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Code-switching, translanguaging and cognitive control

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Overview

- Code-switching and translanguaging: a brief sketch
- Why study these phenomena?
  - Linguistic perspective: bilingual grammars?
  - Educational perspective: does CS further understanding of academic content?
  - Psychological perspective: How does CS affect cognition? (Executive Functions)
- CS and executive functions (Julia Hofweber)
- Where do we go from here?
  - Integrating linguistic, psycholinguistic and educational perspectives

Intrasentential code-switching

- Lexical items and grammatical features from two languages appear in one sentence (Muysken, 2000, p.1)

(1) So you have **eine Übersicht** (Eppler, 2000)

So you have **an overview**

(2) Sie hat noch immer den northern accent **von** Manchester

She has still **the** northern accent **from** Manchester

She still has the northern accent from Manchester (Eppler, 2000)

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Why study code-switching?

- It is key aspect of the input to and output of bilinguals, including in school contexts (Lipski, 2014)
- Inform models of speech processing (Green & Li Wei, 2014)
- A window on the nature of bilinguals' mental grammars
  - Is there one system or two? (García & Otheguy, 2014; MacSwan, 2017)
- It may play a key role in the cognitive advantages of bilinguals (Costa et al. 2009; Hofweber, Marinis & Treffers-Daller, 2016; in press; under review)

Translanguaging (Williams, 1994)

- To read and discuss a topic in one language, and then to write about it in another language, means that the subject matter has to be processed and "digested" (Baker, 2011, p. 289).
- Advantages of translanguaging:
  1. It may promote a deeper and fuller understanding of the subject matter.
  2. It may help the development of the weaker language.
  3. It may facilitate home-school links and cooperation.
  4. It may help the integration of fluent speakers with early learners

Different types of CS (Muysken, 2000)

Insertion

- The insertion of well defined chunks of language B into a sentence that otherwise belongs to language A (Muysken, 2013)

(3) *bütün* **Flughafen'***ı* *bul-dum*

entire airport-Acc. found-Past-1.sg.

"I found the entire airport. " (Sedef, 17-year-old Turkish-German heritage speaker) (Treffers-Daller, 2006)

Alternation

- Alternation: The succession of fragments in language A and B in a sentence, which is overall not identifiable as belonging to either A, or B.

(4) **Ich kann heute nicht kommen** because I'm ill.

I can't come today because I'm ill (Hofweber, 2017)

Congruent lexicalisation or Dense code-switching

- The use of elements from either language in a structure that is wholly or partly shared by languages A and B (Muysken, 2013).

(5) Wir haben friends **gemacht mit'm** shop owner.

We have friends **made with th'** shop owner

"We made friends with the shop owner."

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The effects of different types of code-switching on bilinguals' executive functions

Research question: How do bilinguals' code-switching habits modulate their performance at executive control?

independent variable:
Socio-linguistic code-switching habits

modulate

dependent variable:
non-linguistic / cognitive performance tasks testing executive functions

language pair constant:
German-English bilinguals

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What are executive functions?

umbrella term for processes orchestrating goal-oriented behaviour

Inhibitory control

-focus on the relevant by suppressing irrelevant
-inhibit undesired task-schemata
~concentration skills

Conflict-monitoring

-ability to manage co-activated competing task-schemata & switch between them
~mental flexibility

Debate: Bilingual "advantages" effects in EFs?

-**Findings**: bilinguals outperform monolinguals at tasks testing EFs
-**Explanation**: EFs involved in language control processes -> training effect (Bialystok, 2017)
-**Suggestion**: bilingual practices challenging EFs, e.g. code-switching, at root of phenomenon (Costa et al., 2009)

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Code-switching types (Treffers-Daller, 2009; Green & Wei, 2014)

Different CS types involve inhibition / monitoring to differing degrees

(1) Alternation

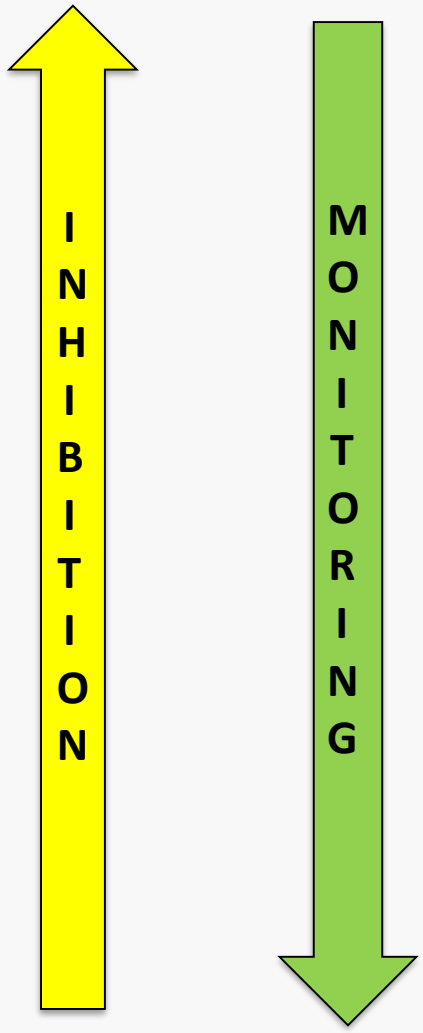
Languages structurally fairly independent
Prolonged inhibition of each language
-> High levels of inhibition
-> Less monitoring

(2) Insertion

+lexical, -grammatical co-activation of languages
-> Partial inhibition

(3) Dense code-switching

Structural integration of languages
Frequent switching
-> Constant monitoring of languages



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Project hypotheses

Focus on the two “extreme ends” of the code-switching continuum,
i.e. Alternation and Dense code-switching.

1) Alternational code-switching frequency will correlate positively with performance at inhibition.

2) Dense code-switching frequency will correlate positively with performance at monitoring.

3) Executive function modulation through code-switching will translate into bilingual advantages compared to monolinguals.

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Participants

Bilinguals: L1 = German, L2 = English, immersed in L2 / UK, N=43

Monolinguals: control group, L1 = English, no active bilingualism, N=41

Variable	Group	Mean	Std. Dev.	P-value	N
Age	Monolinguals	33.83	11.80	0.47	41
	Bilinguals	32.14	9.56	0.47	43
Education	Monolinguals	4.12	0.87	0.69	41
	Bilinguals	4.20	1.10	0.69	43
IQ	Monolinguals	110.44	18.04	0.10	41
(Ravens Progressive Matrix)	Bilinguals	116.28	13.61	0.10	43
Short-term Memory	Monolinguals	6.21	1.07	0.38	41
(Digit span forward)	Bilinguals	6.40	0.80	0.38	43
Working Memory	Monolinguals	4.48	1.21	0.82	41
(Digit span backward)	Bilinguals	4.53	0.84	0.82	43

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Frequency judgement task to capture code-switching

Instruction:

"How often do you come across this type of sentence when talking to other German-English bilinguals?"

Rate from 1 = never ------ to ------ 7 = very frequently

Presentation in visual and audio format:

Ich gebe dem Kinobesuch heute a miss.

(I'll give the cinema visit a miss today.)

stimuli:

14 insertion German into English
14 insertion English into German
14 alternation
14 dense code-switching

- **Utterances from authentic socio-linguistic data-bases (Eppler, 2004, Clyne, 2003)**

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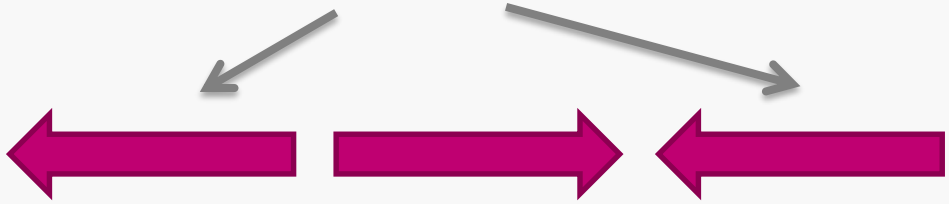
Flanker task: measures inhibition

Instruction: Does the central arrow face leftwards or rightwards?

Congruent condition: faster RTs

Incongruent condition: slower RTs

inhibition of distracting stimuli



Conflict effect: measure of inhibition

Accuracy / RTs incongruent condition – Accuracy / RTs congruent condition

The smaller your CE, the better you are at inhibition.

3 blocks of flanker trials varying in load to Monitoring

block label	congruent trials	incongruent trials	Monitoring cost	Inhibitory Load
92 low	92 %	8 %	Low	High
75 medium	75 %	25 %	Medium	Medium
50 high	50 %	50 %	High	Low

The better you perform in the 92-8 condition, the better you are at inhibition.

The better you perform in the 50-50 condition, the better you are at monitoring.

Results

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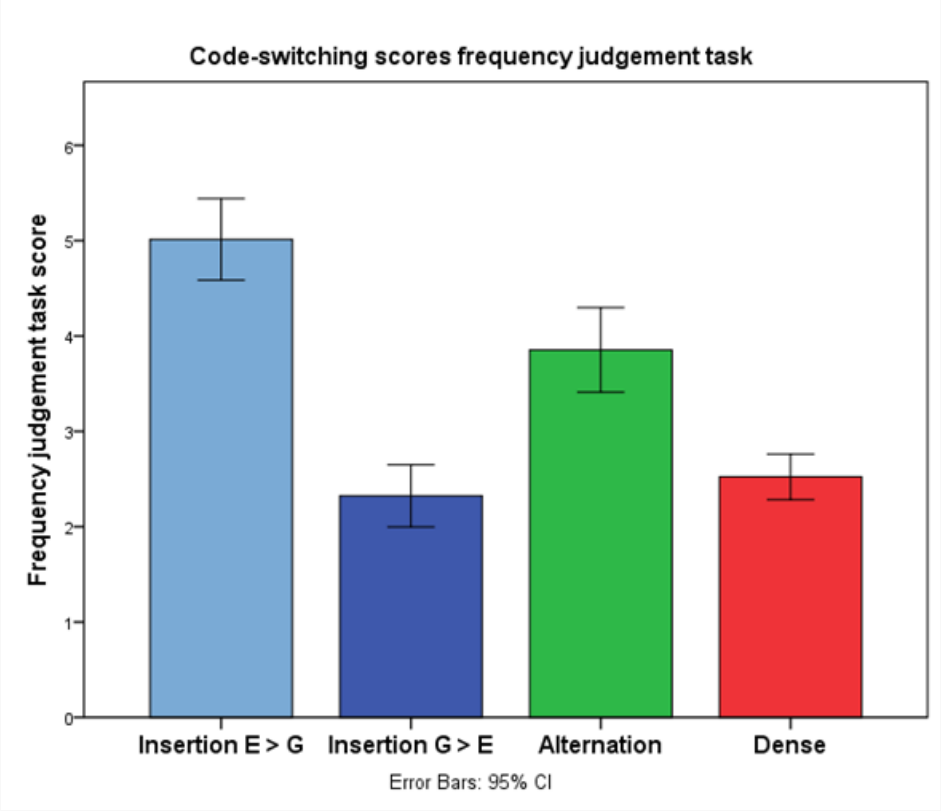
Code-switching types used by German-English bilinguals



-all types of CS used to some extent

-mostly Insertion and Alternation

-low Dense code-switching scores
-> little variation

-sample best suited to investigate effects of Insertion and Alternation

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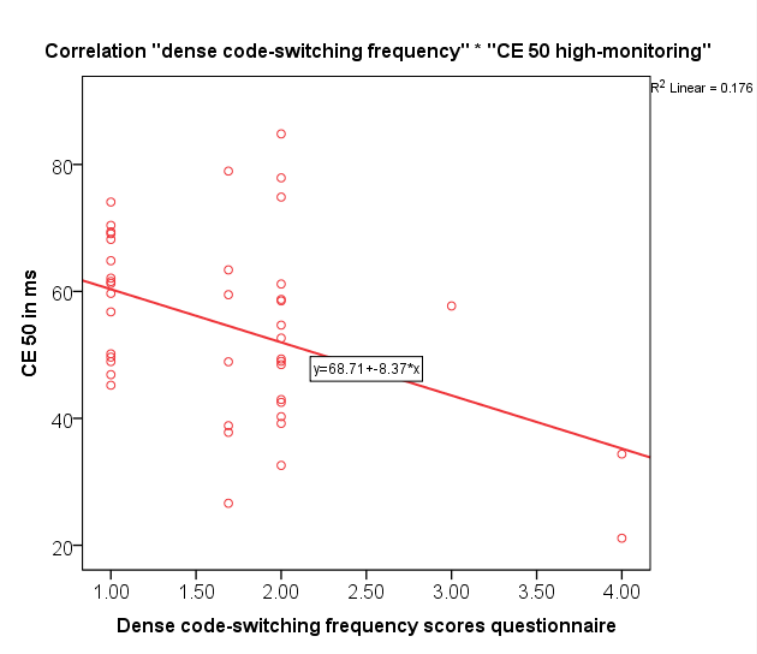
Multiple regression: 50-50 condition (bilinguals only)

Dense code-switching explains **17.5 %** of performance variance.

-> Dense CS frequency correlates positively with performance in the condition challenging monitoring most.



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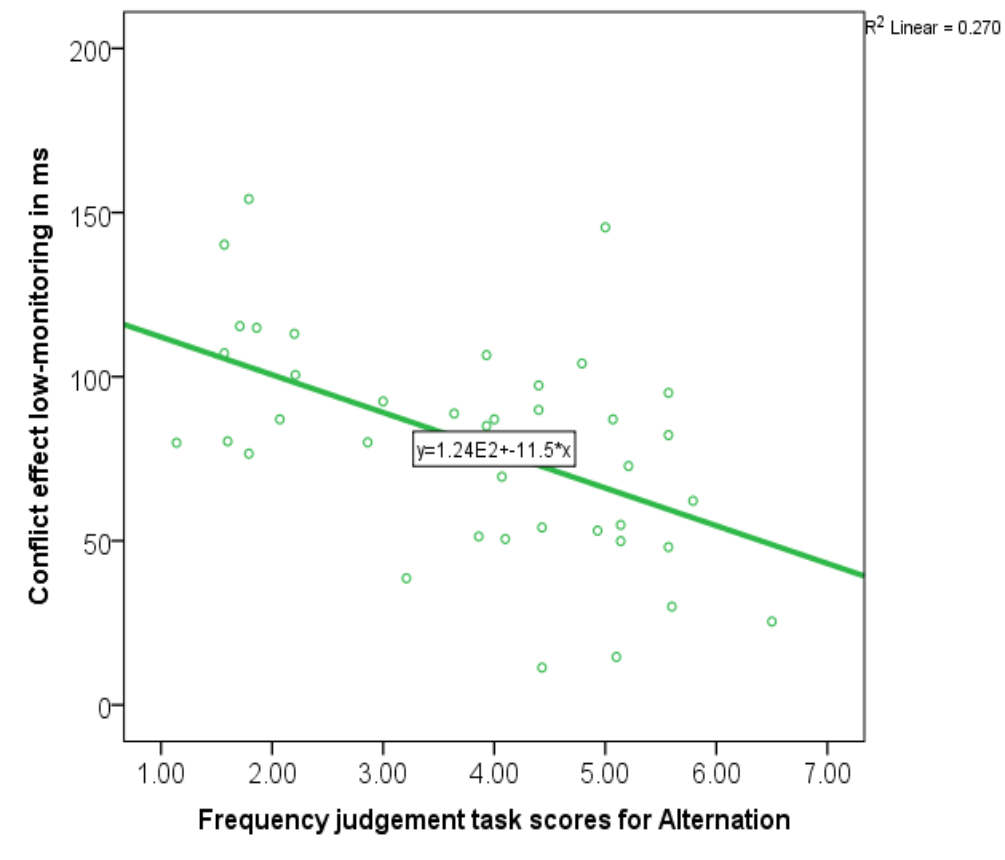
Multiple regression: 92-8 condition (bilinguals only)

-**Alternational code-switching** explains **27%** of performance variance in 92-8 condition

-> The more frequently bilinguals engage in Alternation, the better they perform in the condition challenging inhibition most



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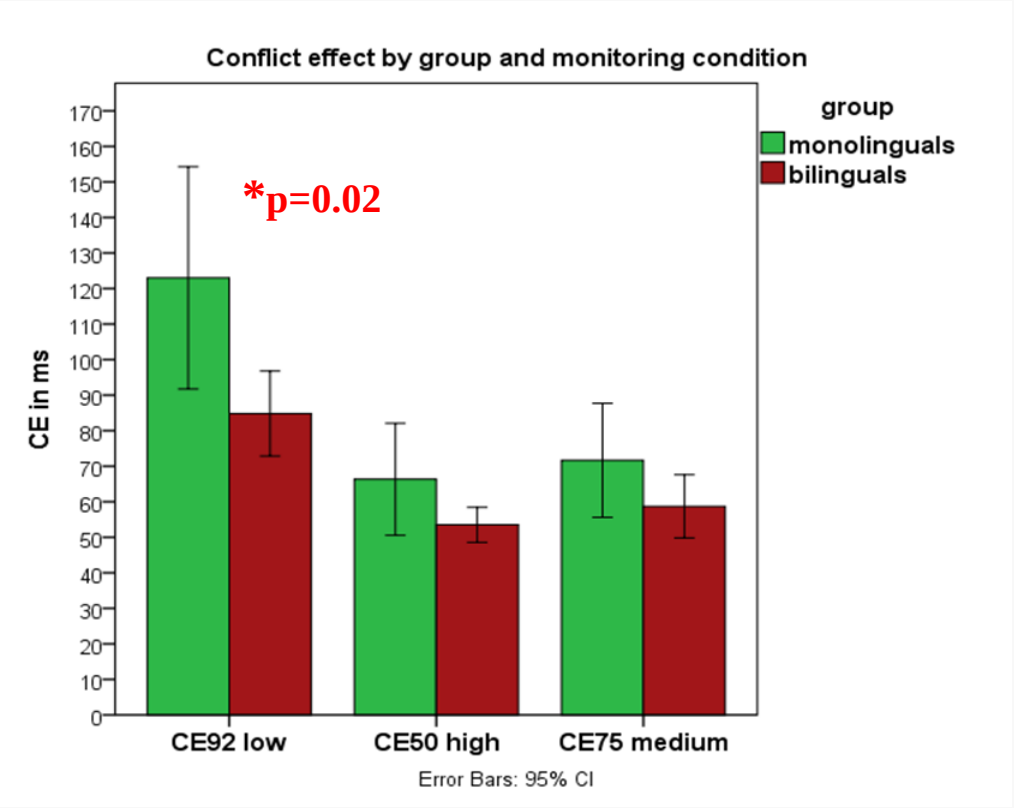
Comparison monolinguals to bilinguals for Inhibitory performance



-Bilinguals outperformed monolinguals in 92-8 condition (p=0.02)

-Bilinguals outperformed monolinguals in the condition posing greatest cognitive load to inhibition

-No performance difference in 50-50 condition (Dense CS too infrequent?)

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Conclusions

1. General trend in line with predictions derived from existing models (Treffers-Daller, 2009; Green & Wei, 2014): When relationships are significant, then…

a) Alternation correlates positively with inhibition.

b) Dense code-switching correlates positively with monitoring, i.e. mental flexibility.

2. Differential impact of different code-switching types on executive functions clearly observable.

3. Modulation of executive functions through code-switching may translate into "bilingual advantages" if code-switching type frequent (here: Alternation, but not Dense).

4. Variable patterns, linked to social and psycholinguistic factors/individual differences

Further research

- More research needed on the relationship between EFs and CS which differentiates between different types of CS
- What are the neurophysiological correlates of the different code-switching types? (Ruigendijk, 2018)
- More experimental work of code-switching needed which makes use of insights from naturalistic code-switching

How useful is CS /translanguaging in the multilingual classroom?

CS in classrooms is often stigmatised, **but**

(a) CS enhances cognitive abilities, such as EFs (which also underlie creativity)

(b) CS plays a “scaffolding” role, i.e. creative resource to overcome initial gaps in L2 competence -> use of CS may boost L2 confidence & reduce L2 anxiety

(c) CS contributes to creation of a multilingual / translingual identity in L2 learners: Language learners -> Language users / Emerging bilinguals

Codeswitching/translanguaging

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- The introduction of the notion of translanguaging is helpful in that it puts CS firmly in its social context and emphasises the creative abilities of multilinguals.
- It has helped to create space for multilingualism in educational contexts.
- But we need bridges between linguistic, psycholinguistic and sociolinguistic analyses of “mixing/translanguaging” and a shared terminology if we are to make advances in understanding multilingual abilities (see Pavlenko, 2017)

Final thought:
many terms… same or different?

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- heteroglossia (Bakhtin, 1975)
- polylanguaging and polylingual languaging (Jørgensen, 2008; Jørgensen, Karrebæk, Madsen, & Møller, 2011)
- metrolingualism (Otsuji & Pennycook, 2011)
- codemeshing (Canagaraja, 2013)
- translingual practice (Canagarajah, 2013)
- multilanguaging (Nguyen, 2012).

(MacSwan, 2017)

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What's behind Christo's wrappers?

- Vielen Dank!
- Teşekkür ederim!
- Thank you very much!

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Questions

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Study 1:
Participants: predictions for code-switching patterns by community type

Languages	Group	Language contact type	Bilingualism type	Predicted code-switching frequency	Age	IQ	N
German-English plus L3 / L4 at school	UK	**1st generation** immigrants **recent language contact**	English L2-users Later English AoO (11)	**insertion English into German**	M = 39	M= 110	11
German-English plus Afrikaans Zulu Setswana	South-Africa	**5th generation** immigration **long-standing language contact**	Heritage speakers Earlier English AoO (7) **schooling in German**	**more dense code-switching**	M = 39	M=108	11

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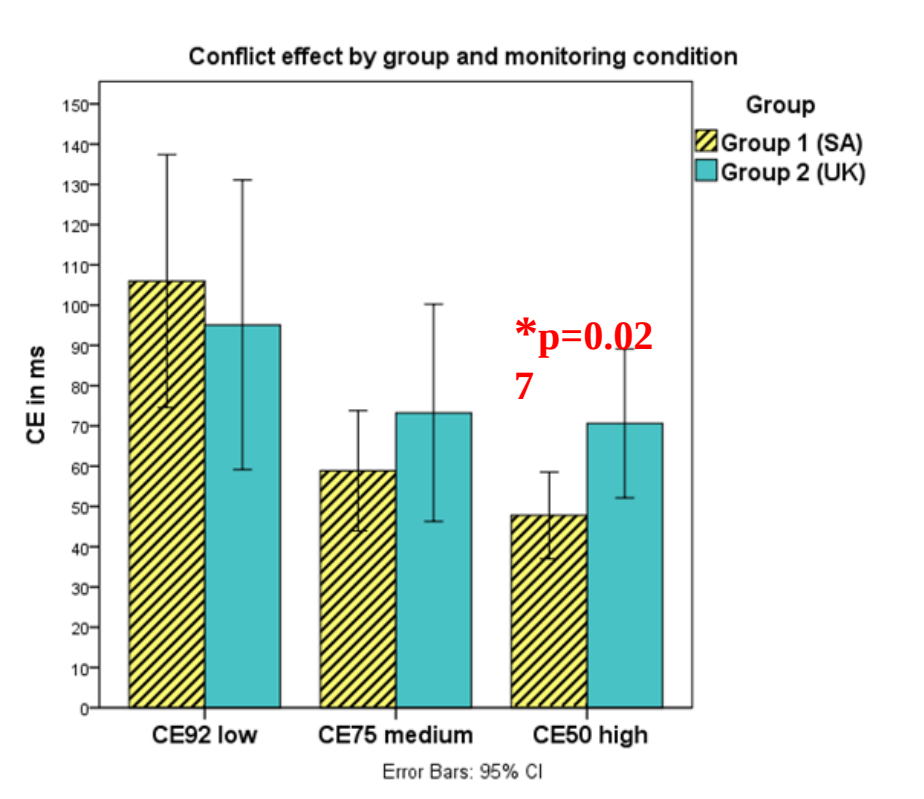
Results: conflict effect by group and by monitoring condition



-interaction CE x group significant with covariate Age of Onset (p=0.04)
without covariate p=0.06

-CE 50-50 bilinguals engaging in more dense code-switching
< CE 50-50 bilinguals engaging in less code-switching
(p = 0.027)

-small sample, but power = 62%

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Multiple regression for 2 key variables (all 22 bilinguals)

predictor variables:
non-linguistic: age, IQ, education, short term memory, working memory,
linguistic: proficiency, English Age of Onset, bilingualism duration, proficiency balance, code-switching frequencies (insertion E -> G, insertion G -> E, alternation, dense code-switching)

outcome variables:
-conflict effect 50-50 high-monitoring condition: none of variables significant predictors
-monitoring cost: dense code-switching only significant linguistic predictor
-> positive correlation dense code-switching * conflict-monitoring performance (r = 0.48)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.478[a]	.229	.190	33.25302473	.229	5.924	1	20	.024
2	.745[b]	.555	.481	26.62572845	.326	6.598	2	18	.007

a. Predictors: (Constant), dense

b. Predictors: (Constant), dense, WMG, IQ