Teaching Second Languages through Computer Games

Diana Pili-Moss
Lancaster University

March 30th 2017 – Chandler House - University College London

In this talk

- Introduction
- Advantages of using videogames in L2 instruction
- Introduction to the computer board game ‘Brocanto’
- Piloty study where Brocanto was used with L1 English children
- Main study where Brocanto was used with L1 Italian children in a primary school in Italy

Second language input

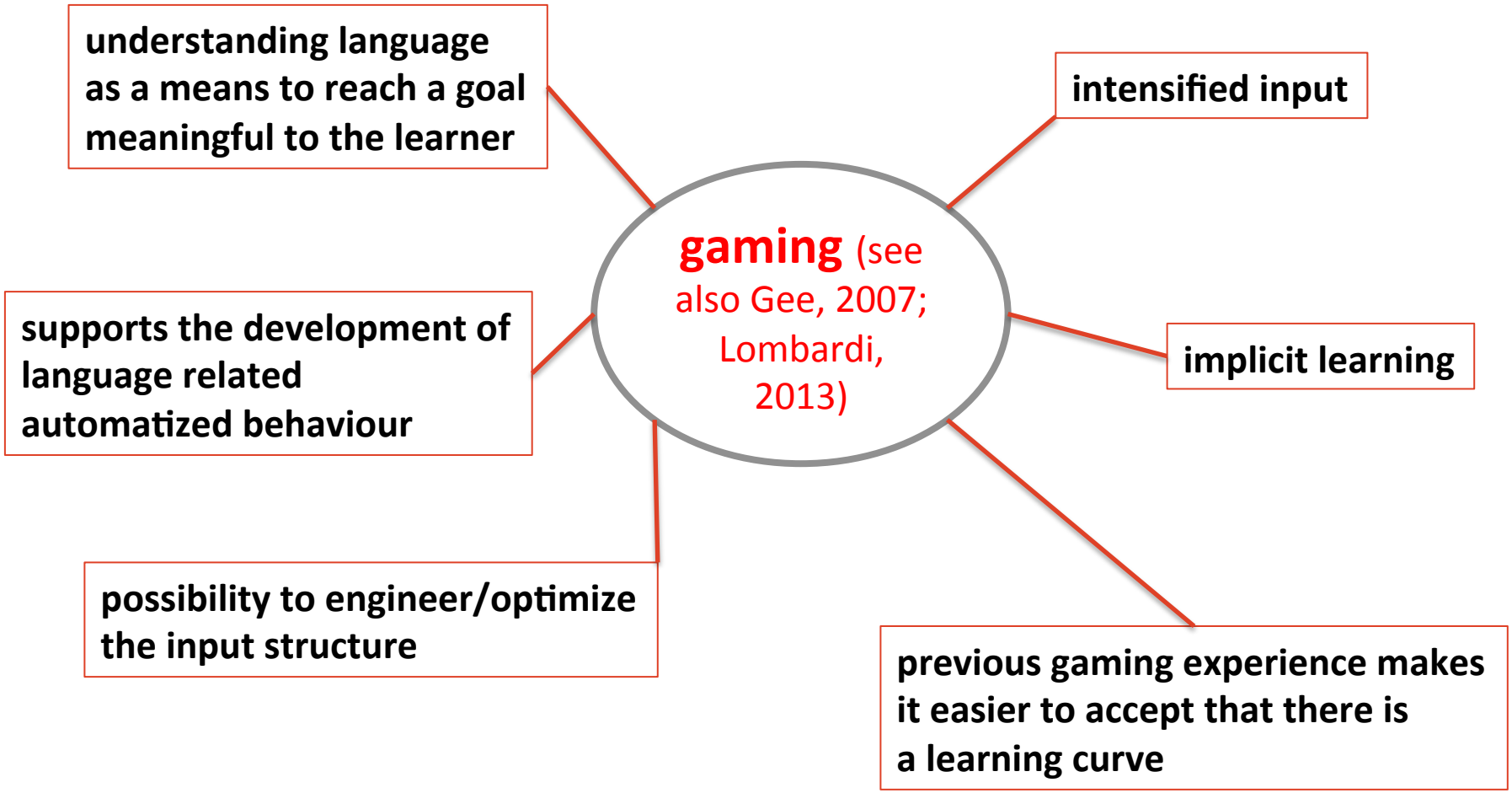
Input effectiveness depends on:

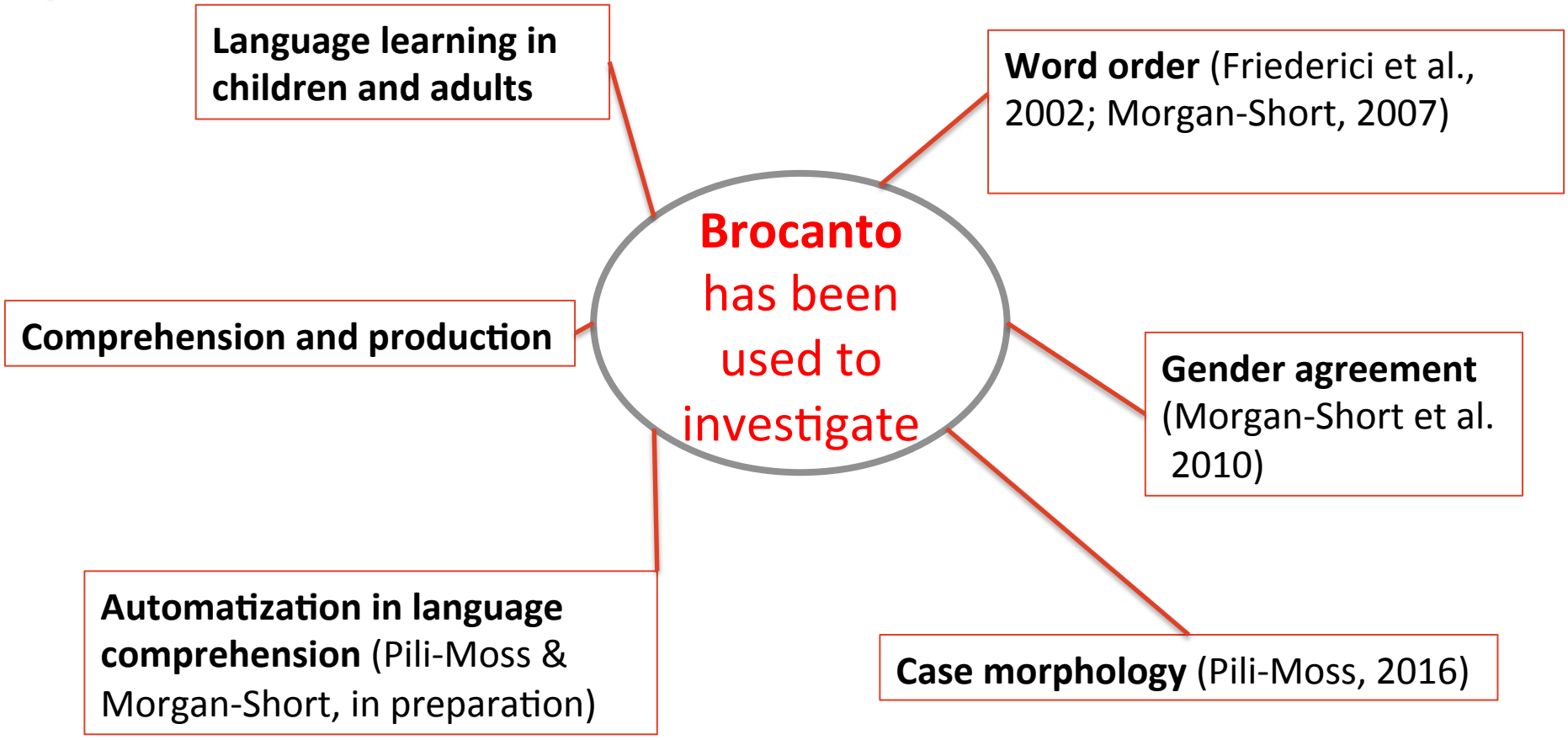
- **amount** (Ellis, 2010; Muñoz, 2006, 2008)

- **how intensive input is** (Muñoz, 2011; Tragant, Muñoz, & Spada, 2016)

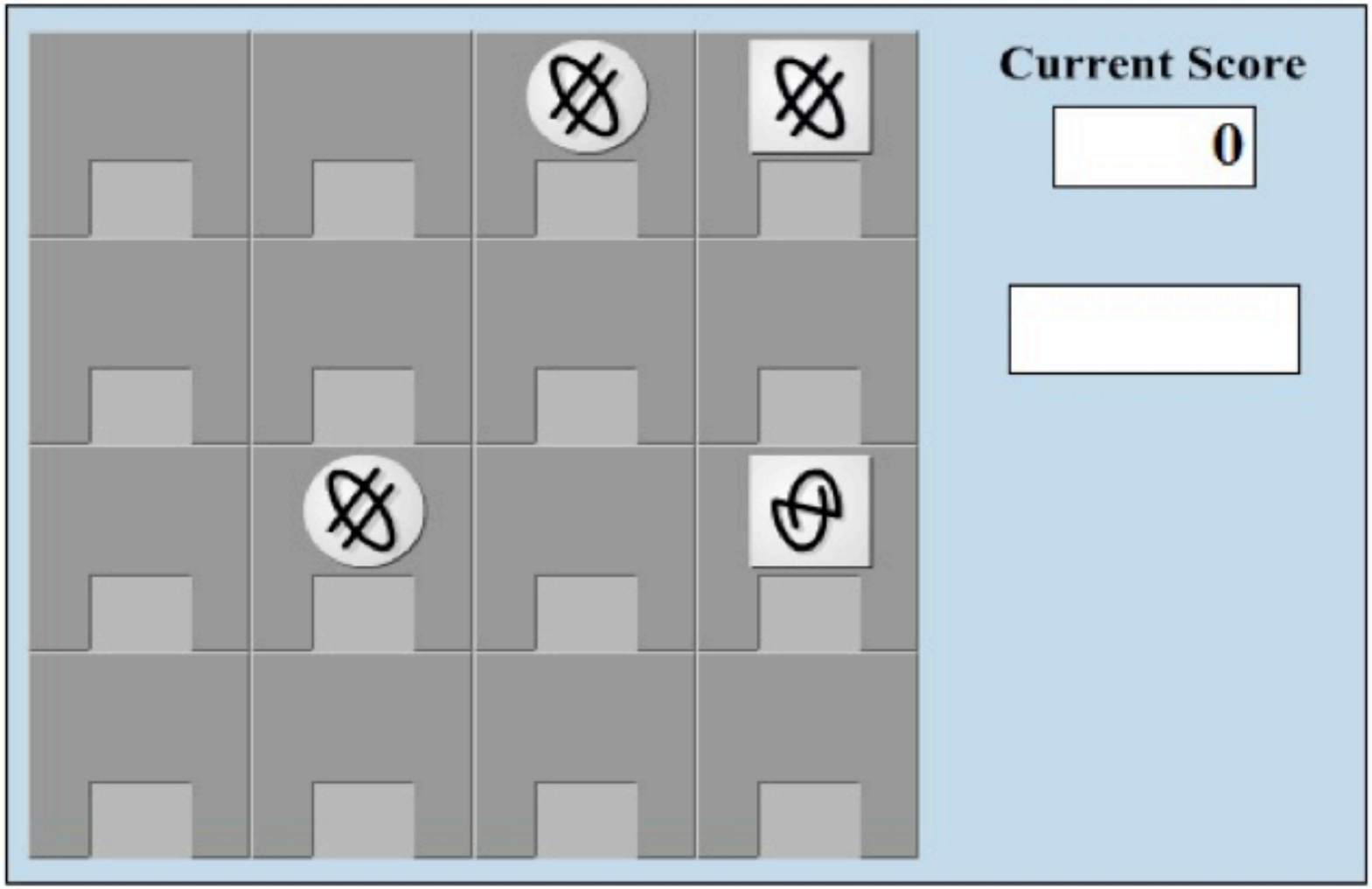
- **structure** (Boyd & Goldberg, 2009; Wonnacott et al., 2012)

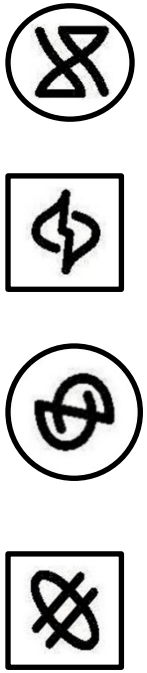
Language instruction through videogames




Brocanto has been used to investigate
Language learning in children and adults
Word order (Friederici et al., 2002; Morgan-Short, 2007)
Comprehension and production
Gender agreement (Morgan-Short et al. 2010)
Automatization in language comprehension (Pili-Moss & Morgan-Short, in preparation)
Case morphology (Pili-Moss, 2016)

The game: Brocanto

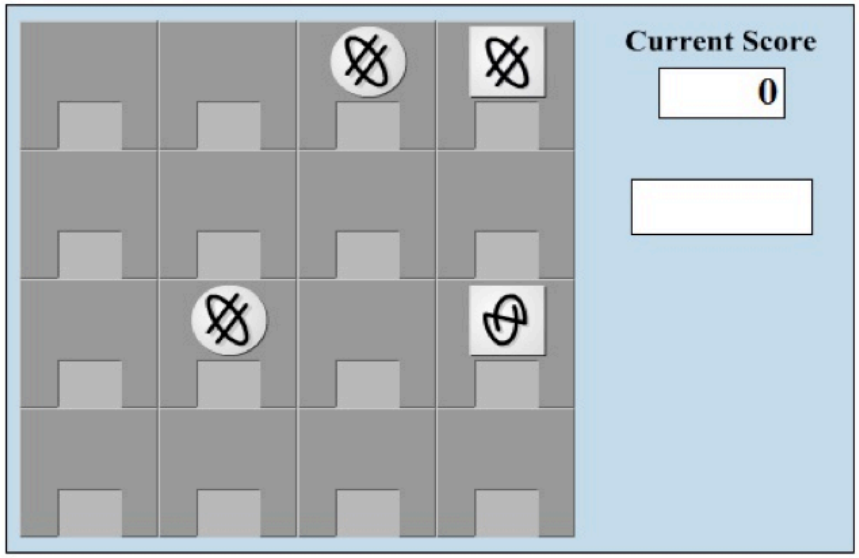




Morgan-Short (2007)

Vocabulary training: 4 token symbols, how to say ‘round’/ ‘square’, name of the 4 moves and 2 possible directions

Brocanto features



Aim: To listen to a sentence in the new language and earn points if the move it describes is performed correctly

Limited time to respond

Feedback

Score given at the end of each 20-move block

Vocabulary and game moves trained previously

Engagement of long-term memory and working memory – attention necessary to succeed in the game

Limitations:

-contextual domain

-comprehension only

-lack of social interaction

-for research purposes only (not a fully developed educational product)

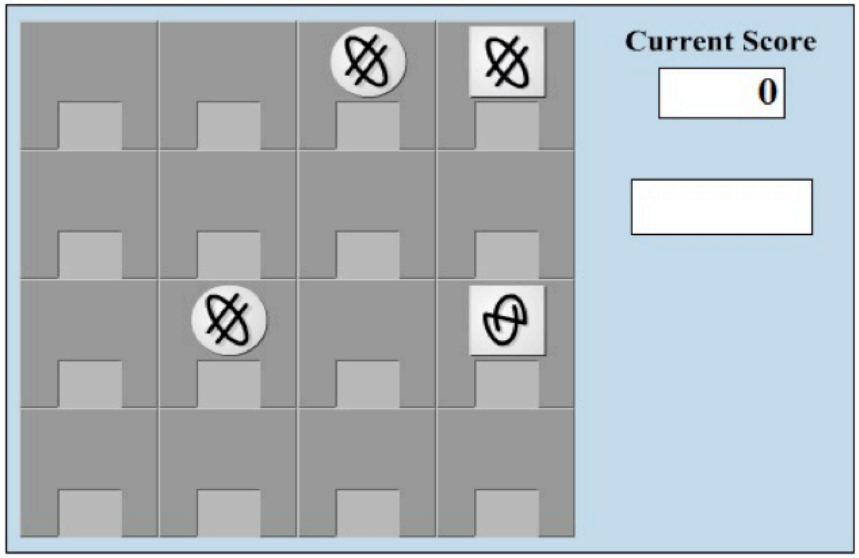
Brocanto

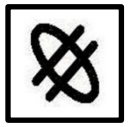
- The game in itself can be easily re-programmed to use any natural language

- However, up to now the game was used with languages created to mirror the characteristics of e.g. French, Spanish, Japanese, but with made-up words that follow the pronunciation rules of the learner's native language

- Why made-up languages?

Example: Japanese





blom

vode

Trose blom-**li** neimo blom-**lu** zayma nim
Round blom-**NOM** square blom-**ACC** across captures
[The round blom token captures the square blom token across]

How do we know children have learnt the relevant features of Japanese?

GJT
Grammaticality Judgment Test

Analysing game performance

The study

Investigated areas:

- Child vs. adult L2 learning
- Amount/quality of language learning
- Role of long-term memory and working memory in implicit language learning
- Type of language knowledge (explicit vs. implicit)

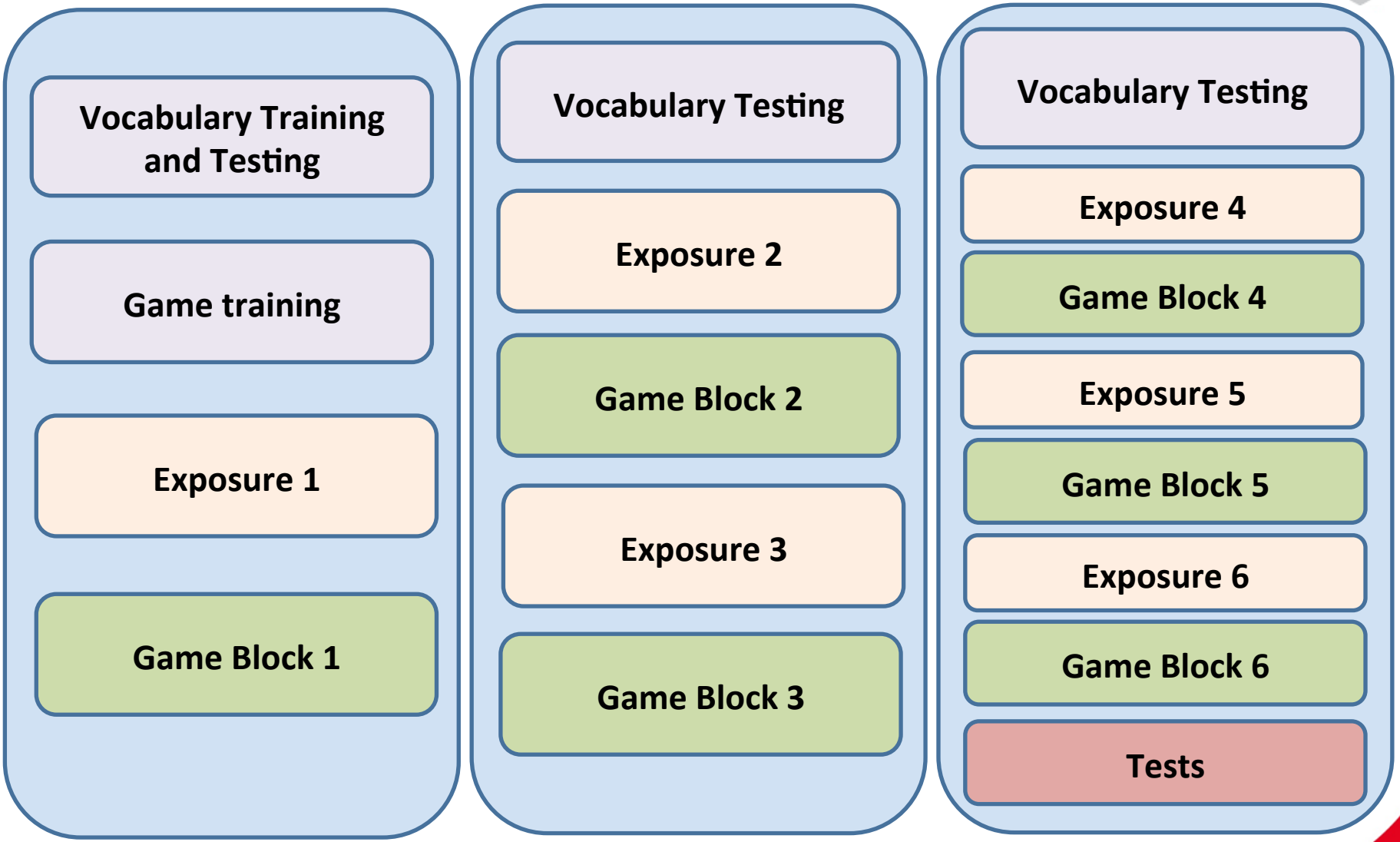
Pilot study

- six 9 year olds and eight adults (< 40) - L1 English
- Individual participants in UK

Main study

- 40 8-9 year olds and 40 adults (< 35)- L1 Italian
- In school in Italy

Design


Vocabulary Training and Testing
Game training
Exposure 1
Game Block 1
Vocabulary Testing
Exposure 2
Game Block 2
Exposure 3
Game Block 3
Vocabulary Testing
Exposure 4
Game Block 4
Exposure 5
Game Block 5
Exposure 6
Game Block 6
Tests

Pilot study: Accuracy across blocks

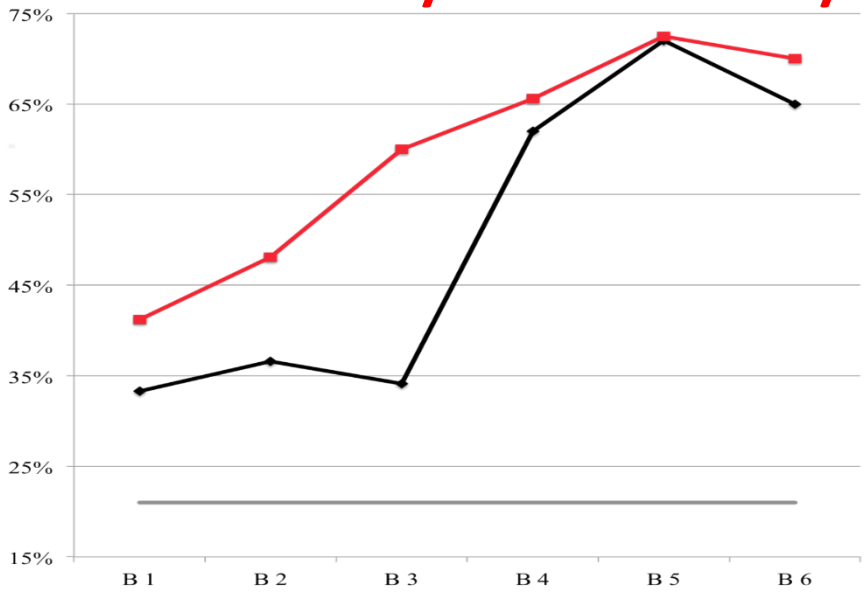


Figure 1. Overall performance (accuracy) across blocks. Sig. difference: Block 3, χ^2 (1) = 21.07, p =.000, Φc = .257.

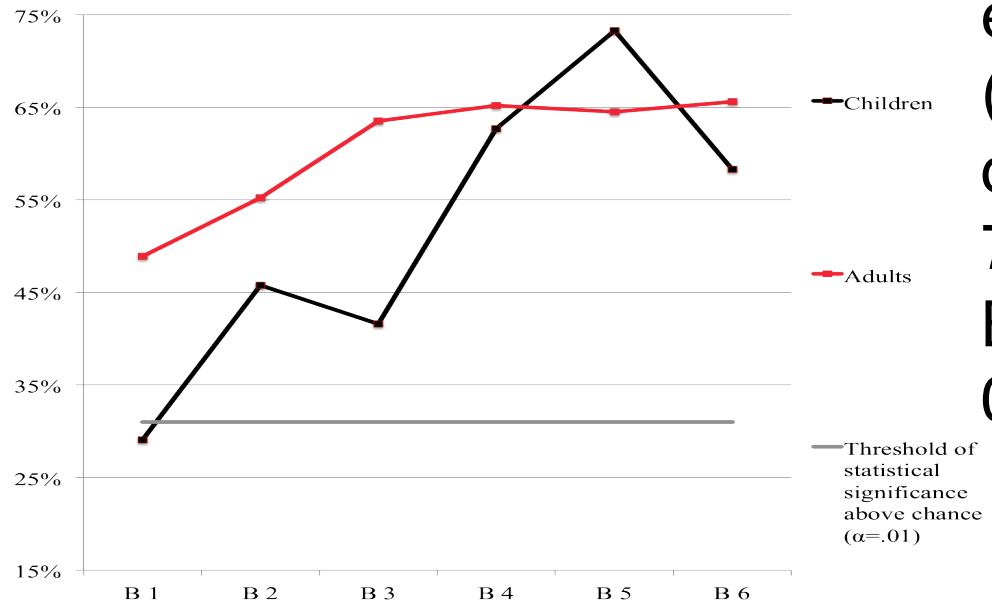


Figure 2. Accuracy based on evidence of correct linking (symmetrical moves). Sig. differences: Block 1, χ^2 (1) = 7.89, p =.008, Φc = .203; Block 3, χ^2 (1) = 9.21, p =.004, Φc = .219.

The main study: The primary school

Primary state school near Milan (Northern Italy)

about 400 pupils

Mixed socio-economic background

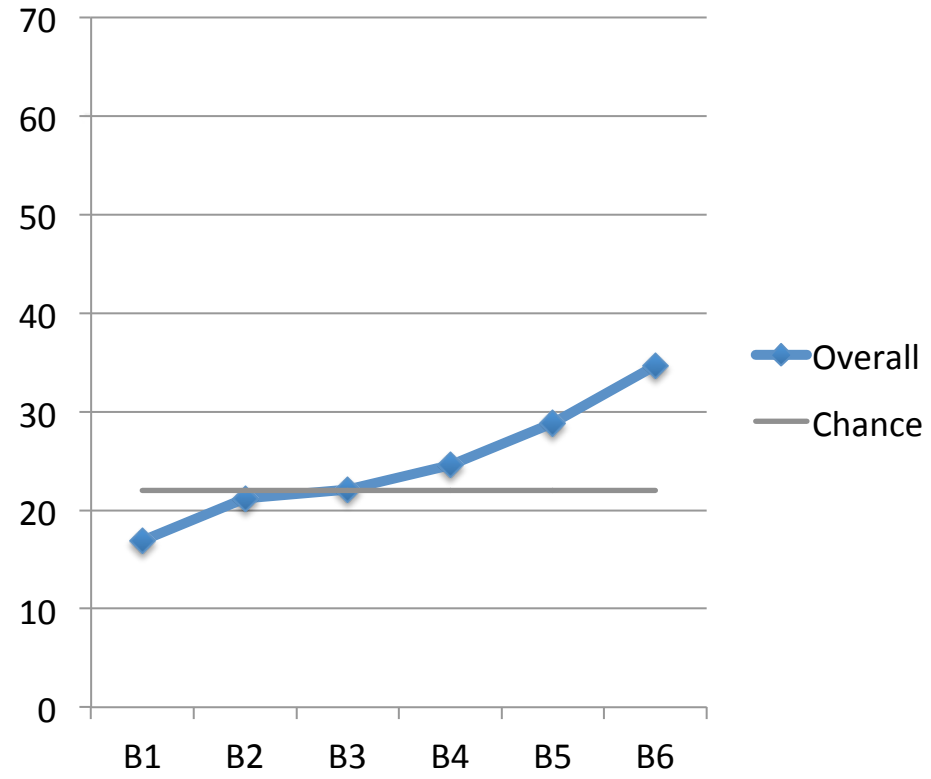
Mixed cultural background

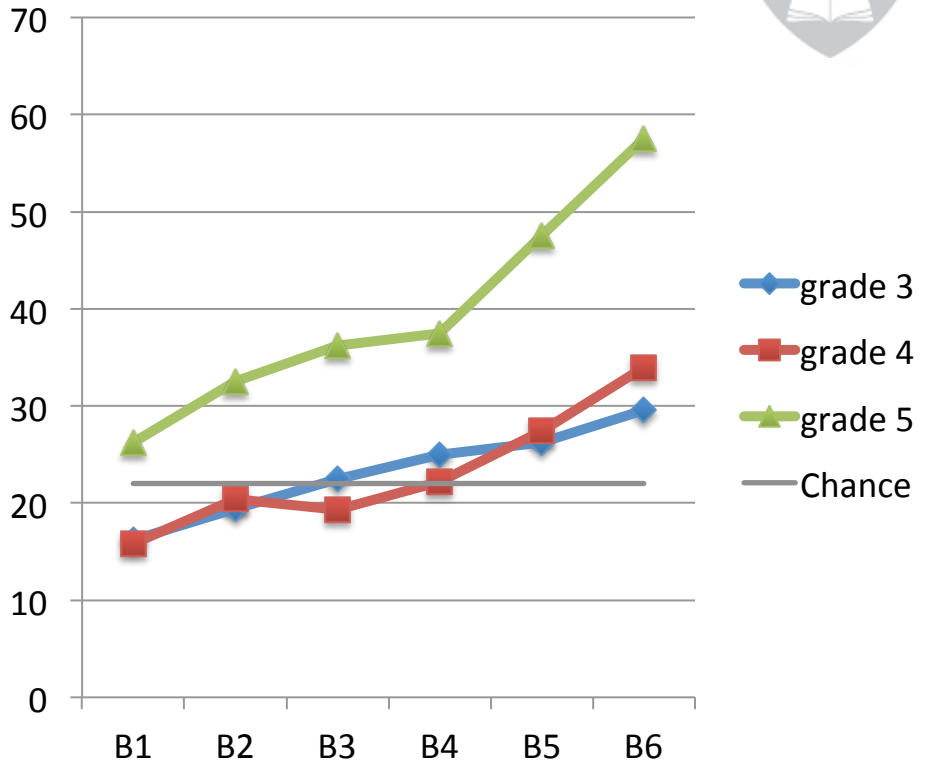
Data collected between October and December 2016

CLIL school: Children are taught two subjects in a second language (English)

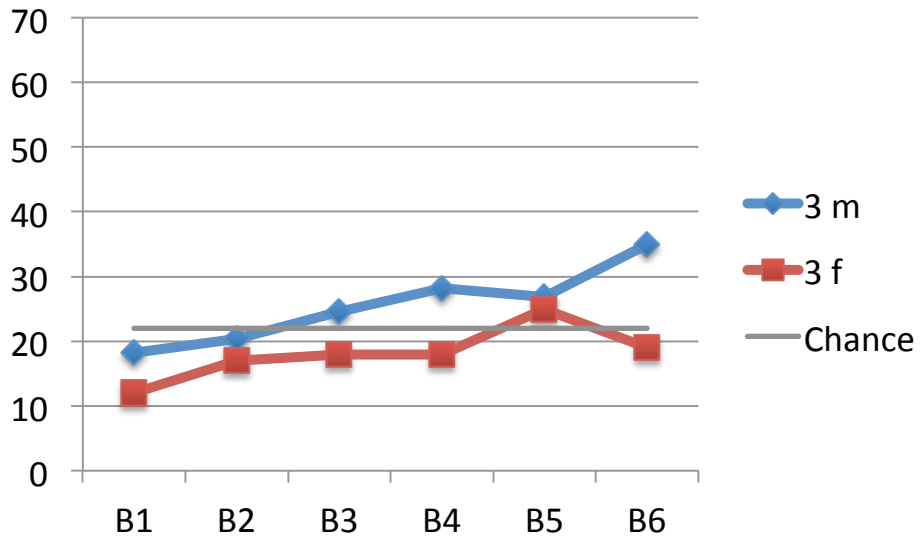
Participants: 43 children; from grade 3 (7-8 y.o.), grade 4 (8-9 y.o.), grade 5 (9 y.o.)

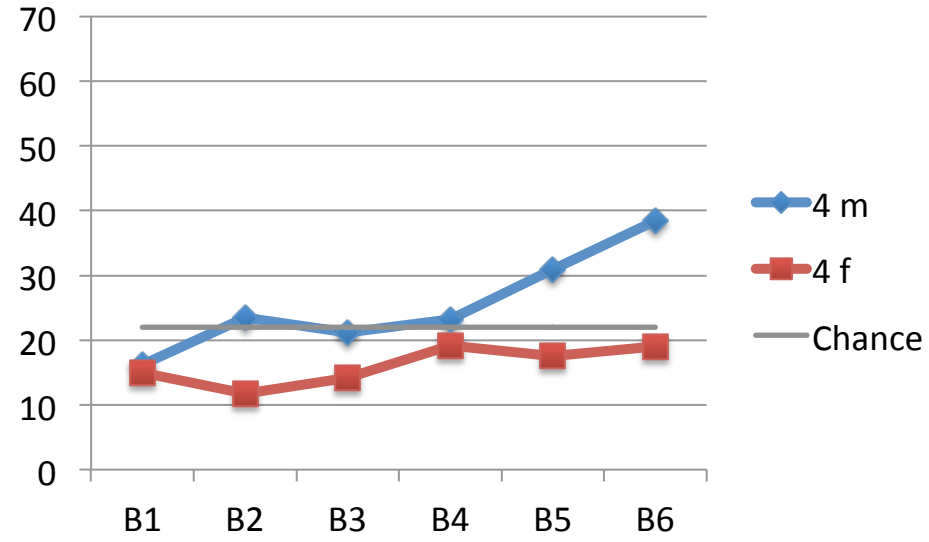
Overall accuracy in the game

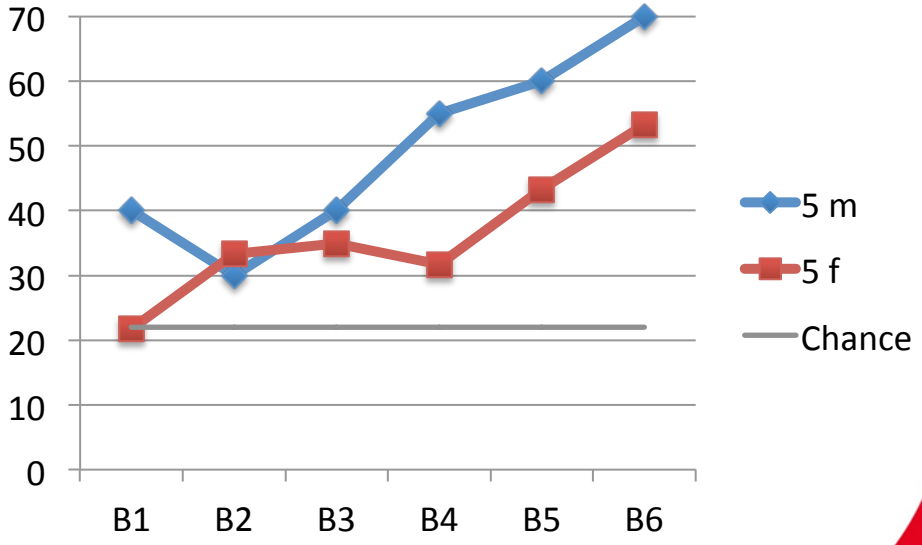




Accuracy in the game: m/f







Language awareness

Final questionnaire

(1) Did you think any of the words were special? Why?

(2) Do you think the new language you heard had any special rules? For example?

(3) If your best friend wanted to play this game, what could you tell them to help them make a lot of points quickly?

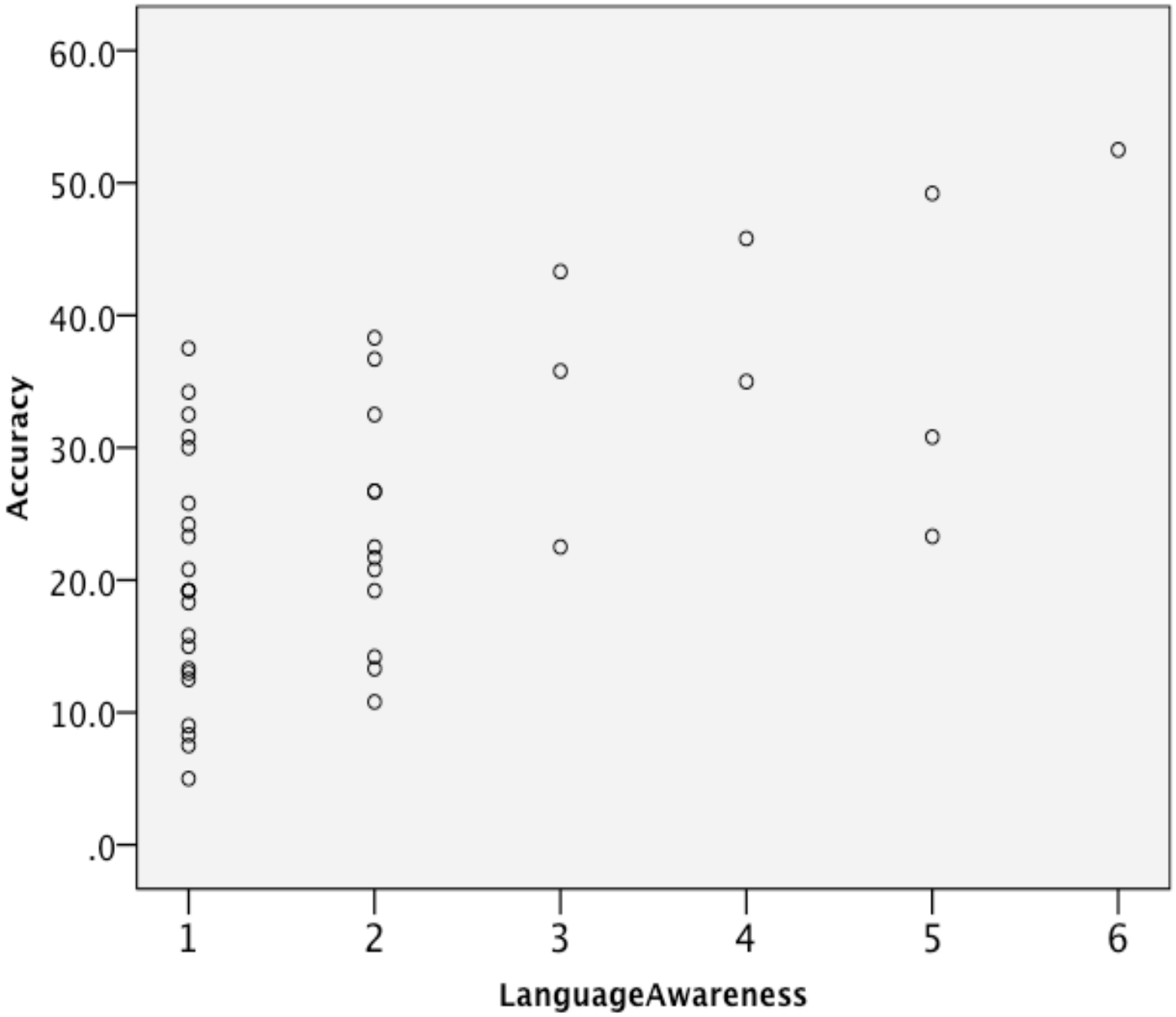
Language awareness

Language focus: word order

Learner

- reports to have noticed nothing in particular	1
- noticed the presence/absence of specific words	2
- noticed the presence/absence of specific words and refers to their position in the sentence	3
- realises there is an order at sentence level but does not provide examples	4
- realises there is an order at sentence level and partially reproduces it	5
- provides a complete example of the word order in the new language	6

Language awareness



Accuracy/Awareness correlation

overall
$r = .608^{**}$; $p < .01$

grade 3
$r = .740^{**}$; $p < .01$

grade 4
$r = .382$; $p = .072$

overall m
$r = .635^{**}$; $p < .01$

overall f
$r = .532$; $p = .050$

Conclusions

- Computer games are an effective medium to teach children of primary school age complex aspects of the grammar of a new language implicitly

- Language awareness, as the ability to notice regularities in the stream of input is significantly related to accuracy in comprehension

Selected references

Boyd, J. K., Gottschalk, E. A., & Goldberg, A. E. (2009). Linking Rule Acquisition in Novel Phrasal Constructions. *Language Learning*, *59*, 64–89.

Friederici, A. D., Steinhauer, K., & Pfeifer, E. (2002). Brain signatures of artificial language processing: Evidence challenging the critical period hypothesis. *Proceedings of the National Academy of Sciences, 99*, 529–534.

Gee, J.P. (2007). *What video games have to teach us about learning and literacy*. New York, NY, Palgrave Macmillan.

Lombardi, I. (2013). Motivazione, gioco, lingua: Elementi ludici tra glottodidattica e psicolinguistica [Motivation, play, language: language teaching and psycholinguistic aspects of gamification]. Ph.D. dissertation, Università Cattolica del Sacro Cuore, Milano.

Morgan-Short, K. (2007). A neurolinguistic investigation of late-learned second language knowledge: The effects of explicit and implicit conditions. Ph.D. dissertation, Georgetown University.

Morgan-Short, K., Sanz, C., Steinhauer, K., & Ullman, M. T. (2010). Second language acquisition of gender agreement in explicit and implicit training conditions: An event-related potential study. *Language Learning*, 60, 154–193.

Muñoz, C. (2006). The Effects of Age on Foreign Language Learning: The BAF Project. In C. Muñoz (ed.) *Age and Rate of Foreign Language Learning*. Clevendon: Multilingual Matters, 1-40.

Muñoz, C. (2008). Symmetries and Asymmetries of Age Effects in Naturalistic and Instructed L2 Learning. *Applied Linguistics 29*(4), 578-596.

Pili-Moss, D. (2016). Tracking the early stages of child and adult comprehension of L2 morphosyntax: A pilot study. (submitted)

Pili-Moss, D., & Morgan-Short, K. (2017). Contributions of declarative and procedural memory to accuracy and automatization in the early stages of L2 learning. Paper to be delivered at the Sixth Implicit Learning Seminar, May 25-26 2017, Eötvös Loránd University, Budapest, Hungary.

Wonnacott, E., Boyd, J. K., Thomson, J., & Goldberg, A. E. (2012). Input effects on the acquisition of a novel phrasal construction in 5 year olds. *Journal of Memory and Language*, *66*(3), 458 – 478.

Thank you

d.pilimoss@lancaster.ac.uk