Workshop on Bilingualism and Executive Function: An Interdisciplinary Approach

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BALED

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Outline

Discussion

Variation within bilinguals

Way forward

Bilingualism → Politics

Raymond Klein

- Dominance – culture, **language, e.g. minorities**;
- Immigration – integration into society → use dominant language;
- Language policy in schools and society;

- UK in 2015: community (heritage) language will not be included anymore as part of GCSE and A level exams due to budget cuts in education.

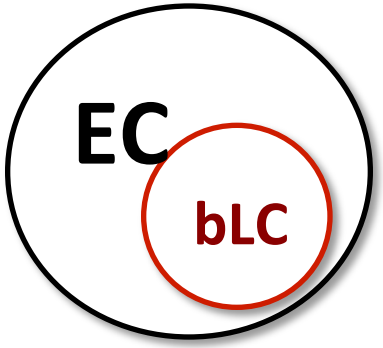
Bilingualism → Politics

Dispute:
Cognitive benefits of bilingualism

Undisputed:
Economic, social, cultural benefits:

- Communicate with a larger number of people;
- Keeping links with extended family;
- Ability to work in larger number of locations;
- Good for business;
- …

Albert Costa: What are the common mechanisms between domain-general EC and bilingual language control?



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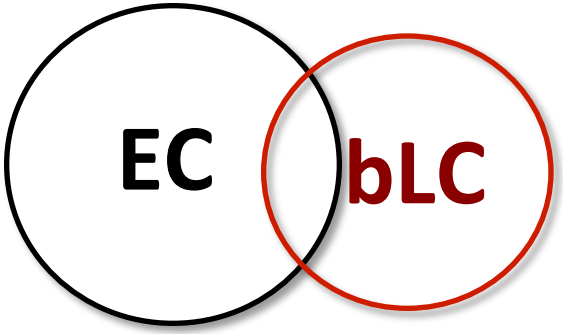
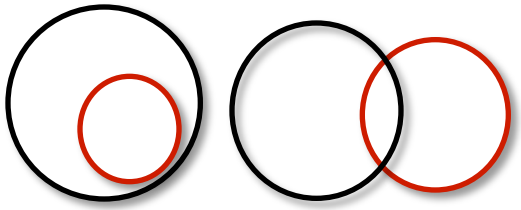


Partially overlapped

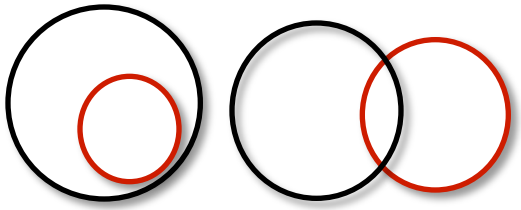
Full vs. Partial overlap



The question needs clarification:

1. The relationship between results from non-verbal and verbal Executive Control tasks (e.g., Calabria et al., 2012; 2014; 2015);
2. The relationship between results from non-verbal Executive Control tasks and language switching/use behaviour (e.g., Aglioti et al., 1996; Costa et al., 2012);
3. The relationship between domain general Executive Control and Executive Control related to language (bilinguals need to be able to inhibit one language and use the other one/to switch between languages)?

Full vs. Partial overlap



If it refers to 1 & 2:

1. The relationship between results from non-verbal and verbal Executive Control tasks (e.g., Calabria et al., 2012; 2014; 2015);
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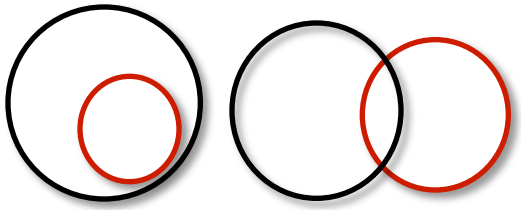
Empirical question: mixed evidence

Conclusion by Costa: partial overlap

Full vs. Partial overlap

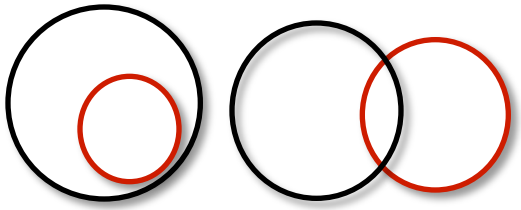


If it refers to 3:

3. The relationship between domain general Executive Control and Executive Control related to language (bilinguals need to be able to inhibit one language and use the other one/to switch between languages)?

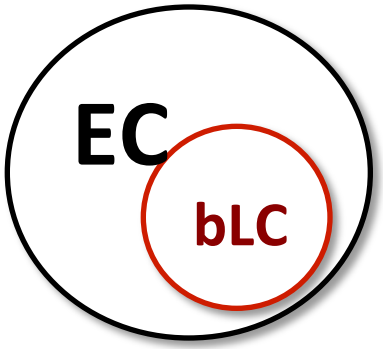
Conceptual/theoretical question

Full vs. Partial overlap

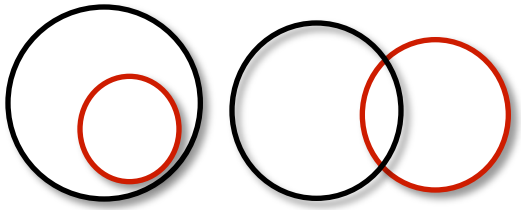


Conceptual/theoretical question

Model used so far: same executive functions/ inhibitory control used to suppress non-relevant language and EFs used generally to control attention and inhibition (Green, 1998; Bialystok, 2001).

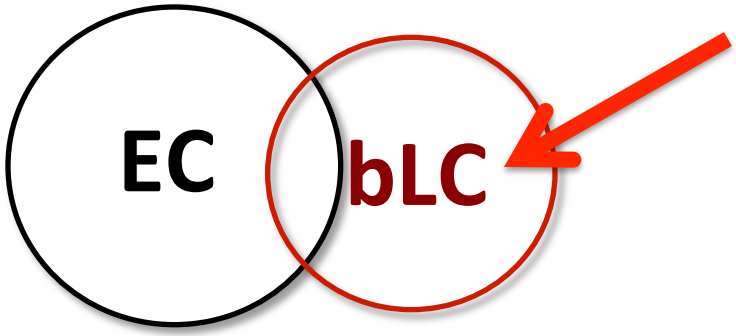


Full vs. Partial overlap



Conceptual/theoretical question

Partial overlap of the EC mechanisms leads logically to the conclusion that there are **language specific Executive Control mechanisms.**



Is this desirable? To be discussed.

Before we go there, we need to explore why we get mixed results

Why do we get mixed results?

There is **individual variability in bilinguals** over and above the individual variability in monolinguals**:**

1. Who is bilingual – inclusion/exclusion criteria?
2. Type of bilingualism (simultaneous vs. early/late sequential vs. L2 learner) → critical periods in both language and executive functions: variation in alignment in bilinguals;
3. Length of exposure → proficiency and use;
4. Type of exposure – classroom vs. immersion;
5. Language practices/use → language dominance: changes over time;

Why do we get mixed results?

6. Language proficiency;
7. Motivation;
8. Socioeconomic status;
9. Language typology: vocabulary, morpho-syntax, phonology, writing system;

10…..

Very large individual variability in impaired populations.

→ NOISE IN THE DATA
→ FACTORS WE DON'T UNDERSTAND FULLY AND REQUIRE FURTHER INVESTIGATION

Why do we get mixed results?

Variability in the EF tasks used:

1. Most EF tasks are complex and not pure;
2. Lack of reliability;
3. Use of different EF tasks per study;
4. Lack of comprehensive models that integrate EFs with language processing.

→LIMITED COMPARABILITY BETWEEN STUDIES

EXCURSION:
→CODE-SWITCHING,
→BILINGUAL EDUCATION AND LITERACY

Study 1 – Julia Hofweber: Code-switching type (Muysken, 2000) and EFs (poster)

(1) Alternation

Independent phrases from language A and B juxtaposed

Ich kann heute nicht kommen BECAUSE I'M ILL.

***I can't come today* BECAUSE I'M ILL.**

(2) Insertion

Phrases from language B inserted into grammar of language A

Wir suchen VOLUNTEERS fuer das Projekt.

We are looking for VOLUNTEERS for the project.

(3) Dense (Green & Li Wei, 2014)

Grammar and lexicon of language A and B converge

THAT's WHAT *papa meinS TO SAY*.

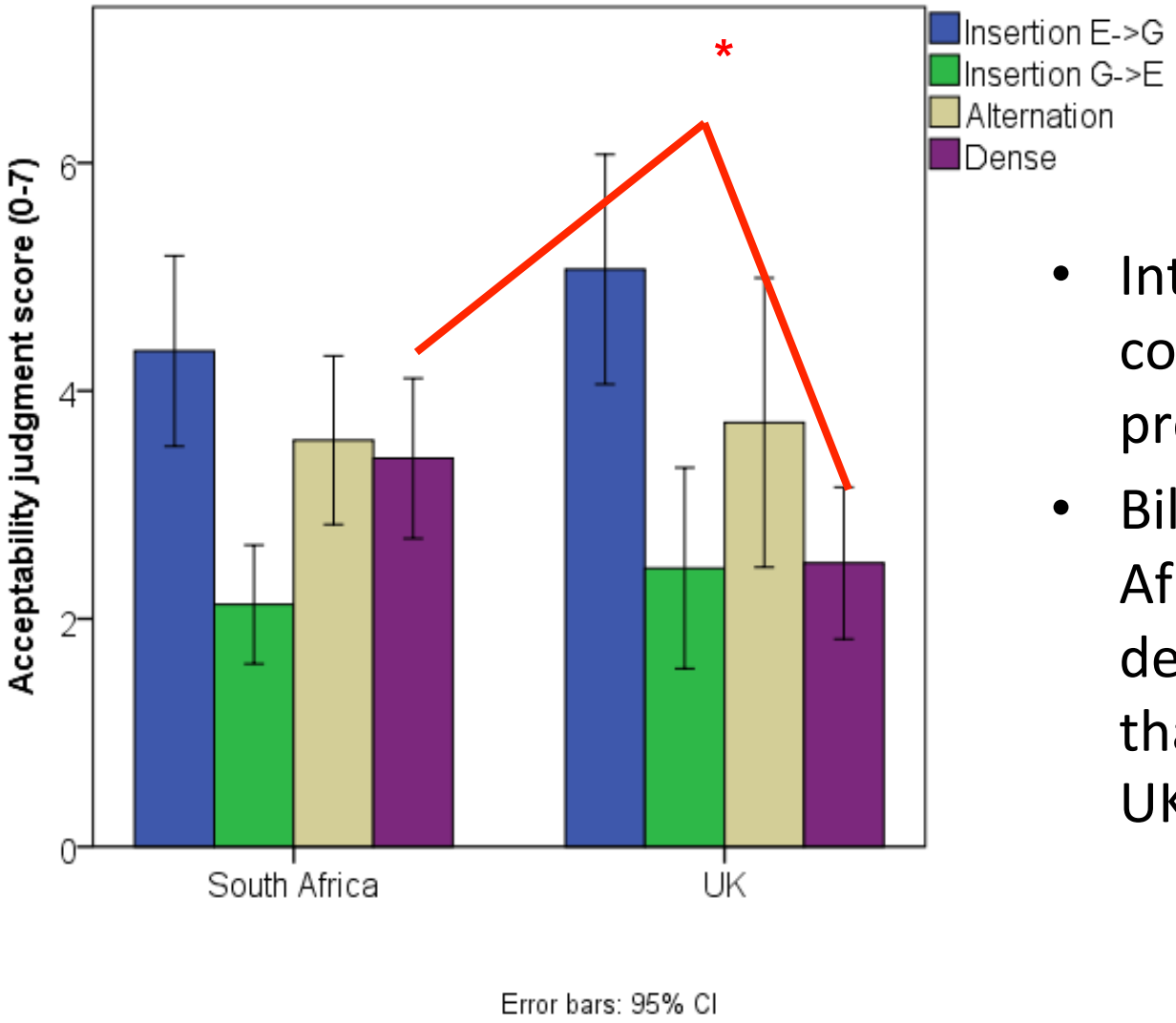
THAT'S WHAT *papa meanS* TO SAY

TASK SWITCHING

Study 1 – Julia Hofweber: Type of code-switching and EFs (see poster)

Languages	Community Type	Bilingualism Type	Code-switching Tendency	Location	Age	Number
German-English	6th generation immigrants	simultaneous balanced	dense code-switching	South-Africa	M = 43	N = 12
German-English	1st generation immigrants	sequential dominant	insertion	UK	M = 30	N = 9
English	control	monolingual	none	UK	M = 25	N = 20

Study 1 – Julia Hofweber: Code-switching type (Muysken, 2000) and EFs (poster)



- Interaction: Group x code switching preference
- Bilinguals in South Africa prefer more dense code switching than bilinguals in the UK

Study 2 – Effects of bilingual education on EFs (with Ianthi Tsimpli & Chris Bongartz)

Focus on bilingual children

Question: Are there effects of bilingual education/ literacy on EFs?

Participants

- 266 bilingual children within 5 countries (Greece, Albania, Germany, UK, USA).

Study 2 – Effects of bilingua education on EFs (with Ianthi Tsimpli & Chris Bongartz)

Albanian-Greek	English-Greek	German-Greek Greek-German
Submersion bilingual education ○ Children taught exclusively through L2 (Greek) ○ No courses in their L1 (Albanian)	**Immersion bilingual education** ○ Children educated through their L1 (English) ○ Greek language courses ~ 3-5 h per week	**Immersion bilingual education** ○ Children educated through their L1 (German) ○ Greek language courses ~ 4h per week
Maintenance bilingual education ○ Tirana: Greek-Albanian school ○ Greek language courses ~ 14-16 h per week		**Maintenance bilingual education** ○ School in Düsseldorf Children taught in Greek (L1) ○ Afternoon classes in Cologne : Greek language course ~ 3h per week

Study 2 – Effects of bilingual education on EFs (with Ianthi Tsimpli & Chris Bongartz)

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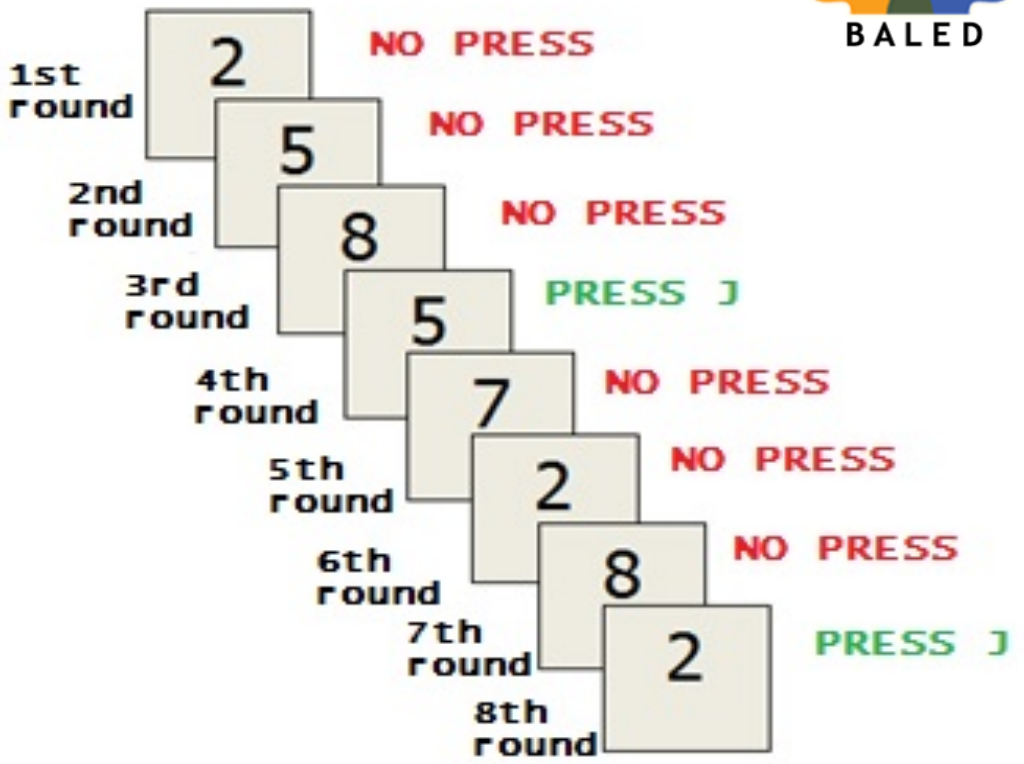


N-back task: updating

Study 2 – Effects of bilingual education on EFs (with Ianthi Tsimpli & Chris Bongartz)

Analyses

- Dependent variable: N-back scores

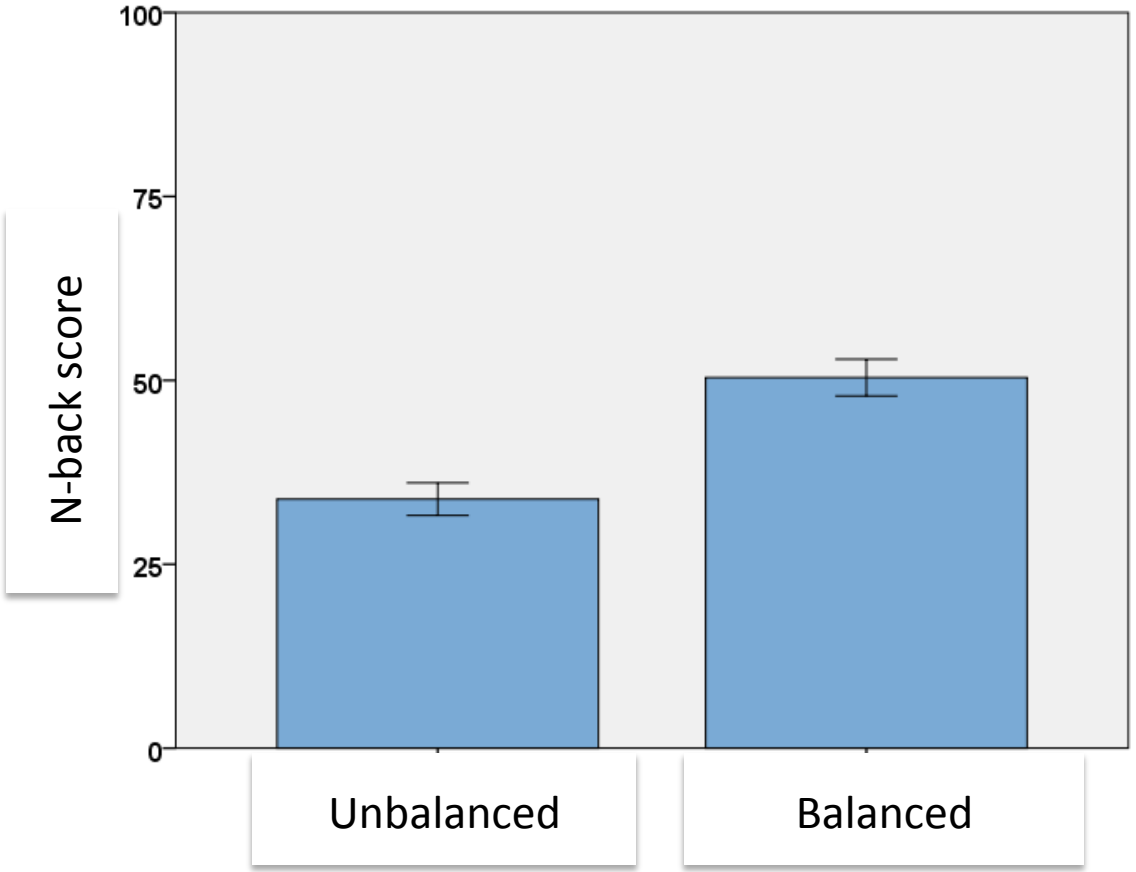
- Bilingual education calculated as the proportion of time spent teaching on the *less taught* language (whichever that might be)
  - 0 = Unbalanced (one language taught 100% of the time)
  - 50 = Balanced (both languages taught 50% of the time)

Study 2 – Effects of bilingual education on EFs (with Ianthi Tsimpli & Chris Bongartz)

Mixed effects models with ‘Bilingual education‘ treated as a continuous predictor, ’country’ and ‘school’ as nested random effects.

- Model 1: ‘Bilingual education‘ as a fixed effect and ‘school’ and ‘country’ as nested random effects.
- Model 2: additional fixed effect for Raven‘s score (as a continuous predictor) → significantly improved model fit (chi-squared = 15.6, p = < .001);
- Model 3: including ’Bilingual education‘ by ‘Raven‘s score’ interaction didn’t improve the model (chi-squared < 1, p = . 952).
- Model 4: Including ‘Vocabulary’ didn’t improve the model (chi-squared < 1, p = .439).

Study 2 – Effects of bilingual education on EFs (with Ianthi Tsimpli & Chris Bongartz)



'Bilingual education score' [estimate = 0.88, SE = 0.33, t = 2.693, p = .007]

'Raven's score' [estimate = 0.88, SE = 0.35, t = 2.547, p = .011]

What's the way forward?

MODEL THE FACTORS THAT CONTRIBUTE TO NOISE (e.g., environmental factors)

SCRUTINISE THE TASKS WE USE, INCREASE THE RELIABILITY, PIN DOWN WHAT WE TEST AND DEVELOP COMPREHENSIVE MODELS: EFs – LANGUAGE

BEWARE OF CEILING EFFECTS when we don't find differences

What's the way forward?

LEAVE POLITICS (and personal biases) **ASIDE AND LOOK FOR THE EVIDENCE**

LEAVE THE ZEITGEIST ASIDE (and be mindful of recent trend to provide evidence against the bilingualism advantage!) **AND LOOK FOR THE EVIDENCE**

ENCOURAGE A CONSTRUCTIVE DEBATE (thanks for organising this workshop) **AND LOOK FOR THE EVIDENCE**

What's the way forward?

If several studies show null effects, this is inconclusive:

WE STILL HAVE TO ACCOUNT FOR THE STUDIES THAT **DO SHOW EVIDENCE FOR AN ADVANTAGE**

Discrepancies between studies can be used to try to UNDERSTAND the relationship between EFs and language.

Thank you!