



Investigating the relationship between aptitude and working memory in younger and older bilinguals.

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Background

- Language learning aptitude has featured intermittently in the spotlight since Henmon’s work in the 1930s.
- Recent research claims that working memory (WM) and aptitude may be interchangeable constructs (Wen & Skehan, 2011; Miyake and Friedman, 1998).
- However, several factors influence individual differences in WM such as age and bilingualism.
- Age-related declines in cognitive performance have been extensively researched (Mattay et al, 2006; Salthouse, 2009; Wang et al, 2011).
- WM changes may be one of the main causes of said declines (Salthouse, Atkinson & Berish, 2003; Hedden, T., & Gabrieli, 2004; Craik & Salthouse;2011).
- However, bilingualism may enhance some WM functions (Bialystok et al, 2004) or even improve later life cognition (Bak et al, 2014).
- Little research has explored the effect older age and bilingualism might have on language learning aptitude.

Research Question

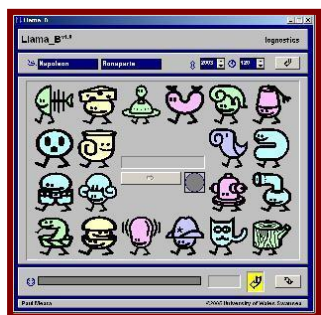
What are the effects of bilingualism and aging on WM and aptitude?

Tasks

- LLAMA aptitude tests (Meara 2005)
 - Free, loosely based on Carroll’s MLAT
 - Includes four subtests
 - Has yet to be validated



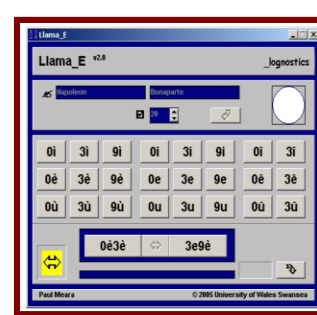
LLAMA_B
Vocabulary
Test



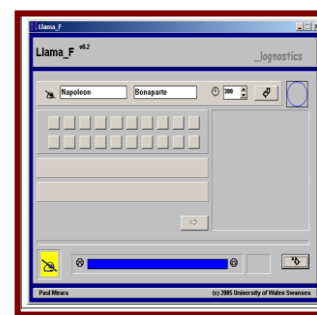
LLAMA_D
Sound
Recognition



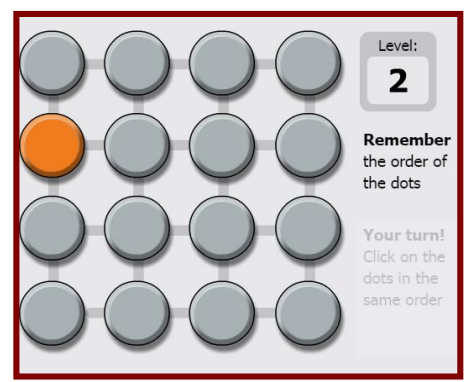
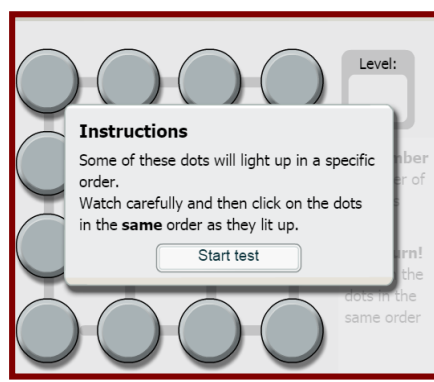
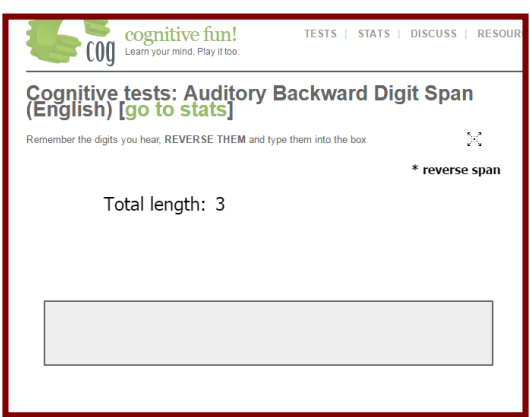
LLAMA_E
Sound Symbol
Correspondence



LLAMA_F
Grammatical
Inferencing



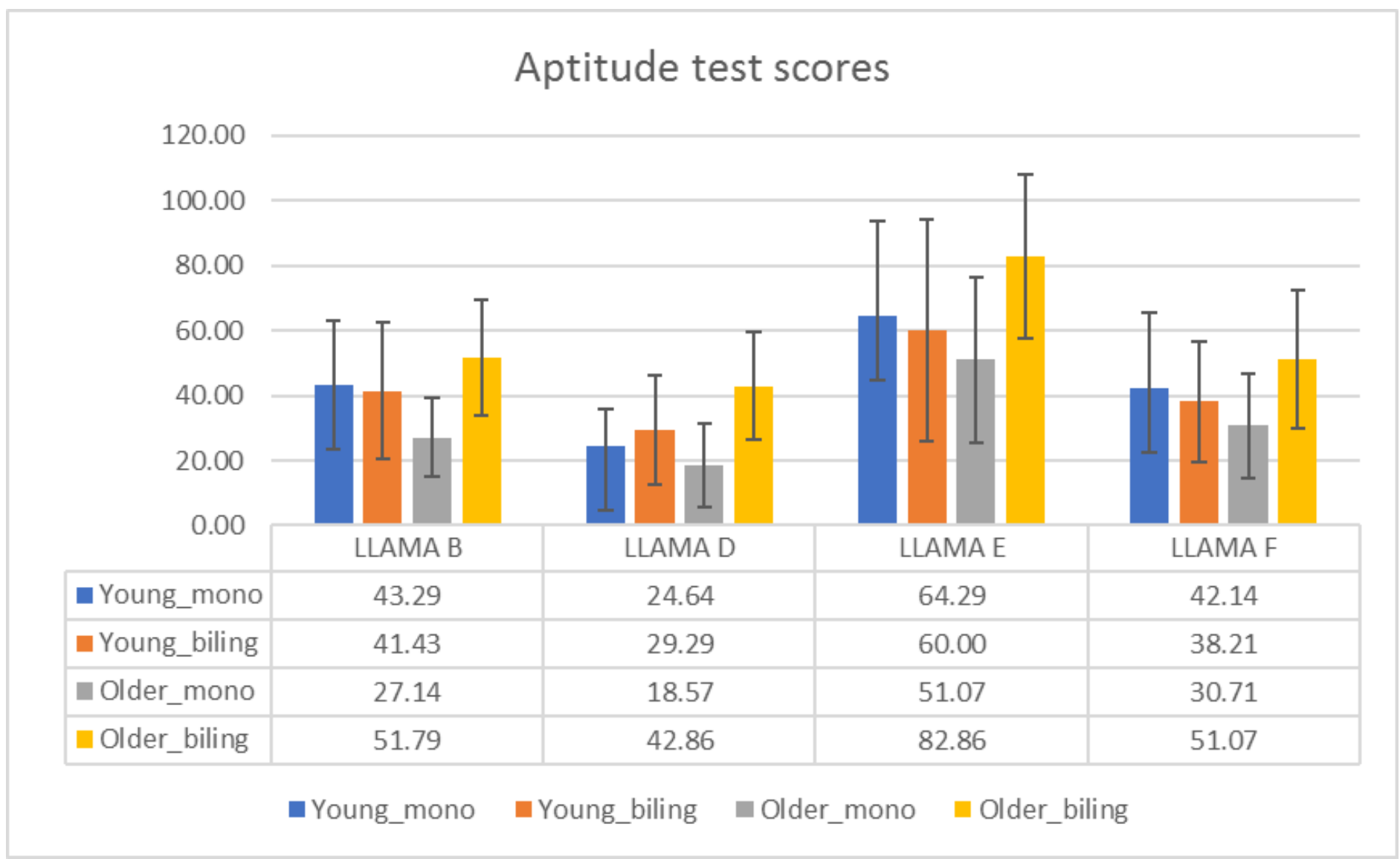
- Three WM tests
 - auditory digit-span backwards test
 - Test phonological loop & CE
 - a visual spatial test
 - Test visuo-spatial sketchpad
 - Trail Making Tests parts A & B
 - Measure of attention



Participants

- N= 56 matched on age, gender and bilingual status

	Group 1	Group 2
Mean age (range)	21 (18-23)	61.5 (50-78)
Bilingual	14 (7 F, 7M)	14 (7 F, 7M)
Monolingual	14 (7 F, 7M)	14 (7 F, 7M)
n	28	28

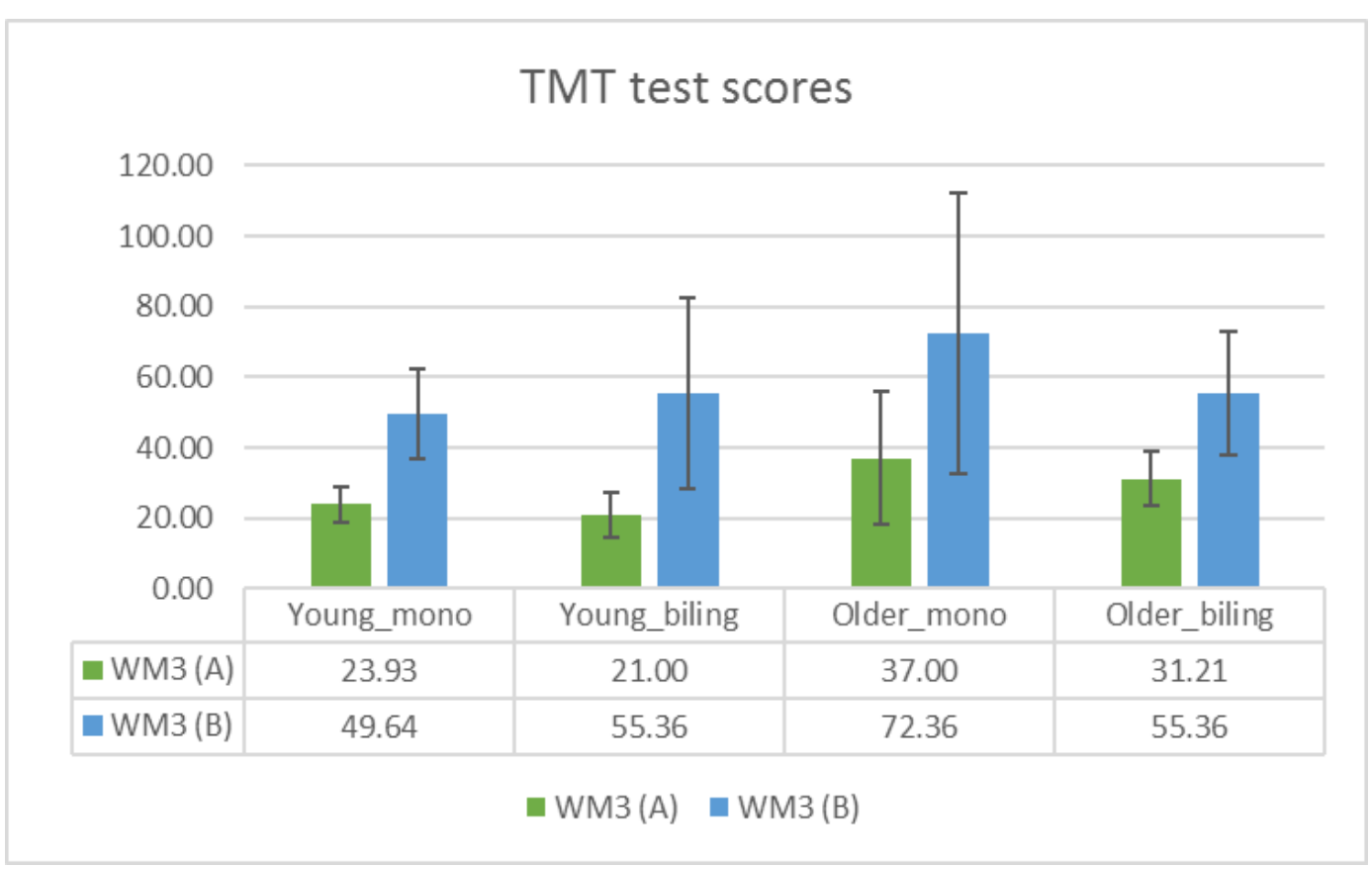
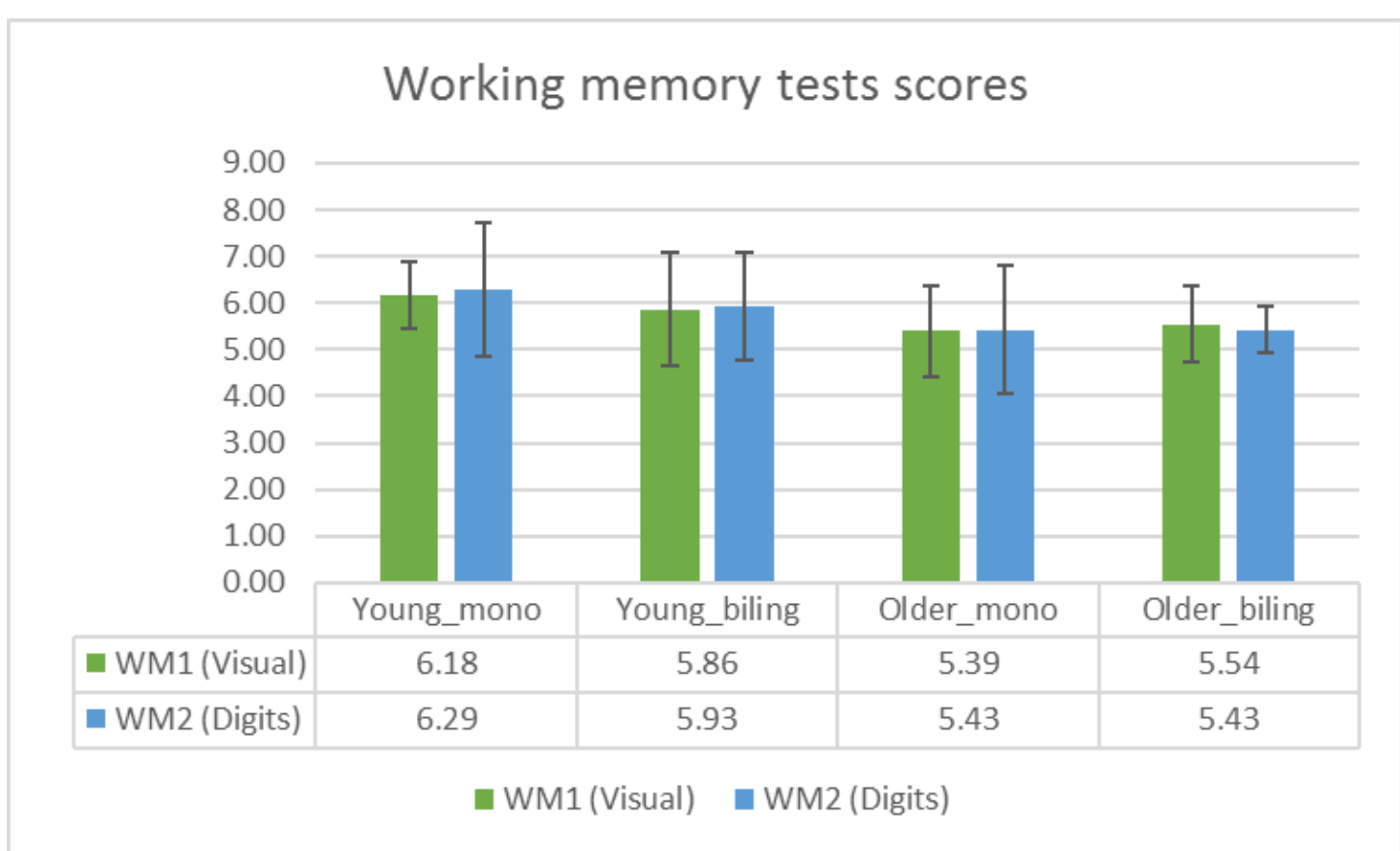


Results

- Levene’s tests show data suitable for ANOVA.
- ANOVAs with Bonferroni correction and Cohen’s D.

Aptitude:

- For three out of four LLAMA aptitude tests:
 - Overall group effects
 - LLAMA B: $F(3, 52)=4.210$ $p=.010^*$
 - LLAMA D: $F(3, 52)=6.507$ $p<.001^*$
 - LLAMA E: $F(3, 52)=2.828$ $p=.047^*$
 - Only significant difference is between older monolingual and bilingual groups
 - LLAMA B: $p=.006^*$ $d=-1.563$
 - LLAMA D: $p<.001^*$ $d=-1.572$
 - LLAMA E: $p=0.040^*$ $d=-1.208$



Working memory:

- No significant differences for working memory on the visual or digits backwards tasks for any group.
- Results for the TMT tests were not normally distributed: Mann Whitney U tests carried out.
- Age effect between younger and older groups on TMT A ($U= 165.5$, $p<.001$).
- No difference due to bilingual status.

Discussion

- WM and aptitude are affected by age and bilingualism in different ways.
- Bilingual advantage in older group across 3 of the LLAMA aptitude tests.
- Age advantage on one of the WM tests.
- This suggests that aptitude tests are not interchangeable with WM tests.
- WM may be a component of aptitude.

Limitations:

- WM not fully tested.
- LLAMA tests need to be validated.