

Birštonas, Lithuania

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**Language development across the lifespan:  
A multilingual perspective**

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# A deficit vs. development view of the lifespan

- The deficit view of childhood
  - Children as “incomplete adults”
  - Defined by what they can’t yet do
- The deficit view of ageing
  - Ageing as an incremental loss of function
  - Defined by what older people can’t do any more
- Lifespan as development
  - Defined by the opportunities & the challenges of each age
  - Cf. Erik Erikson & the 8 psychosocial stages of development

# Monolingualism as default

Monolingualism: clear, basic, simple

-> **natural**

Multilingualism: complicating things

-> **in need of explanations**

*Bak & Alladi 2014, Future Neurology*

*Mehmedbegovic & Bak 2017, Eur J of Lang Policy*

# Has human language developed in a multilingual context?

- Multilingualism widespread among hunter-gatherers
- “Linguistic exogamy”
- Learning new languages across lifetime
  
- Multilingualism (*including late language acquisition*):
  - Natural state of human brain, mind & society
  - Natural form of mental exercise



# Monolingualism vs multilingualism: what is the default?



- The tower of Babel vs. Warramurrungunji
  - What was the world in the beginning: mono- or multilingual?
- Multilingualism across history
  - Multilingualism of early societies, linguistic exogamy
- Anglosphere as the default setting in modern science
  - Monolingual English-speaker as the typical participant
- Multilingualism across the world
  - Multilingualism as the rule across much of Europe, Africa & Asia

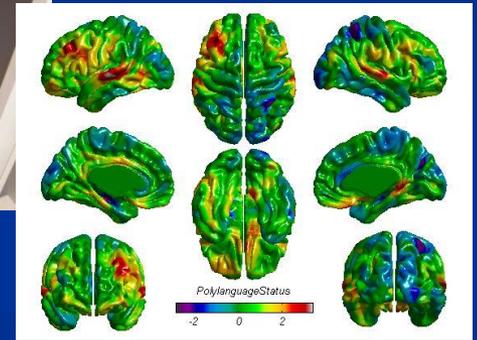
# Limited resources vs. added value models

Limited resources models:

“Chest of drawers” analogy

Strict, static localisation

Competition for space



Added value models

Interactive (more than the sum of the ingredients)

Dynamic localisation, neuroplasticity

Emphasis on learning & adaptation

**Better suited to describe multilingualism**

*Mehmedbegovic & Bak, 2017, Eur J of Language Policy*

D. J. Saer

The effects of bilingualism on intelligence  
*British Journal of Psychology, 1923*

- “*lack of definiteness in the meaning*”
- “*confusion is carried over from the brain area connected with language to those connected with other functions*”
- “*emotional conflict*”, not relieved by the “*cathartic play*”  
reconciling the emotional world with the “*reality principle*”

# A Canadian Revolution: from Montreal to Toronto...

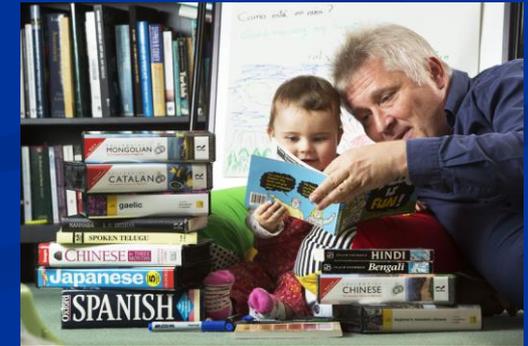
- Lambert & Peal 1962
- Ellen Bialystok & her group @ York University
- 1990's: Bilingualism in children:
  - Metalinguistic skills
  - Executive functions
  - Social cognition



# Bilingualism & cognitive processes

- Exposure to different languages
  - => metalinguistic knowledge (spoken & written language)
- Language switching/mixing person/context dependent:
  - => theory of mind, perspective taking, social cognition
- Simultaneous activation of different languages:
  - => executive/attentional control mechanisms, switching

But bilingualism has also its price => slower lexical access



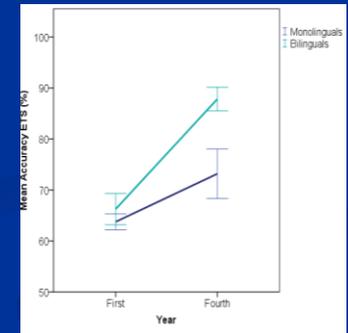
**But for all of us who are not babies any more...**

- Do bilingualism effects persist across the lifespan?
- Can they be due to language learning in later life?

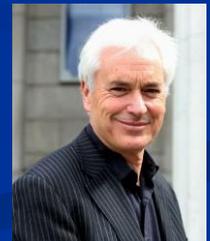
# Bak et al 2014, *Frontiers in Psychology* Vega-Mendoza et al 2015 *Cognition*



- Using Test of Everyday Attention (TEA) “Elevator Task”
  - Early childhood bilingualism: better switching
  - Early adulthood bilingualism: better inhibition
  - No effects on visual-auditory divided attention



- Languages vs. humanities students
  - Year 1 (initial): No difference in switching
  - Year 4 (final) year:: Significant difference in switching



# Bak et al 2014, *Annals of Neurology*

## Cox et al 2016, *Neuropsychologia*



- Addressing the issue of reverse causality...
- ...through the Lothian Birth Cohort 1936
- Comparing performance age 11y. vs. age 70+y.
- 262/853 “able to communicate in L2”
- Specific effects of bilingualism:
  - Reading (NART), verbal fluency, general IQ
  - Simon Test - independent of Ch-IQ
  - Faux pas test (social cognition) - dependent on Ch-IQ



# Bialystok et al 2007, *Neuropsychologia*



- 230 dementia patients, ca. 50% bilingual
- Bilinguals develop dementia 4 years later!
- Related to contemporary research on bilingualism:
  - Bialystok et al 2004
  - Kavé et al 2008
  - Craik et al 2010
- The results interpreted in the light of **cognitive reserve**

# Alladi, Bak et al 2013, *Neurology*

## Mortimer et al, 2014, *Neurology*



- Bialystok et al 2007:
  - 230 dementia patients, 50% bilingual – dementia 4 years later
  - BUT confounds: immigration, ethnicity, lifestyle etc
  
- Why Hyderabad?
  - Bilingualism common, old, not associated with migration
  - Excellent clinical services, multilingual tests & staff
  
- Results in 648 patients (60% bilingual)
- 4 years delay (6y. in illiterates!, n > 150)
- FTD > AD/VascD > DLB



Dr Suvama Alladi

Alladi et al, *Stroke* 2016

Paplikar et al, *Aphasiology* 2018



- 608 stroke patients (58% bilingual)
- Difference in *lifestyle/risk factors* => later age of stroke
- Difference in *cognitive reserve* => different outcome

■ Results: age at stroke: 56 vs. 56.5 years

■ Outcome:	<u>Monolingual:</u>	<u>Bilingual:</u>
■ Normal cognition	19.6%	40.4%
■ Vasc Dementia/MCI	68.7%	49.0%
■ Aphasia	11.8%	10.5%
■ Global aphasia:	58.6%	17.9%

**Bak et al, 2016**  
**Long et al, 2019**



- Similar effects after an intensive language course?
- One week intensive Gaelic course on the Isle of Skye
- Improvement in switching after one week
- Includes participants up to 78y (1<sup>st</sup> study) & 85y (2<sup>nd</sup> study)
- Lasting 9 month later in those who practice >5hr/week

# De Bruin et al 2015, *JML* De Bruin et al 2016, *LNC*



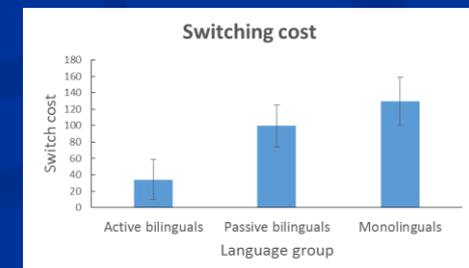
## ■ People > 65 y:

- Gaelic: home/community, English: school/work
- Later life: some use both, other only English



## ■ Active bilinguals:

- No difference: ToL & Simon Task, but on switching
- Different baseline performance:
- => different strategy?
- Longer reaction times in lexical access



# Lingo Flamingo

- A social enterprise founded in Glasgow by Robbie Norval
- Offering language classes
  - To healthy elderly
  - To patients with dementia
- Counteracting loneliness & low self-esteem



# Conclusions

- Current neuroscience emphasises:

- Interaction
- Plasticity

- Languages can be learned at **any age** but the way they integrate into our cognitive system may vary

- Language learning/use across the lifespan:

- Contribute to the cognitive reserve
- Counteract pathological processes: stroke, dementia



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