

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

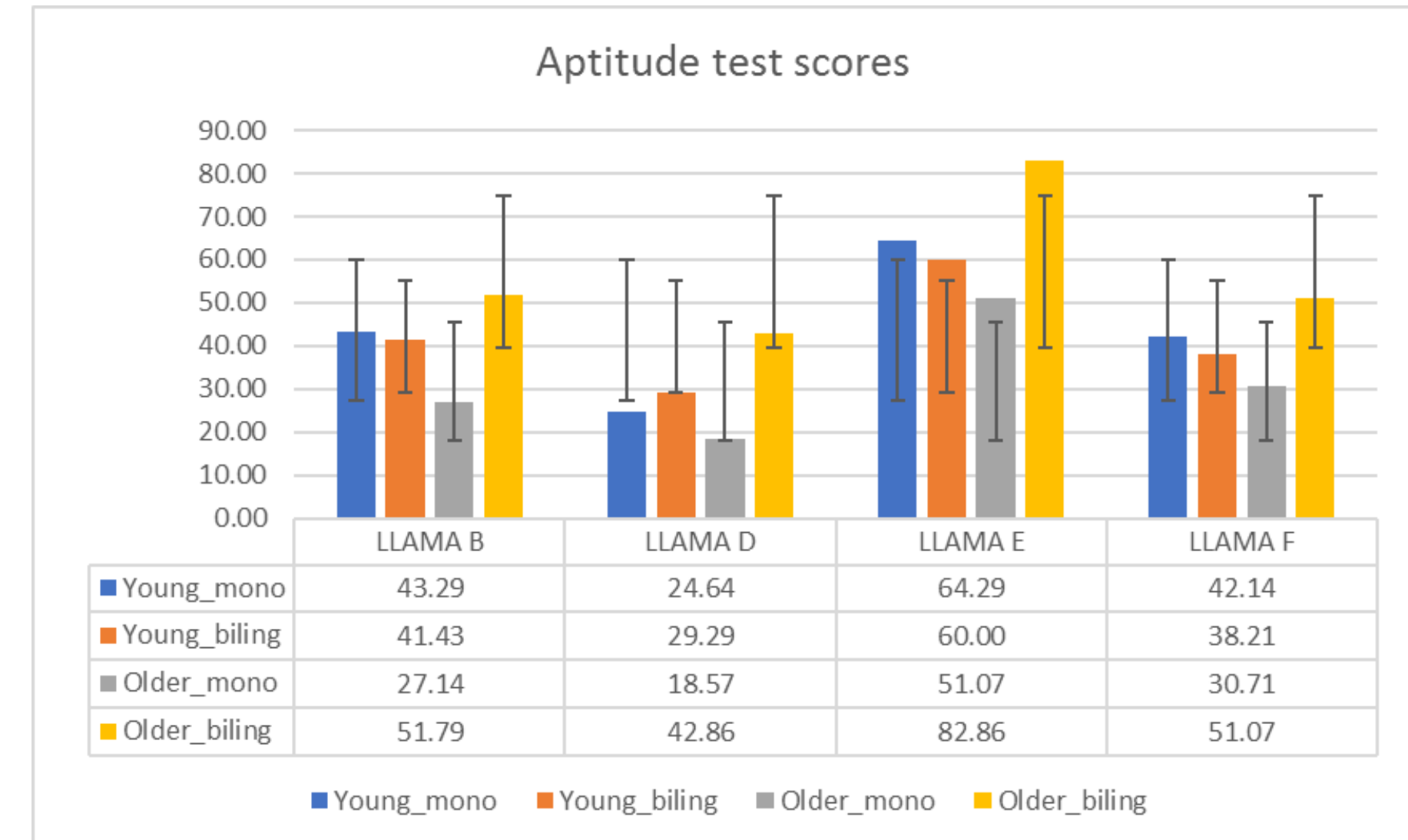
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Background

- 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.



Results

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

Aptitude:

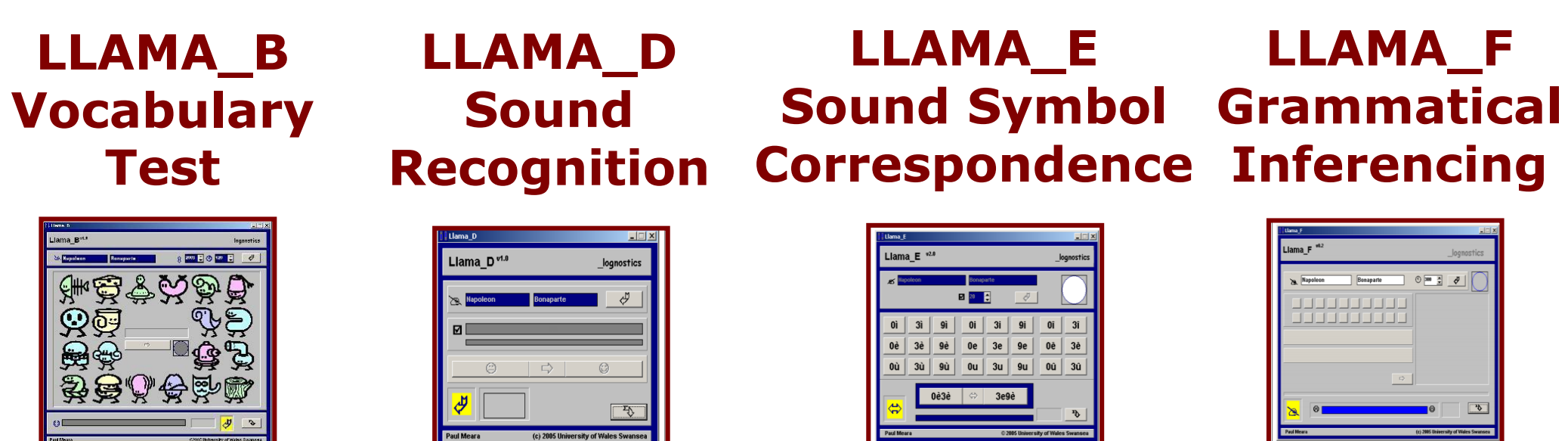
- For three out of four LLAMA aptitude tests:
 - Overall group effects
 - LLAMA B: $F(3, 52)=4.210 p=.010^*$
 - LLAMA D: $F(3, 52)=6.507 p<.001^*$
 - LLAMA E: $F(3, 52)=2.828 p=.047^*$
 - Only significant difference is between older monolingual and bilingual groups
 - LLAMA B: $p=.006^* d=-1.563$
 -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

Research Question

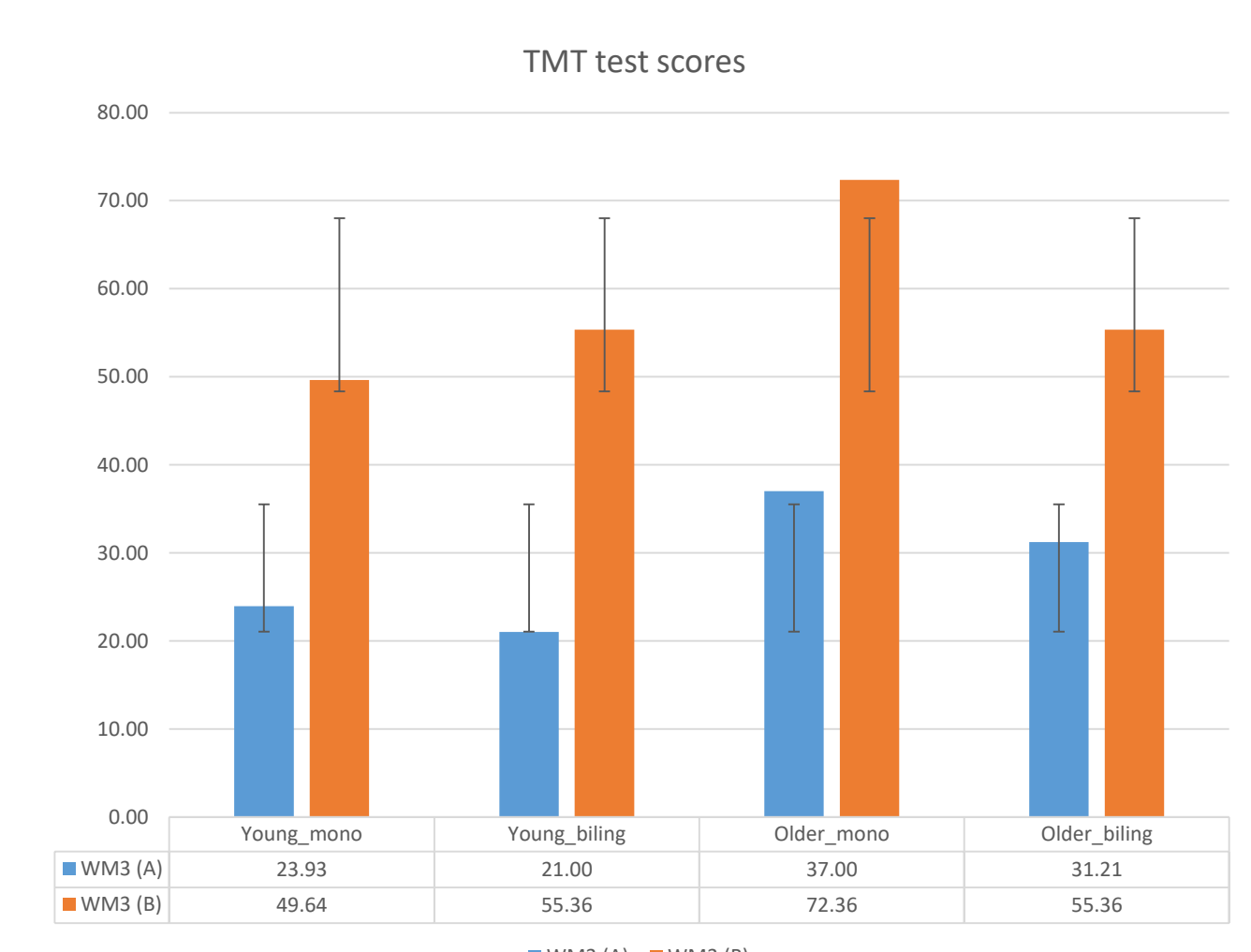
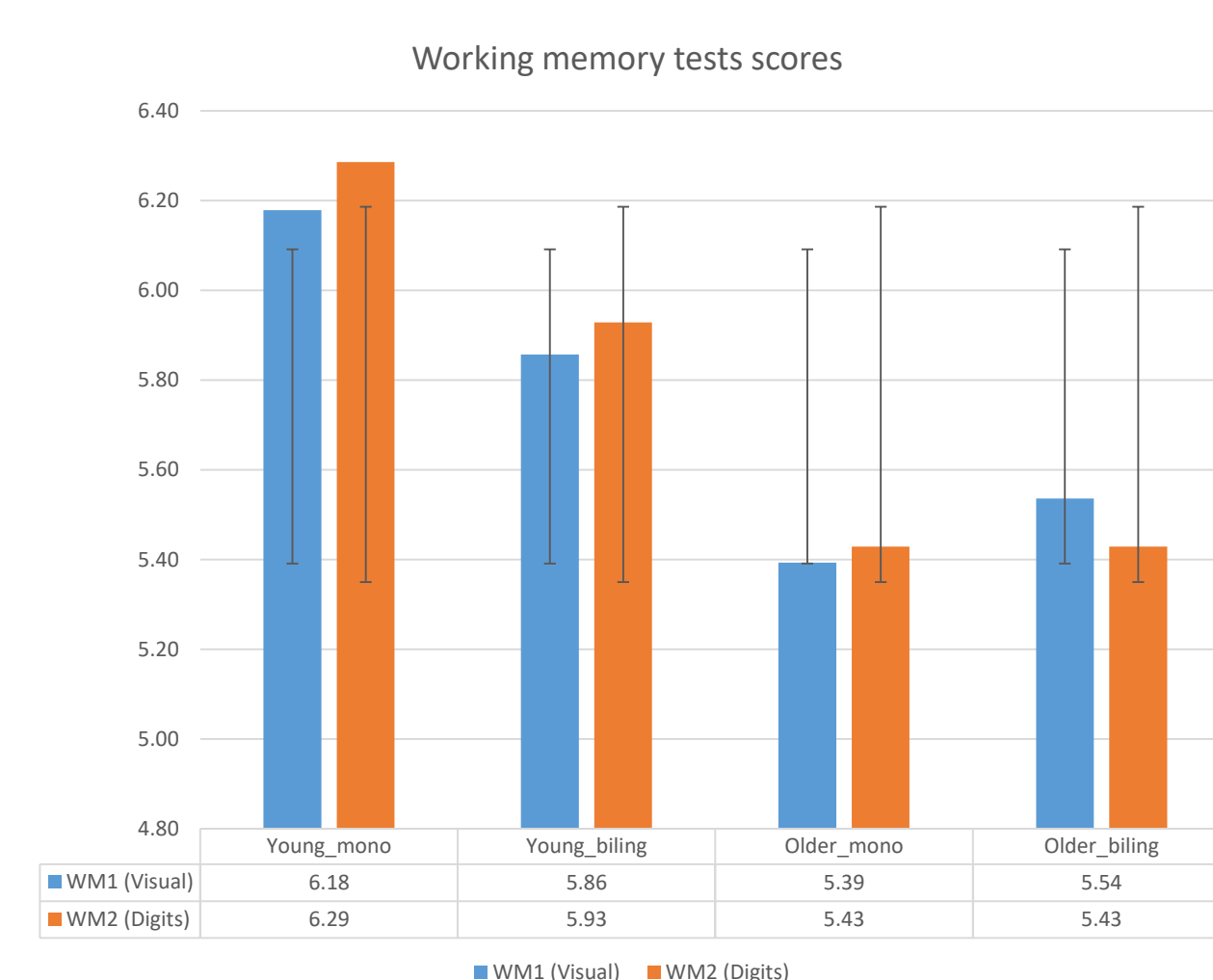
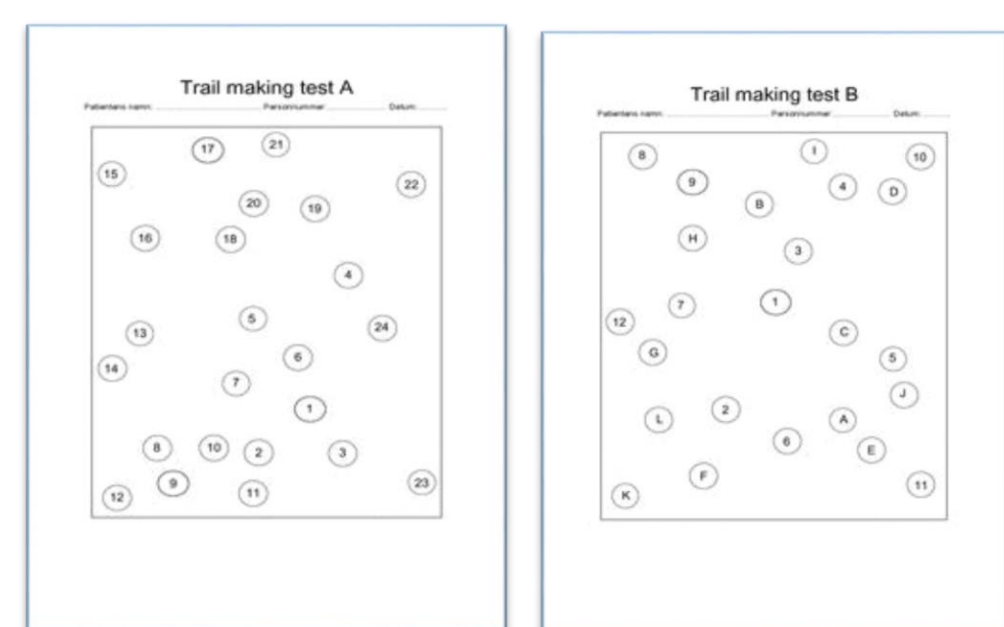
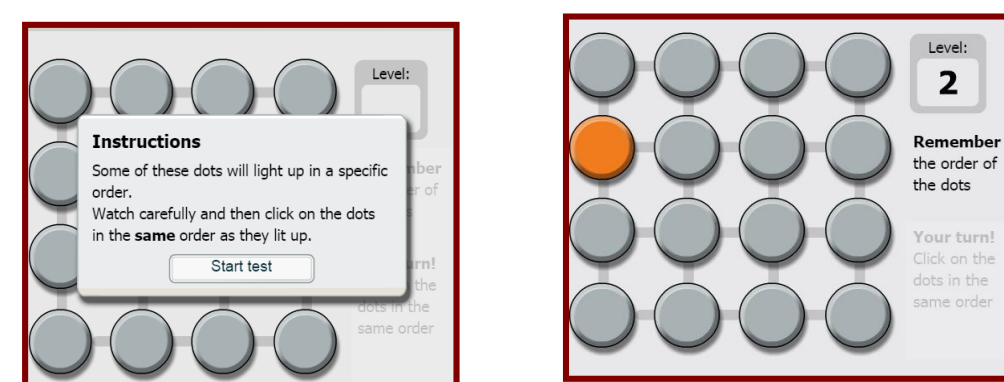
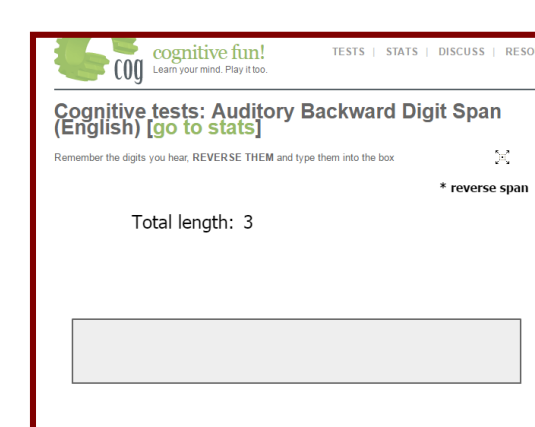
What are the effects of bilingualism and aging on WM and aptitude?

Tasks

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



- 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



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.

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