

# Reading and writing eye-tracking research papers

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# What is the basic structure of a research paper?

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# What's the first thing you look at when you read a research paper?

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# What's the first thing you look at when you read a research paper?

[the title]

abstract

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# What's the first thing you look at when you read a research paper?

method

[results] -> images/graphs, statistics -> discussion

[conclusion]

references

# What to look for in a research paper?

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In general

Eye-tracking research

# Title and abstract

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RESEARCH ARTICLE

## Viewers can keep up with fast subtitles: Evidence from eye movements

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# Title and abstract

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People watch subtitled audiovisual materials more than ever before. With the proliferation of subtitled content, we are also witnessing an increase in subtitle speeds. However, there is an ongoing controversy about what optimum subtitle speeds should be. This study looks into whether viewers can keep up with increasingly fast subtitles and whether the way people cope with subtitled content depends on their familiarity with subtitling and on their knowledge of the language of the film soundtrack. We tested 74 English, Polish and Spanish viewers watching films subtitled at different speeds (12, 16 and 20 characters per second). The films were either in Hungarian, a language unknown to the participants (Experiment 1), or in English (Experiment 2). We measured viewers' comprehension, self-reported cognitive load, scene and subtitle recognition, preferences and enjoyment. By analyzing people's eye gaze, we were able to discover that most viewers could read the subtitles as well as follow the images, coping well even with fast subtitle speeds. Slow subtitles triggered more re-reading, particularly in English clips, causing more frustration and less enjoyment. Faster subtitles with unedited text were preferred in the case of English videos, and slower subtitles with text edited down in Hungarian videos. The results provide empirical grounds for revisiting current subtitling practices to enable more efficient processing of subtitled videos for viewers.



# Title and abstract

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*Media Psychology*, 13:243–272, 2010  
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DOI: 10.1080/15213269.2010.502873



## **The Cognitive Effectiveness of Subtitle Processing**

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# Title and abstract

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*In an experimental study, we analyzed the cognitive processing of a subtitled film excerpt by adopting a methodological approach based on the integration of a variety of measures: eye-movement data, word recognition, and visual scene recognition. We tested the hypothesis that the processing of subtitled films is cognitively effective: It leads to a good understanding of film content without requiring a significant tradeoff between image processing and text processing. Following indications in the psycholinguistic literature, we also tested the hypothesis that two-line subtitles whose segmentation is syntactically incoherent can have a disruptive effect on information processing and recognition performance. The results highlighted the effectiveness of subtitle processing: Regardless of the quality of line segmentation, participants had a good understanding of the film content, they achieved good levels of performance in both word and scene recognition, and no tradeoff between text and image processing was detected. Eye-movement analyses enabled a further characterization of cognitive processing during subtitled film viewing. This article discusses the theoretical implications of the findings for both subtitling and multiple-source communication and highlights their methodological and applied implications.*

# Title and abstract

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SCIENTIFIC STUDIES OF READING

<https://doi.org/10.1080/10888438.2020.1823986>



## Using Eye Movements to Study the Reading of Subtitles in Video

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# Title and abstract

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## **ABSTRACT**

This article reports the first eye-movement experiment to examine how the presence versus absence of concurrent video content and presentation speed affect the reading of subtitles. Results indicated that participants adapted their visual routines to examine video content while simultaneously prioritizing the reading of subtitles, especially when the latter was displayed only briefly. Although decisions about when and where to move the eyes largely remained under local (cognitive) control, this control was also modulated by global task demands, suggesting an integration of local and global eye-movement control. The theoretical and pedagogical implications of these findings are discussed, and we also briefly describe a new theoretical framework for understanding all forms of multimodal reading, including the reading of subtitles in video.

# Reporting standards in eye-tracking research

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# Reporting standards in eye-tracking research

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Fiedler, S., Schulte-Mecklenbeck, M., Renkewitz, F., & Orquin, J. L. (2020, September 11). Guideline for Reporting Standards of Eye-tracking Research in Decision Sciences. <https://doi.org/10.31234/osf.io/f6qcy> [PsychArXiv]

- ❑ 215 eye-tracking papers in behavioral decision-making 2007-2017
- ❑ 31 items judged as necessary by the majority of experts
- ❑ 70% report less than 50% of the items

# Reporting standards in eye-tracking research

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1. State **auxiliary assumptions** about the underlying processes of dependent variables

## 2. Methods

### *Apparatus*

Description of the eye-tracking device

Model (e.g., Tobii 1000)

Producer/ brand

Type (remote, head mounted)

# Reporting standards in eye-tracking research

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## *Description of the monitor*

Resolution

Size

Description of the Software

Software used to pre-process the eye-tracking data

Stimulus presentation software



# Reporting standards in eye-tracking research

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## *Material*

Description of how AOIs were defined

Absolute size of the AOIs

Relative size of AOIs and content within the AOIs

Minimal distance between AOIs

Overlap between the AOIs

Description of the stimulus

Method for stimulus preparation

Luminescence matched

# Reporting standards in eye-tracking research

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## *Procedure*

Setup

Inter stimulus interval

Presentation length and position of fixation cross

Length of stimulus presentation

Counter-balancing of the position

Order of stimulus presentation

Number of trials

Settings and locations where data was collected

# Reporting standards in eye-tracking research

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## 3. Results

### *Data quality*

- Monitoring of data quality during experiment

- Proportion of trials excluded for the analysis

- Reasons for exclusion

- Number of participants excluded from the analysis

- Quality threshold for data exclusion

- Percentage of lost data

# Reporting standards in eye-tracking research

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## *Dependent measures*

Aggregation method for fixations

Additional transformation of the data

## **4. Discussion**

Limitations due to the use of eye-tracking methodology

# Reporting standards in eye-tracking research

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## Experiment book containing:

- ❑ goals of the study,
- ❑ concept and design
- ❑ stages and timeline
- ❑ methodology (stimuli preparation and selection criteria, procedure, software used, experiment coding guidelines and scripts, stimuli lists and parameters, number of blocks, trials, experiment duration, etc.)
- ❑ hypotheses
- ❑ predictions (expected outcomes and their interpretation)

**Also: consider pre-registration!**

# Group practice

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- ❑ choose a topic
- ❑ look for papers on the topic
- ❑ find relevant paper/information by skimming the documents
- ❑ provide a short literature review (3 papers) or the most relevant paper for your research and state:
  - ❑ goal, hypotheses, variables, method (device, procedure, statistics), results, interpretation

# Group practice

- - consumer choices (ads)
    - legibility (fonts)
    - food and memory
    - machine-translated subtitles
  - intralingual subtitles / technical videos
    - creative subtitles
    - art perception

comprehension, user experience, enjoyment, preferences

# Literature

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Fiedler, S., Schulte-Mecklenbeck, M., Renkewitz, F., & Orquin, J. L. (2020, September 11). Guideline for Reporting Standards of Eye-tracking Research in Decision Sciences. <https://doi.org/10.31234/osf.io/f6qcy> [PsychArXiv]

Liao, S., Yu, L., Reichle, E.D. & Jan-Louis Kruger (2020). Using Eye Movements to Study the Reading of Subtitles in Video, *Scientific Studies of Reading*, DOI: 10.1080/10888438.2020.1823986

Perego, E., Del Missier, F., Porta, M. & Mauro Mosconi (2010). The Cognitive Effectiveness of Subtitle Processing. *Media Psychology*, 13:3, 243-272, DOI: 10.1080/15213269.2010.502873

Szarkowska, A., Gerber-Morón, O. (2018). Viewers can keep up with fast subtitles: Evidence from eye movements. *PLoS ONE* 13(6): e0199331. <https://doi.org/10.1371/journal.pone.0199331>