Age	Edu (yrs)	AaE	LoR	C-Test NL	C-Test EN	% EN use	% DU use	pref. lg.	CS dens.
Best performance										
MAB	72	13	13	59	64	40	99	1	English	0.00
MUR	76	15	15	61	81	72	90	10	English	0.18
BOJ	77	14	20	57	94	86	99	1	English	0.42
RIO	77	19	20	57	93	85	90	10	Both	0.00
Poorest performance										
HEH2	71	10	21	50	21	15	99	1	English	0.74
GEP	72	14	16	56	28	59	100	0	Both	3.11
HIG	79	10	22	57	43	61	100	0	English	3.13
LIV	76	13	23	53	67	-	90	10	English	0.00

Conclusion:

- there was no overall advantage for the long-term bilinguals on executive function tasks
- impressionistically, a higher level of education and a longer period of residence was associated with the best performers
- substantially more code-switches were found for three out of four of the poorest performers
- the poorest performers also seemed to score lower overall on the proficiency tasks in both languages
- neither CS density nor C-Test scores were significant predictors for the overall bilingual population
- the role of background factors for the development of EF is complex!

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