Agència de Gestió d'Ajuts Universitaris i de Recerca
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Ajuts Joan Oró per a la contractació de personal investigador predoctoral en formació (FI-SDUR)

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Evaluating Multimodal Comprehension: Effects of Question Types in Documentary Viewing

- Presenter: Kadir **Kaderoğlu**
- Supervisors: Dr. Roger **Gilabert** & Dr. Maria-del-Mar **Suárez**

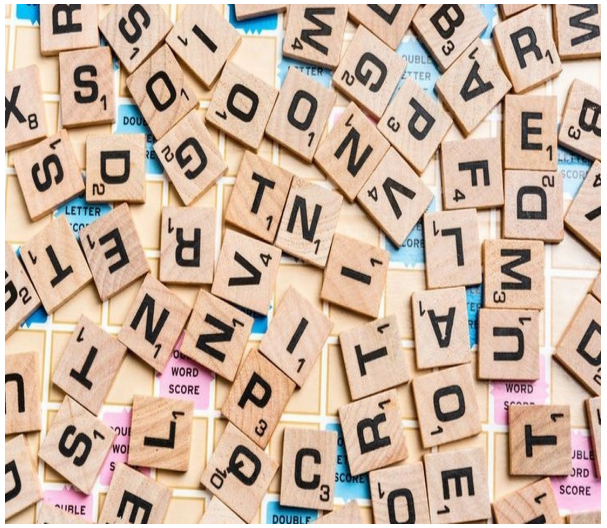
Omnipresence of multimodality

- “Language learning is multimodal” (Douglas Fir Group, 2016, p. 29)

- “… with new technologies multimodality has reached a qualitatively new level. Graphic, pictorial, audio, physical, and spatial patterns of meaning are integrated within, and even supplant, traditional spoken and written texts” (Douglas Fir Group, 2016, p. 22)

something as simple as text messaging is multimodal

- Words
- GIFs
- Emojis
- Stickers
- Voice messages



Understanding a spoken message

- Decoding phonemes (bottom up)
- Using background information (top down)
- **Relying on visuals (e.g., gestures & images)**

Assessing Viewing Comprehension ~~not Listening Comprehension~~

Validity concerns with viewing comprehension

- face validity
  (how well a test appears to measure what it is supposed to measure based on a quick judgment)
- content validity
  (how well a test accurately measures the specific skill or construct it is intended to measure)
- construct validity
  (the extent to which a test accurately measures the construct it intends to assess)
- ecological validity
  (the extent to which a test mirrors real-world contexts)

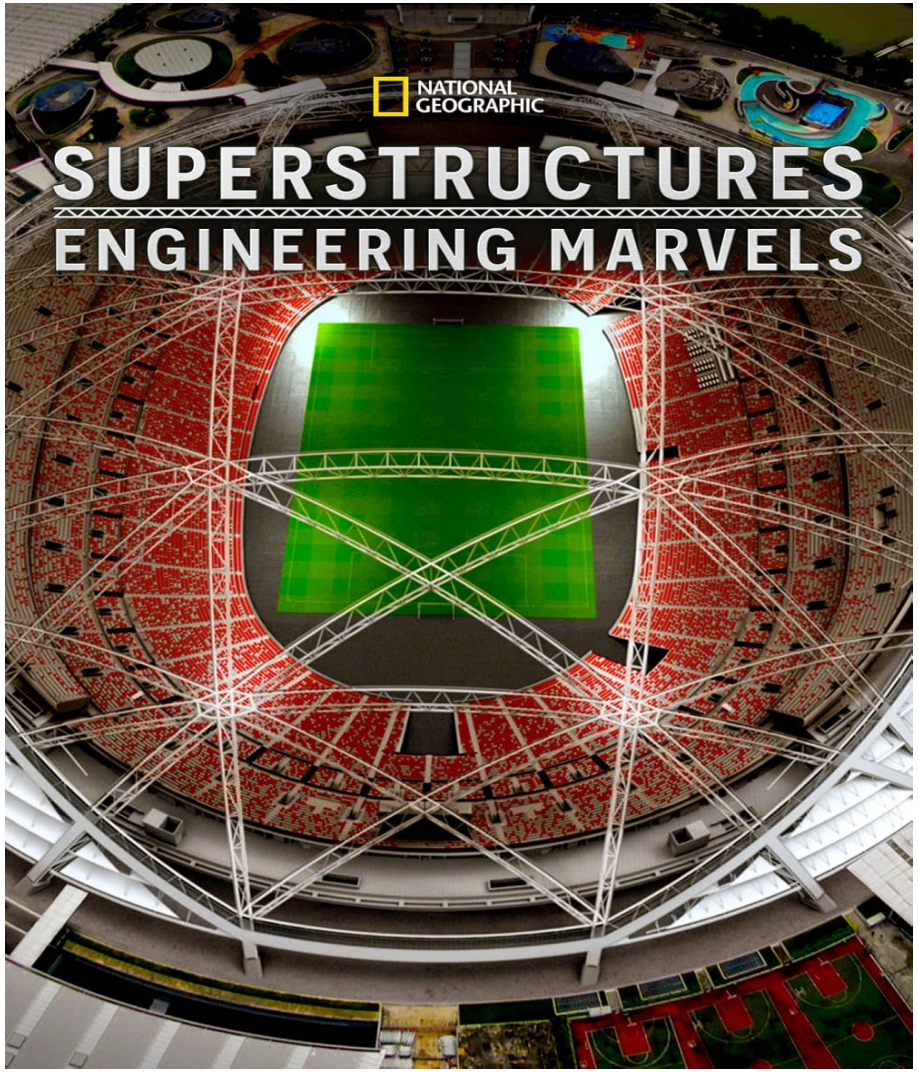
Previous work on viewing comprehension in L2

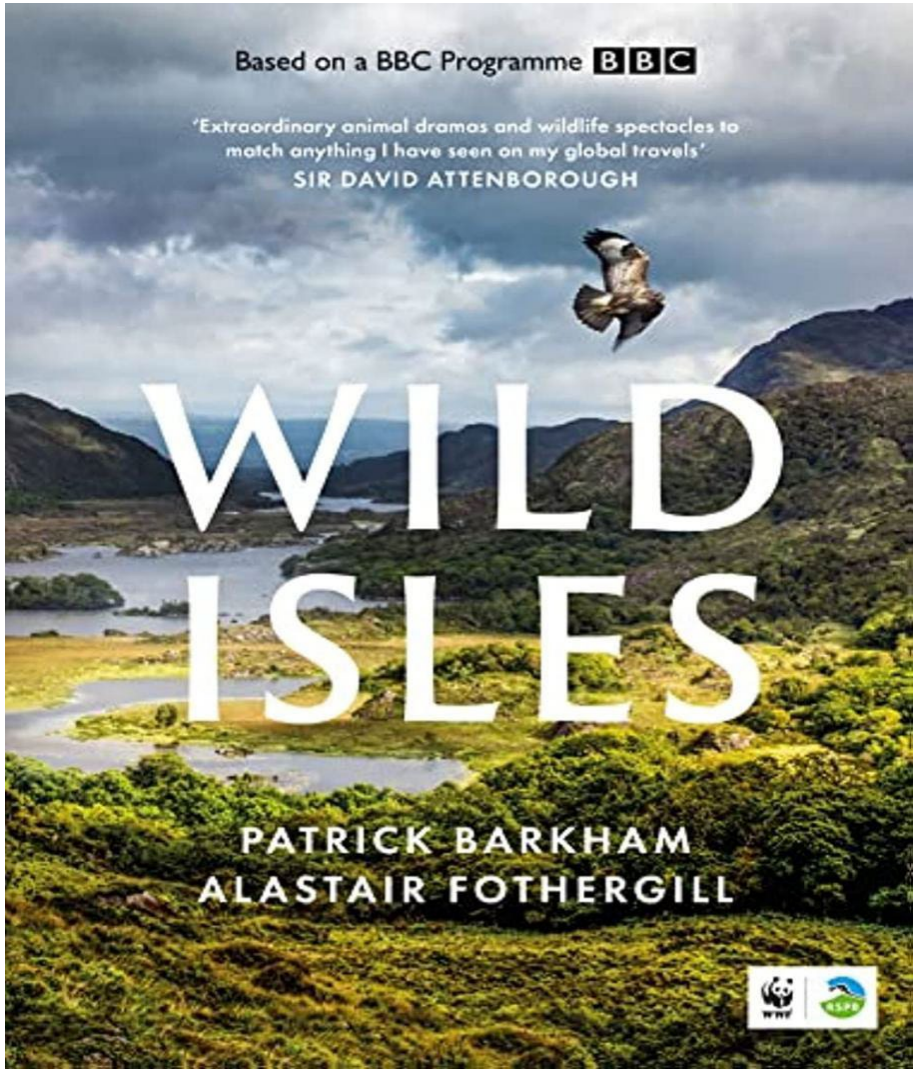
- Durbahn et al. (2020)
- Engineering documentary
- audio-based, audio plus imagery-based, and imagery-based comprehension questions.
  Audio plus imagery-based Qs scores were significantly lower than the other two.

- Fievez (2020)
- sitcom
- Audio-based vs audio plus imagery-based questions
  Audio plus imagery-based Qs significantly higher than the audio-based Qs

Contrasting information begs for more research on the topic.

Documentaries used in the study





Question types

- textually explicit questions (N = 39 wildlife; N = 40 sci&tech)
  - True/False and “I don’t know” option & multiple choice (one correct answer, two distractors, and “I don’t know” option) formats
- visual-only questions (N = 15) : those that required attention to images to answer the questions
- audio-only questions (N = 30): those that depended solely on aural input
- audiovisual questions (N = 34): those that could be answered using either visual or aural information

Question types with visual examples

- visual-only questions: those that required attention to images to answer the questions

The narrator (David Attenborough) appears on a beach in the opening scenes of the episode.

a. True
b. False
c. I do not know

What color are Kingfishers?

a. Green and blue
b. Blue and orange
c. Orange and yellow
d. I do not know.

Question types with visual examples

- audio-only questions: those that depended solely on aural input

Where do the majority of the golden eagles live today?

a. Scotland
b. Ireland
c. England
d. I do not know.

Question types with visual examples

- audiovisual questions: those that could be answered using either visual or aural information

Orcas' favorite food is tuna.

a. True
b. False
c. I do not know

Research Question

- *Is there a **significant difference** in participants' **comprehension** based on **question types** (visual-only, audio-only, audiovisual) across two **documentary genres** (wildlife, science and technology)?*

Hypothesis

- Mayer's (2005) "People can learn more deeply from words and pictures than from words alone" (p. 1)

Higher comprehension should be expected for the audiovisual questions due to the availability of two modes (aural & visual)

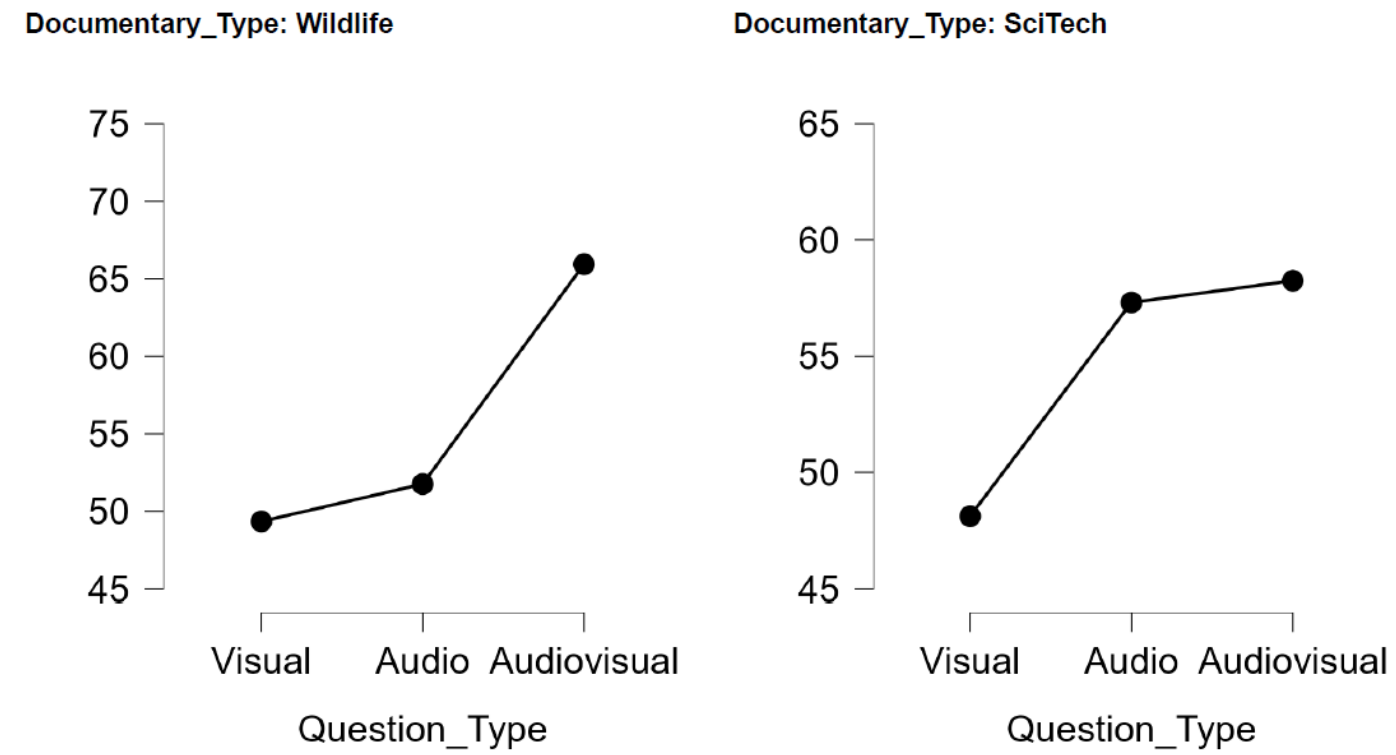
Analysis

- Two-way repeated measures ANOVA in JASP

(within-subject factors: question type and documentary type)

Results

Descriptives plots



Results

Within Subjects Effects

Cases	Sum of Squares	df	Mean Square	F	p	η^2_p
Question_Type	3408.260	2	1704.130	12.585	< .001	0.411
Residuals	4874.575	36	135.405			
Documentary_Type	35.471	1	35.471	0.125	0.728	0.007
Residuals	5101.271	18	283.404			
Question_Type ✻ Documentary_Type	832.691	2	416.346	3.179	0.054	0.150
Residuals	4714.582	36	130.961			

Note. Type III Sum of Squares

Post-hoc Analysis (Question Type)

Post Hoc Comparisons - Question_Type

			95% CI for Mean Difference					95% CI for Cohen's d			
		Mean Difference	Lower	Upper	SE	t	Cohen's d	Lower	Upper	p_{bonf}	
Visual	Audio	-5.800	-13.637	2.036	2.969	-1.953	-0.374	-0.906	0.158	0.199	
	Audiovisual	-13.355	-21.062	-5.648	2.920	-4.573	-0.862	-1.488	-0.237	< .001	***
Audio	Audiovisual	-7.555	-12.857	-2.253	2.009	-3.761	-0.488	-0.892	-0.084	0.004	**

** p < .01, *** p < .001

Note. P-value and confidence intervals adjusted for comparing a family of 3 estimates (confidence intervals corrected using the bonferroni method).

Note. Results are averaged over the levels of: Documentary_Type

Discussion

- Results align with Fievez (2020) and Mayer's Cognitive Theory of Multimedia Learning (2005)
  - Dually presented information is better processed compared to the information presented via single mode

Implications

Increase ecological validity for listening activities by playing videos, in addition to audios.

In a similar vein, move beyond traditional listening tasks/exams.

References

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