

# Reading comprehension in monolingual and bilingual children: the role of working memory

DIPARTIMENTO DI PSICOLOGIA  
DEI PROCESSI DI SVILUPPO  
E SOCIALIZZAZIONE



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RAPPORTO  
NAZIONALE

RAPPORTO  
PROVE INVALSI  
2019



Italian Annual Survey on Educational Achievement (SNV) carried out by the National Institute for the Evaluation of Education System (INVALSI).



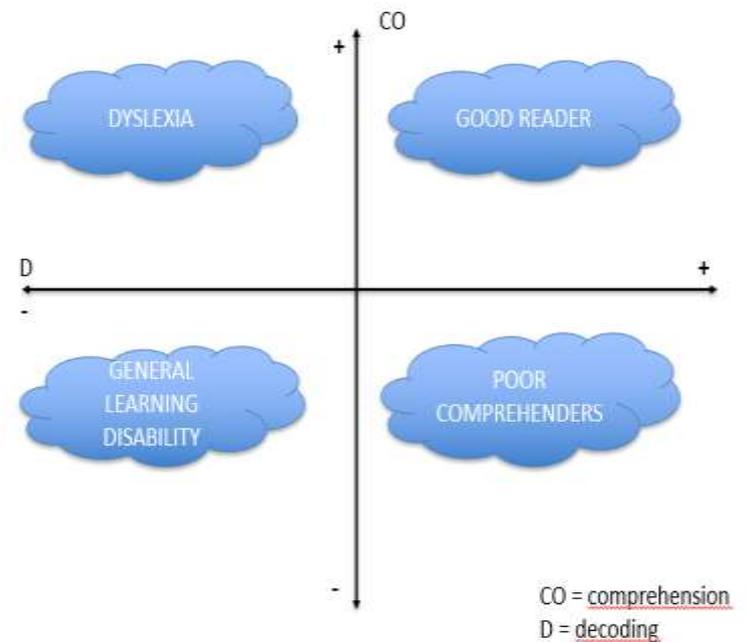
# Main findings of developmental studies that investigated reading comprehension in bilingual and monolingual children

- a significant mean size effect in favor of the monolinguals' reading comprehension
- decoding skills, show a small significant difference between first- and second-language learners but decrease their influence as children get older (Melby-Lervåg and Lervåg, 2014)
- listening comprehension and its underlying language skills (e.g., vocabulary or sentence comprehension)- are the main factors predicting differences in reading comprehension between bilinguals and monolinguals. (Bonifacci & Tobia, 2017; Kovelman, Baker, & Petitto, 2008; Lervåg & Aukrust, 2010)

The main prediction of the well-known *Simple View of Reading* model (Gough & Tunmer 1986; Hoover & Gough 1990):

combinations of efficiency in decoding and oral language comprehension explain levels of children's text comprehension

SVR MODEL



## Differences in reading comprehension seem to be moderated by a long exposure to L2 language

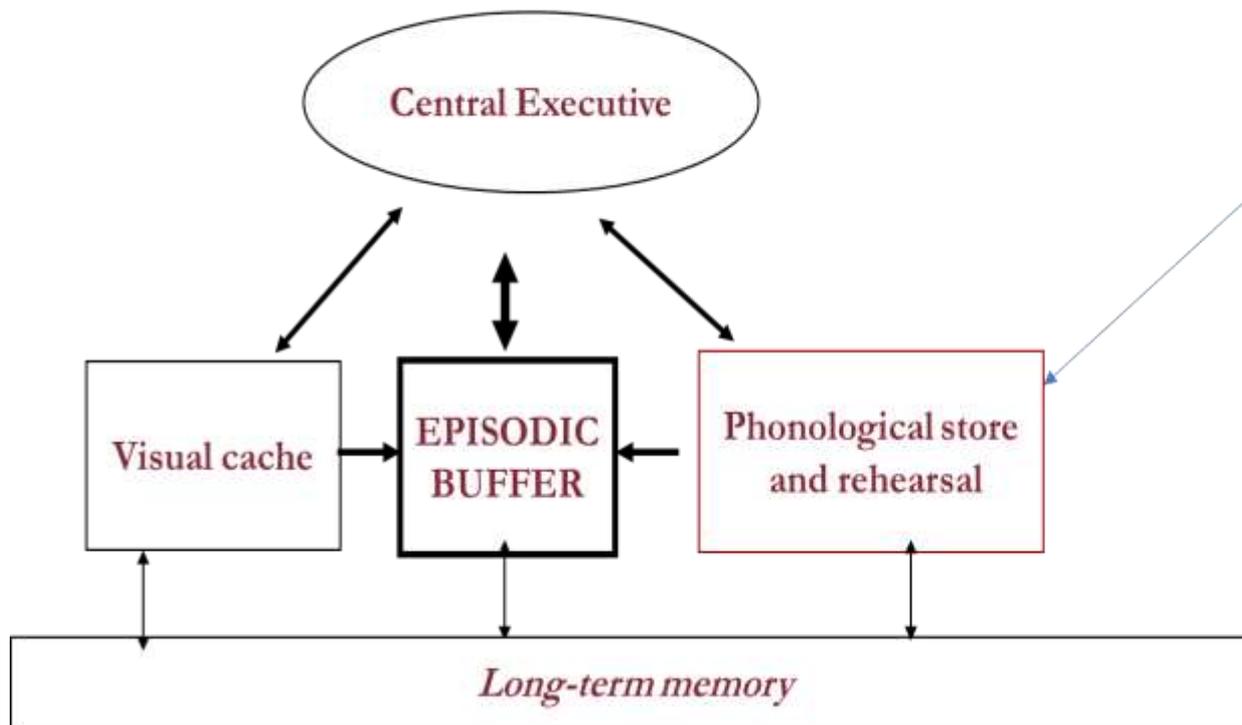
- Comparing early and late bilinguals - that is, children who learned L2 **before or after 4 years of age** - to monolingual controls, Bonifacci & Tobia (2016) found that reading and listening comprehension were at the same level as controls for early bilinguals but at a lower level for late bilinguals



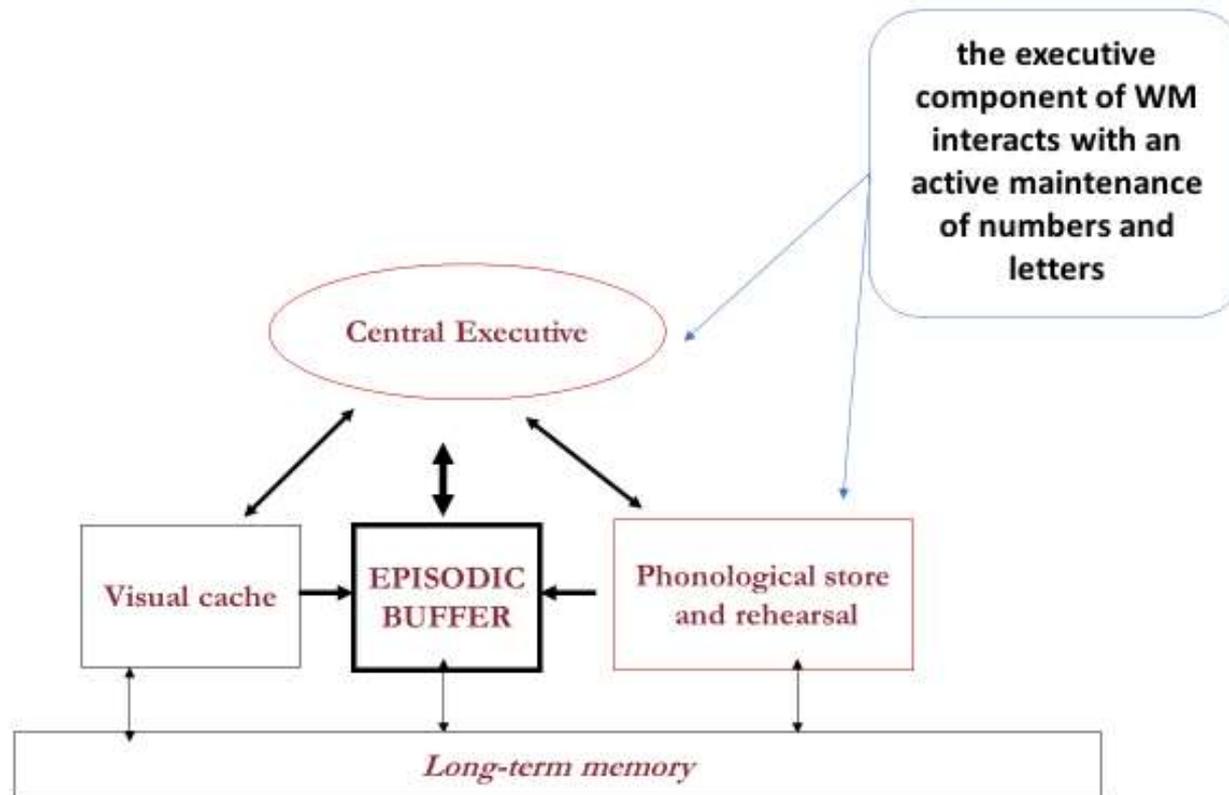


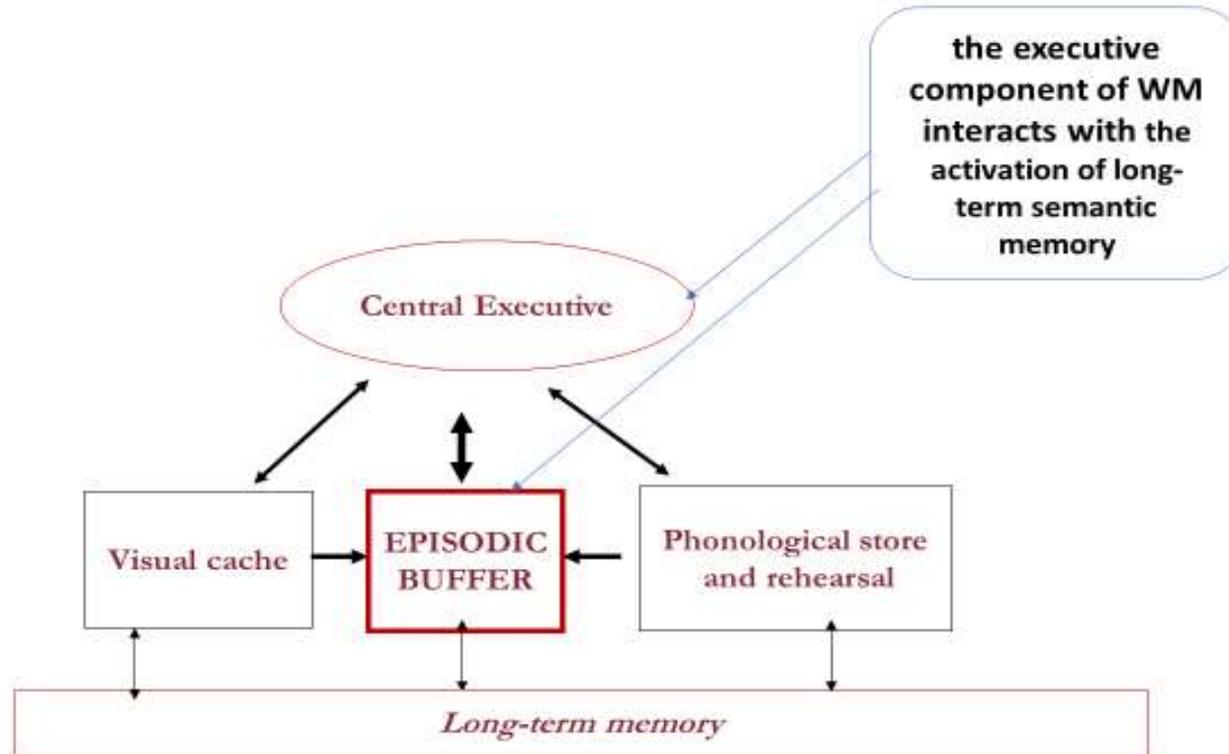
# Our study aims

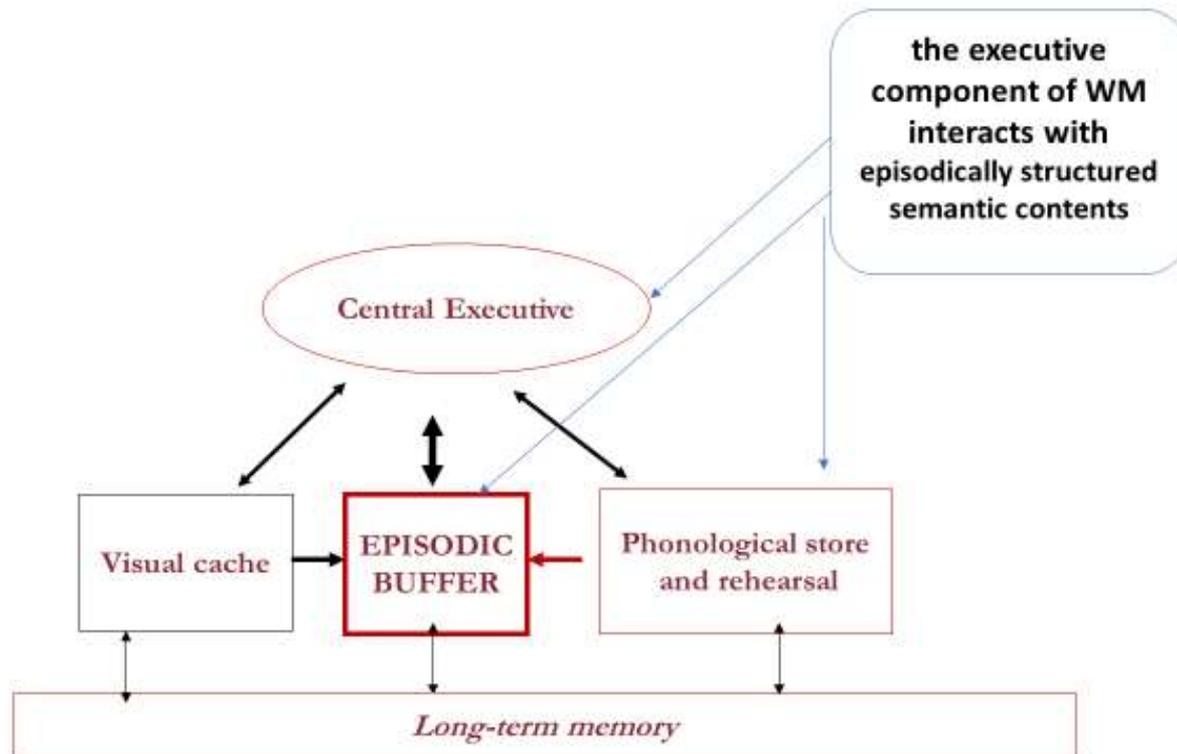
- We ask whether working memory affects reading comprehension in a similar way for monolingual and bilingual children
- Using Baddeley's influential model we explored the role of different working memory components.



The phonological store is involved with a passive maintenance of phonological information









We ask whether these different WM components explain variances of reading comprehension, or whether the direct effect of WM components is only related to decoding and oral language skills, as has been found in other studies (Peng, Barnes, C.Wang, W.Wang, Li, Swanson et al., 2018) and predicted by the Simple View of Reading model

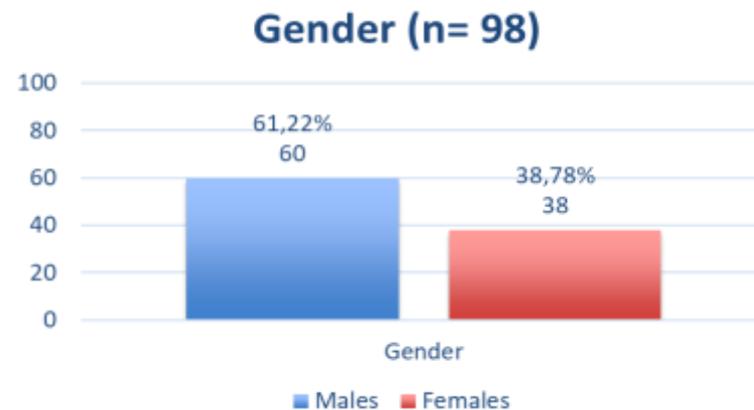


# Participants

**98 children** attending the third, fourth and fifth classes of a primary school in the Prima Porta district of Rome

The inclusion criteria:

- 2 or more years of permanence in Italy
- Without certified diagnoses
- IQ>80 at Raven's Coloured Progressive Matrices test





## Using the parents' questionnaire: Monolingual children

<b>Language exposure at home</b>	<b>Parents' native language</b>	<b>The child's comprehension of a parent's non-Italian native language</b>
Italian	Italian	/
Italian and occasional other language	Non-Italian for one parent	The parents state that it is equal to or less than 2 (1 = not at all; 2 = hardly)
Italian and occasional other language	Both parents are non-Italian, have been living in Italy for at least 10 years, their level of competence in the Italian language is equal to or greater than 3 (3= easily; 4= fluently)	The parents state that it is equal to or less than 2 (1 = not at all; 2 = hardly)

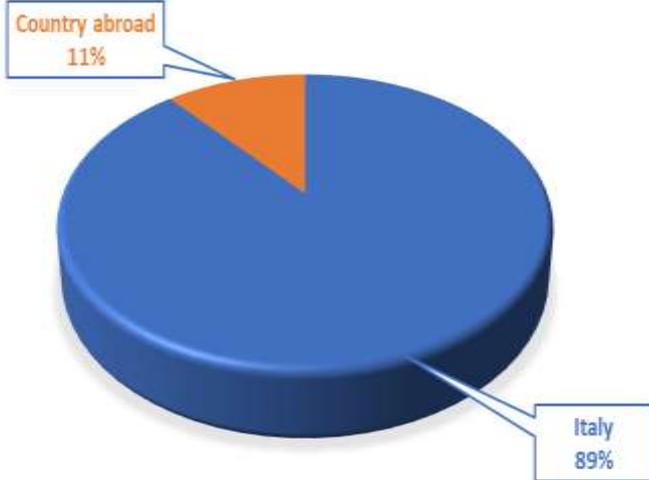


## Using the parents' questionnaire: Bilingual children

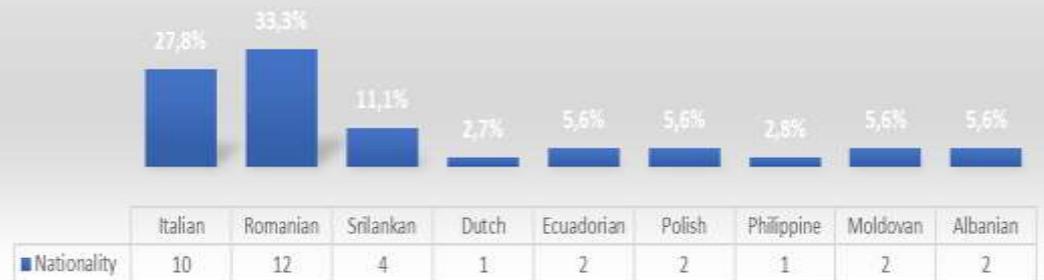
<b>Language exposure at home</b>	<b>Parents' native language</b>	<b>The child's comprehension of L1 (his/her native language)</b>
L1 and L2 (Italian)	Non-Italian for both parents	The parents state that L1 comprehension is equal to or greater than 3 (3= easily; 4= fluently)
L1 and L2 (Italian)	Non-Italian for one parent	

# Nationality and birth country of bilingual children

BIRTH COUNTRY (N=36)



Bilinguals Nationality (n=36)





## Sample descriptive and demographics

<b>Demographic information SES</b>	<b>Monolinguals</b>	<b>Bilinguals</b>
<b>N°</b>	62	36
<b>SEX (males %)</b>	66.12%	52.77%
	<b>M(SD)</b>	<b>M(SD)</b>
<b>Age</b>	113,09 (9.01)	114.34 (9.46)
<b>Parents' level instruction</b>	22.40 (5.05)	23.50 (5.65)



# Materials and procedures

## Decoding and reading comprehension tasks

### DECODING SKILLS



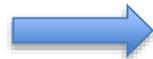
Reading speed and correctness  
(*narrative-written passage*, ALCE test)

### READING COMPREHENSION



Read a text and answer 10 open questions  
(*narrative-written passage*, ALCE test)

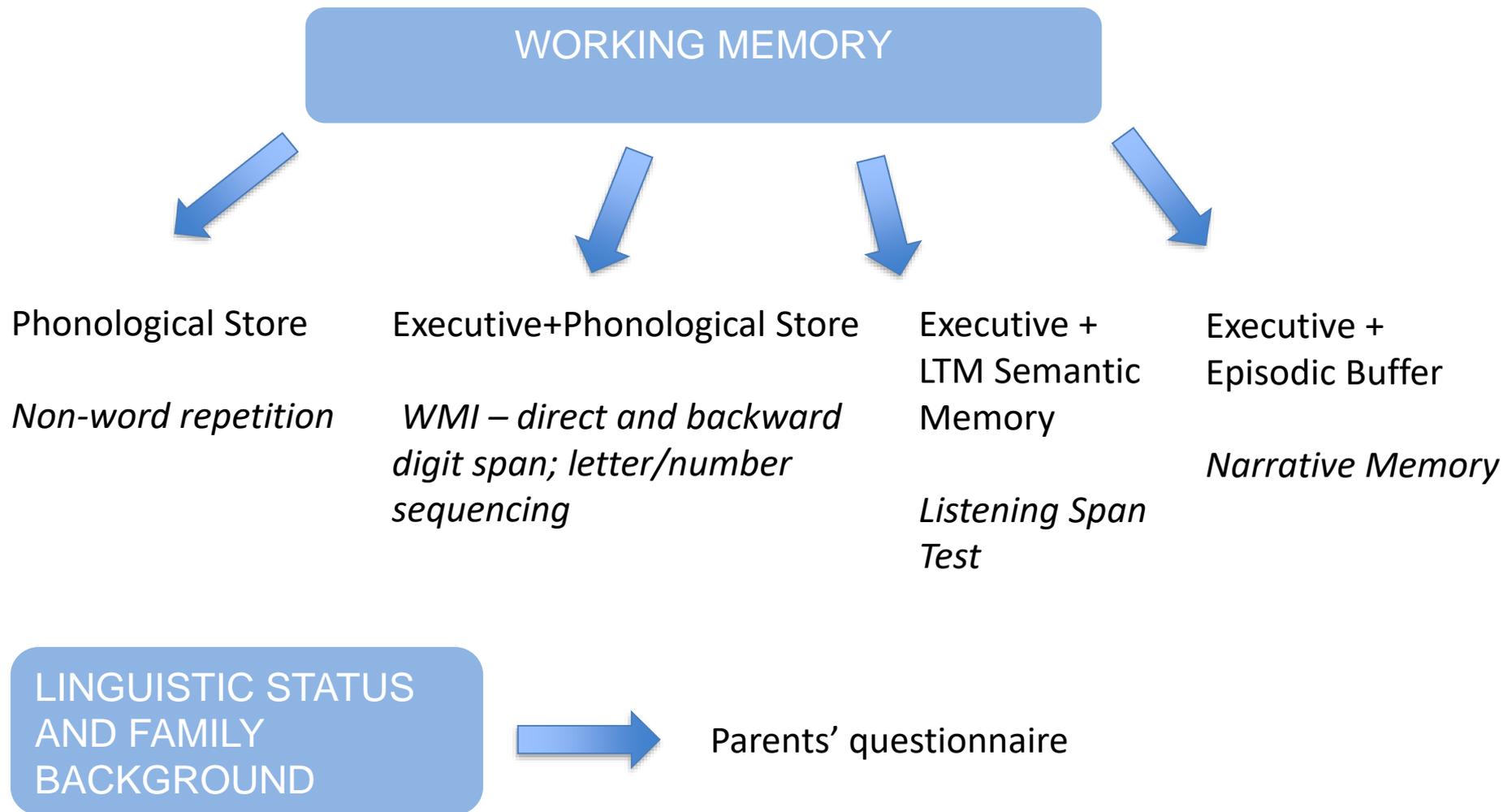
### LISTENING COMPREHENSION



Listen to a narrative read aloud by the experimenter and answer 10 open questions  
(*narrative-oral passage*, ALCE test)



# Materials and procedures



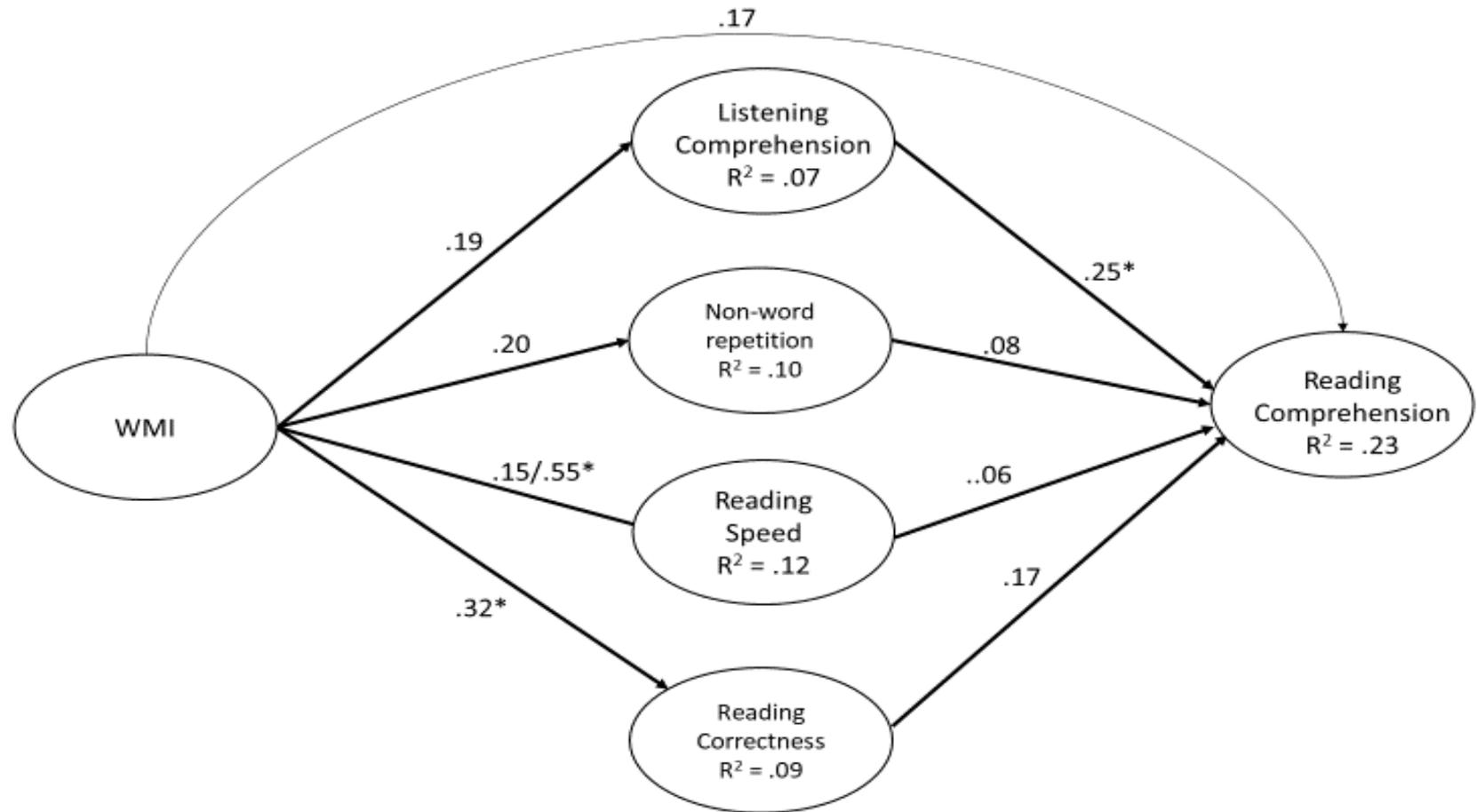


## Descriptives scores

	Construct assessed	Monolinguals	Bilinguals
		M(DS)	M(DS)
<b>Decoding</b>	Speed in text reading	44,40 (7,96)	42,80 (10,21)
<b>Decoding</b>	Correctness in text reading	44,82 (8,86)	42,58 (7,18)
<b>Reading comprehension</b>	Text comprehension read aloud by the child	51,93 (8,25)	47,44 (10,65) * (p=0.02; Eta squared=0.05)
<b>Listening comprehension</b>	Text comprehension read aloud by the experimenter	53,88 (8,10)	51,94 (7,80)
<b>Non-word repetition</b>	Phonological store	-1,15 (1,56)	-0,99 (1,75)
<b>WMI- direct and backward digit span; letter/number sequencing</b>	Executive+phonological store	99.51 (16.01)	94.00 (15.09)
<b>Listening span test</b>	Executive+LTM semantic memory	-0.77 (0.88)	0.57 (0.97)
<b>Narrative memory</b>	Executive+episodic buffer	10.50 (2.69)	10.25 (2.89)

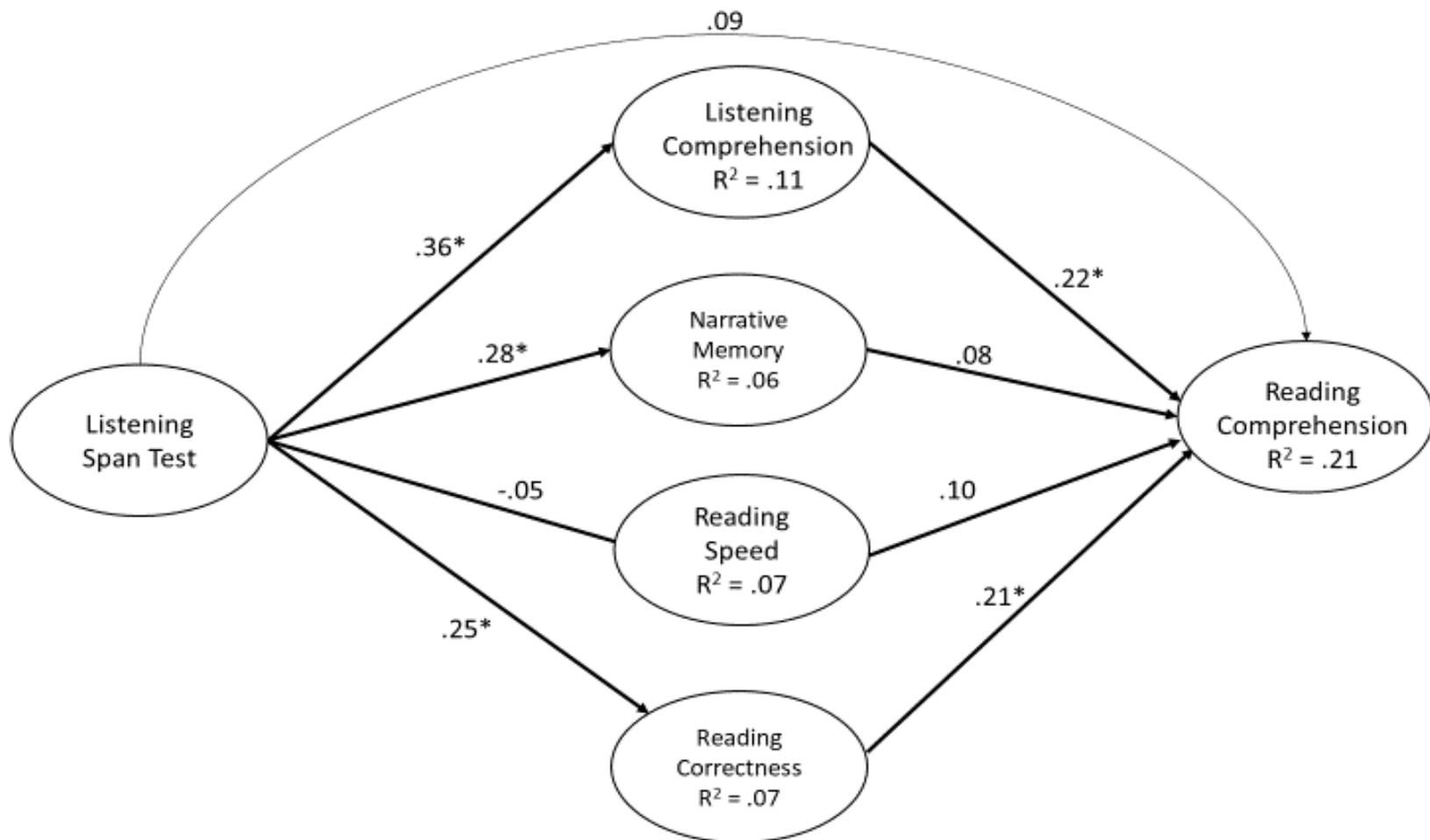
Two regression analyses have been carried out using the software PROCESS, SPSS

First model





## Second model





# What our study adds to previous studies

**A contribution from semantic long-term memory to the elaboration carried out by WM is significantly related to listening comprehension, which we used as a proxy for oral language comprehension. We found that this contribution does not differ in monolinguals and bilinguals**



**Thus the lower reading comprehension showed by our bilingual participants does not seem to be explained by lower oral language skills.**



# What our study adds to previous studies

**The executive component of WM is also highly involved in reading speed, but for bilingual children only**



**Reading speed in our bilingual children may be enhanced by anticipation strategies that rely on good sentence comprehension. Working memory involvement is thus an indicator of a more strategic process occurring in bilinguals in the decoding process.**



**This partly different reading may focus the bilingual children's attention on local comprehension and undermine the mental "weaving" of semantic links between different text contents. Providing evidence for this explanation will be the objective of next analyses**



# THANK YOU FOR YOUR ATTENTION!



Thanks to Professors Margherita Orsolini and Francesca Federico who with dedication and professionalism have guided me in the processing and interpretation of data

Thanks to Professor Michele Vecchione for his valuable contribution of statistical analysis

Finally, my heartfelt thanks go to all the children and teachers of “Via Baccano” primary school in Prima Porta