



Empirical Research Methods 1

Quality criteria, structure and content of scientific texts

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Room 1.14

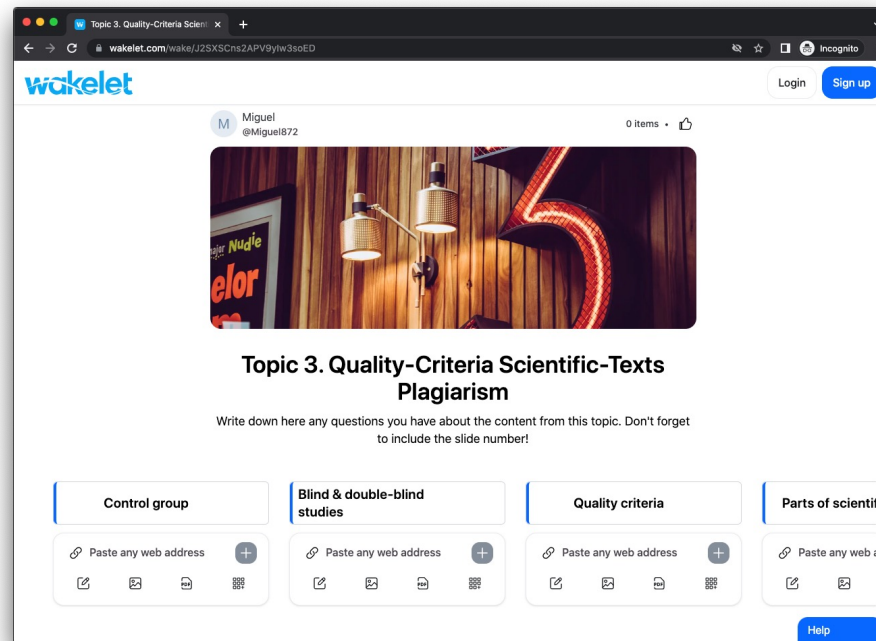
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Reminder

Ask it in the wakelet!

- ❖ For this and all future topics, write any questions or comments you have about the topic in the respective wakelet
- ❖ <https://wakelet.com/i/invite?code=a7jwlxov>



Agenda

- Control group
- Blind and double-blind study designs
- Quality criteria: Objectivity, Reliability, Validity
- Parts of a scientific paper
- Plagiarism and the importance of citations
- The fantastic world of APA style

Reminder: before starting

From now on, you will find self-paced activities at the end of the slides from most topics. They look like this:

Self-paced APA activity 1

Instructions: Write the correct reference (as in a reference list)
The answer is in the next slide!

- ◇ Title: A lifespan perspective on embodied cognition
- ◇ Type: Journal article (Frontiers in Psychology)
- ◇ Authors:
 - ◇ Loeffler, Jonna
 - ◇ Raab, Markus
 - ◇ Cañal-Bruland, Rouwen
- ◇ Year: 2016
- ◇ Volume: 7
- ◇ Pages: 1-6
- ◇ Doi: 10.3389/fpsyg.2016.00845
- ◇ Keywords: Cognition; Developmental; Elderly; Embodiment; Lifespan; Sensorimotor

From last topic...

- ◇ **Experimental design:** How you set up your experiment:
 - ◇ Between groups vs. within subject?
 - ◇ Assignment of participants (e.g., randomization)?
 - ◇ Inclusion of control variables? Which ones?
 - ◇ Sample size (n)?
 - ◇ (...)
 - ◇ **Factorial design:** part of the experimental design
 - ◇ Definition of factors and factor levels (e.g., 2 x 3)
 - ◇ Having more than one factor / IV allows you to determine possible interactions between factors

Resources:

<http://support.sas.com/resources/papers/sixsigma1.pdf>

https://en.wikipedia.org/wiki/Design_of_experiments#Discussion_topics_when_setting_up_an_experimental_design

CONTROL GROUP

Control group

“...a group separated from the rest of the experiment such that the independent variable being tested cannot influence the results.”

<https://www.thoughtco.com/control-and-experimental-group-differences-606113>

		Factor 1: Prompt A	
Factor 2: Prompt B		Prompt A: on	Prompt A: off
	Prompt B: on	A-B	B
	Prompt B: off	A	Control Group

Control group

- ❖ Not all experiments have a control group
- ❖ Experiments with a control group can be called “controlled experiments”

BLIND AND DOUBLE-BLIND STUDY DESIGNS

Blind and double-blind experimental designs

Why? For preventing biases on our research study

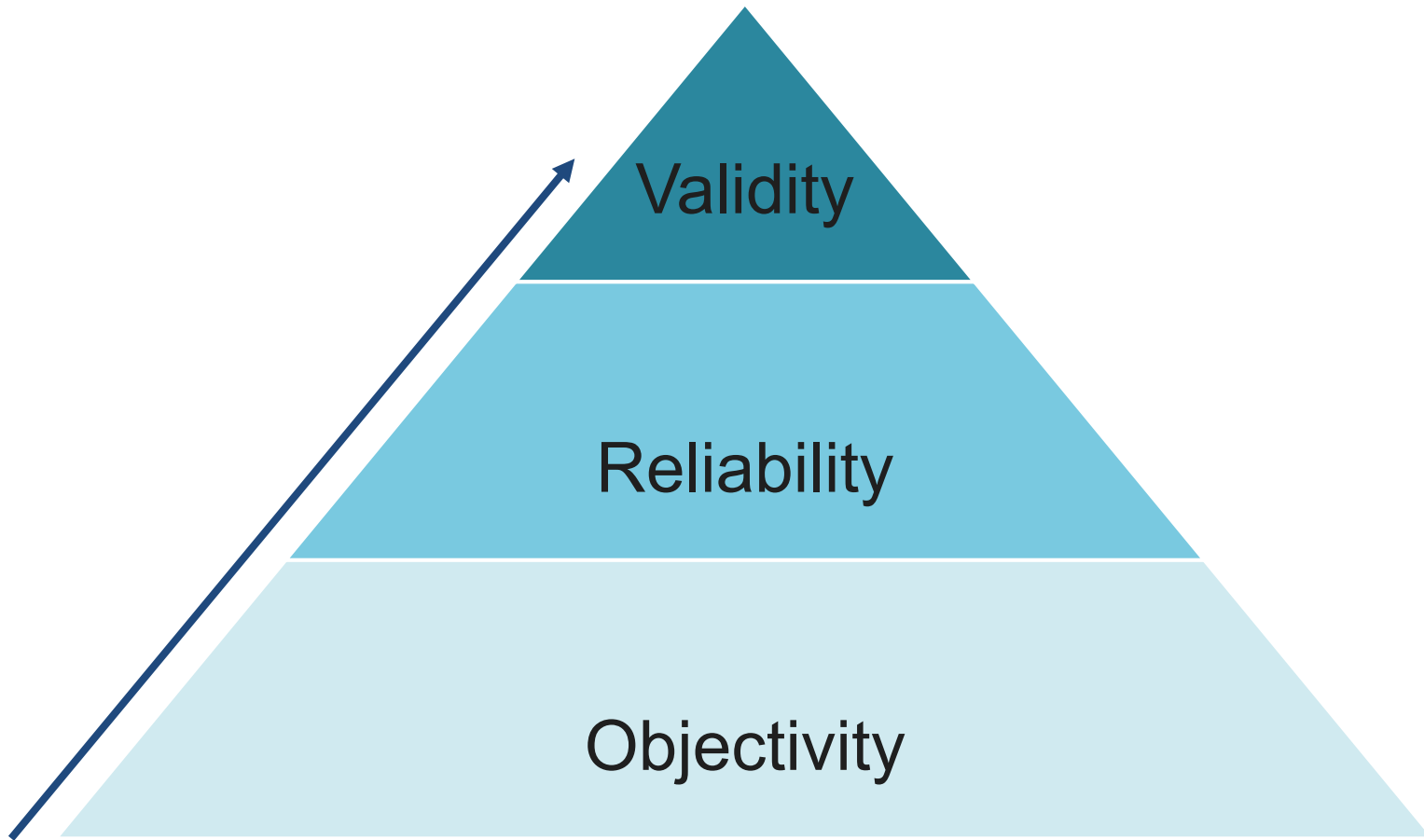
- Blind study: the participant doesn't know to which condition they were assigned to, but the experimenter knows ;-)
- Double blind: neither the experimenter nor the participant know the condition to which the participant was assigned

Blind and double-blind experimental designs

1. “For preventing biases on our research study”... What kind of biases do you think a blind or double-blind study can prevent?
2. What are some possible complications that would need to be accounted for in case of wanting to conduct a blind or double-blind study?

QUALITY CRITERIA: OBJECTIVITY, RELIABILITY, VALIDITY

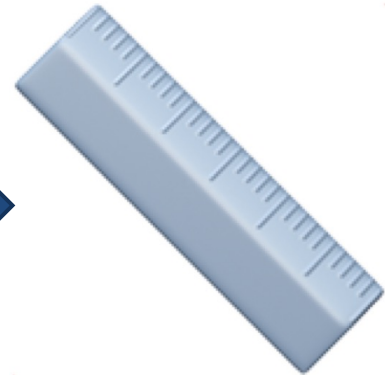
Main quality criteria: Hierarchical relationship



Quality criteria: Objectivity

1. If data has not been collected and analyzed **objectively**, any results are due to personal biases and therefore cannot be reliable or valid.

Example: for measuring a table, we could use our hand (e.g. “2 hands long, 1.5 hands width”) but that varies from person to person. Therefore, an objective measure could be a ruler



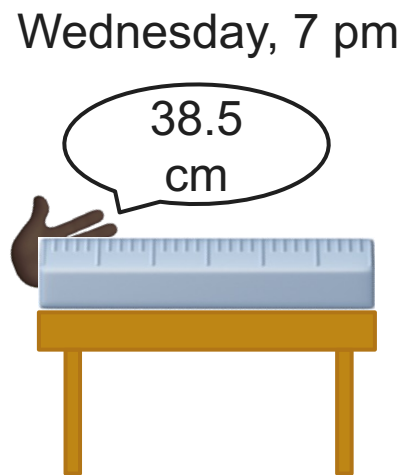
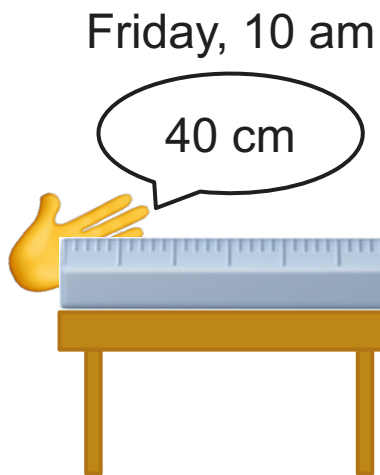
How to increase objectivity

- ◇ While conducting experiments:
 - ▣ Trained experimenters (experimenter guidelines)
 - ▣ Blind experimenters (blind to exp. conditions)
 - ▣ Standardization of the experimental context
- ◇ When analyzing data:
 - ▣ Standardize analysis procedures
 - ▣ For discourse analysis: Inter-rater reliability
 - ▣ Blind analysis

Quality criteria: Reliability

2. Assuming data has been collected objectively, it also needs to be **reliable**: obtaining the same results, of the same object, if measuring multiple times.

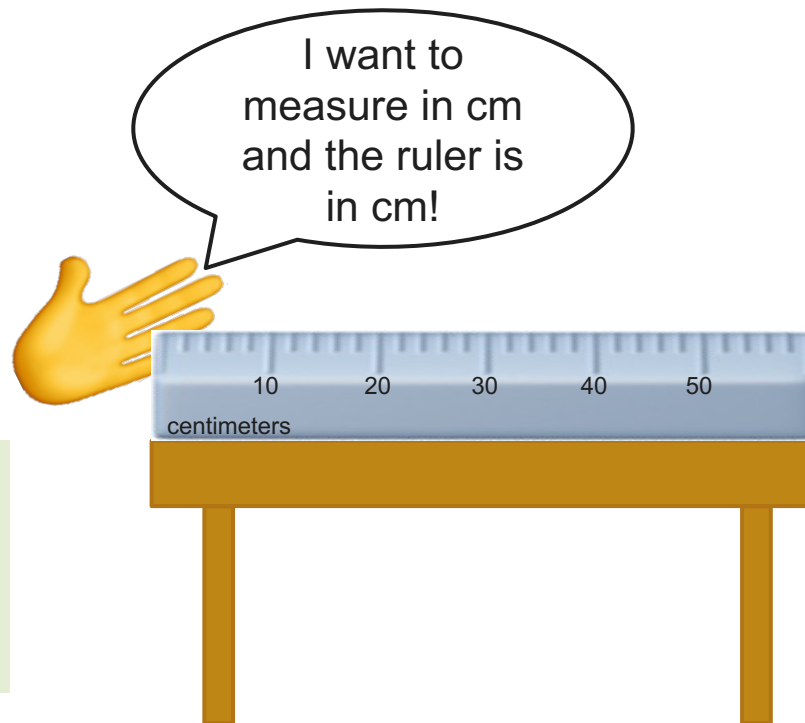
Example: for measuring the same table multiple times, the ruler should provide highly similar measurements, regardless of who makes the measurement or when



Quality criteria: Validity

3. Finally, even if data is objective and reliable, it may still not be **valid**. For that, we need to ensure to measure what we truly intend to measure; do justice to the underlying construct.

Example: using a ruler that is well calibrated (correct spacings). If we're claiming to be measuring in cm, then the ruler must be in centimeters and not inches



There are more types of validity, e.g. construct validity, predictive validity. Here we're learning about the main type of validity

PARTS OF A SCIENTIFIC PAPER

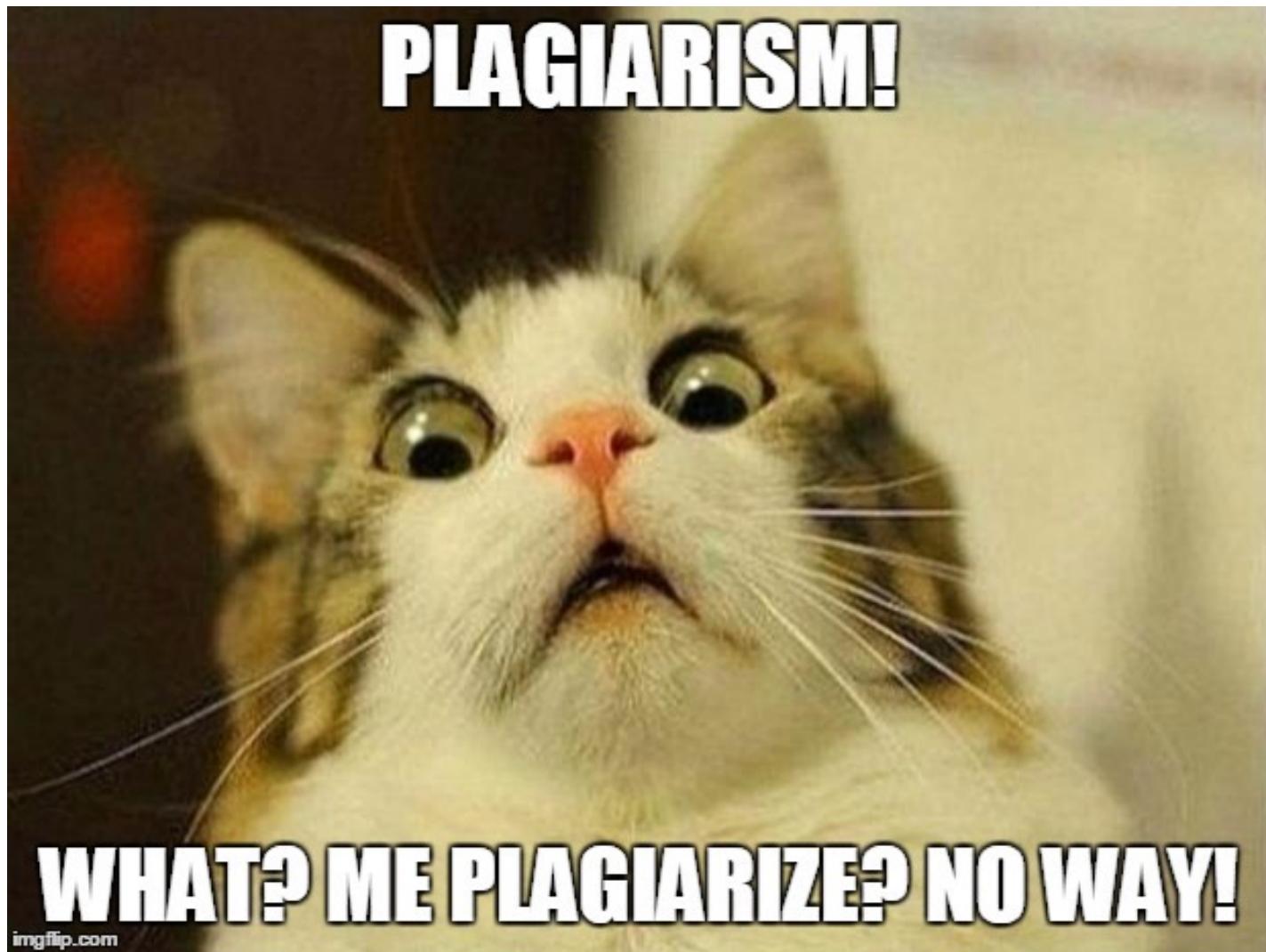
Typical parts of a scientific paper

Parts:

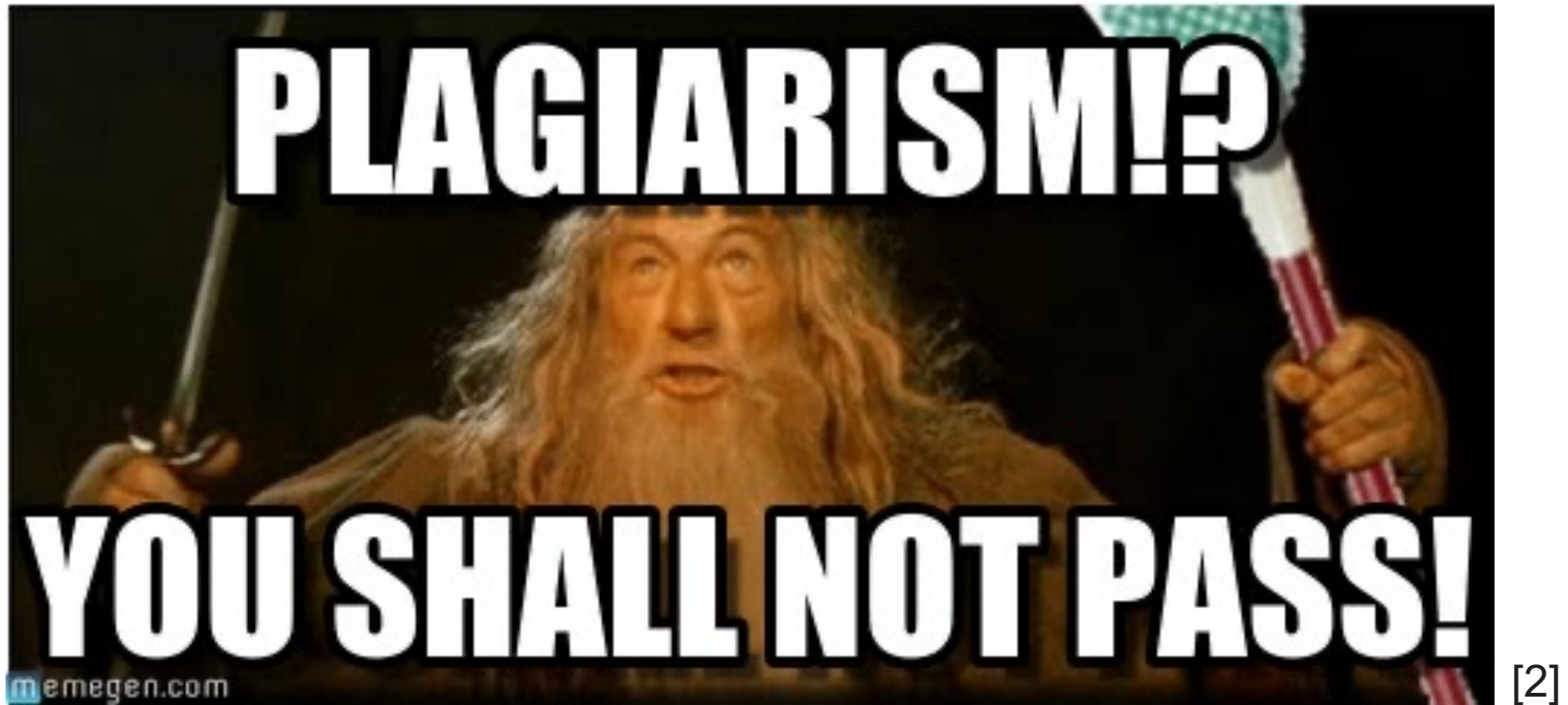
- Title
- Abstract
- Introduction
- Theoretical background
- Research design & methods (sample, sampling technique, exp. procedure, data collection (incl. which DVs and how are they measured), ethical considerations, quality criteria and how to meet them, overview on analysis)
- Results
- Discussion
- Limitations and future research
- Conclusions
- References
- Acknowledgements

PLAGIARISM AND CORRECT CITATIONS

We already mentioned this aspect during the first session. This is a quick reminder (with memes) about it



[1]



Consequences of plagiarism:

- Minor violations → worse grade
- Major violations → failing the class
- Serious or repeated violations → losing examinations right → failing the study program



[1] <https://imgflip.com/i/qert2>

[2] <https://shhs-southhadleyschools.libguides.com/incorporatingquotes>

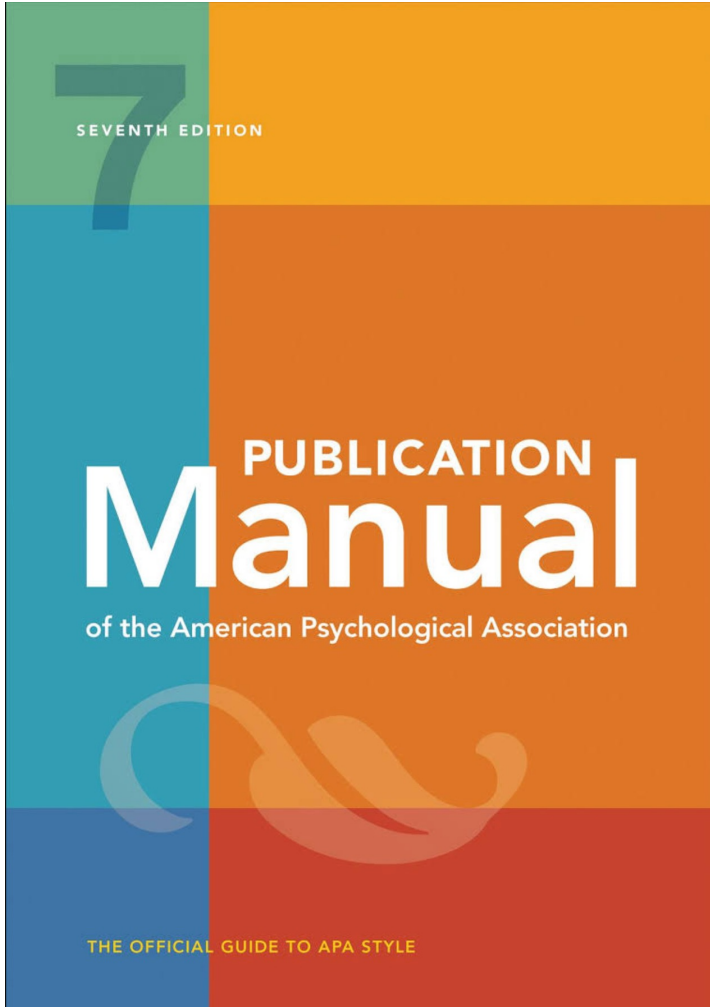
[3] <http://memes.com/img/1093232>

THE FANTASTIC WORLD OF APA STYLE

APA:
Have you heard about that?

APA: quick intro

- ❖ Acronym of “American Psychological Association”.
Funded in 1892
- ❖ Very influential organization in the field of Psychology
- ❖ Created the APA style and Publication manual (on next slide) which is not only used in Psychology but also in other fields.
- ❖ You will need to use APA style for most, if not all, of your classes



- Latest edition: 7th; released in 2019
- Comprehensive book; it is recommended to read about the respective topics once you need them
- You do not need to learn all the rules by heart for the exam!
- However, it can be handy to master the most important rules without checking the book every single time

All ideas, results, analyses, etc. that you did not produce yourself, **need to be cited accordingly!**

APA: Frequently needed rules

In-text citations: Paraphrasing

- ❖ You refer to results / ideas / argumentation of someone else, describing in your **own words** what they have stated before
- ❖ Format:

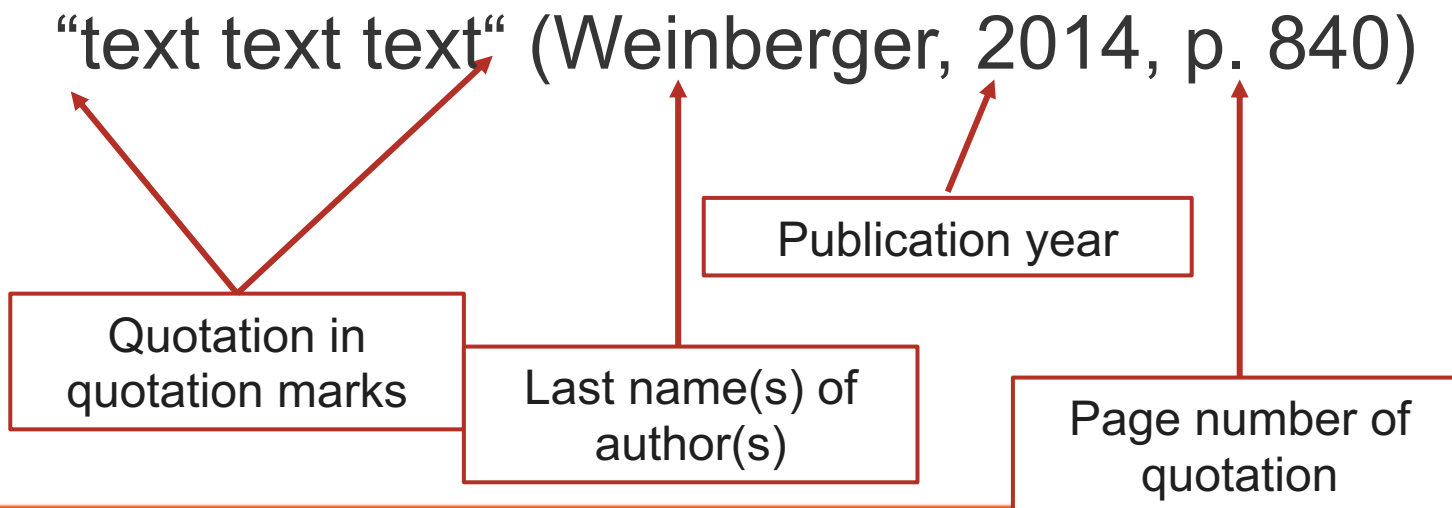
...text text text (Weinberger & Fischer, 2006).

Last name(s) of
author(s)

Year of publication

In-text citation: Direct quotation

- ❖ **Word-for-word** reproduction of text
- ❖ Try to avoid using direct quotations as much as possible
- ❖ “Basic” format:



In-text citations: Amount of authors

Number of Authors to Include in In-text Citations

For a work with one or two authors, include the author name(s) in every citation.

(McCall, 2019)

(Moyer & Hendricks, 2014)

Thornton and Manning (2016)

For a work with three or more authors, include the name of only the first author plus "et al." in every citation, including the first citation, unless doing so would create ambiguity.

(Huerta et al., 2019)

Kapoor, Bloom, Montez, et al. (2017)

Kapoor, Bloom, Zucker, et al. (2017)

To learn more about avoiding ambiguity in in-text citations, see pp.266-267 of the manual.

Morningside University. (2021, February 25). *LibGuides: APA Citations (7th ed.): In-text Citation Author Rules*. Morningside.libguides.com; Morningside University.
<https://morningside.libguides.com/APA7/authors>

APA: Reference list

◇ Journal article

- Tsovaltzi, D., Judele, R., Puhl, T., & Weinberger, A. (2015). Scripts, individual preparation and group awareness support in the service of learning in Facebook: How does CSCL compare to social networking sites? *Computers in Human Behavior*, 53, 577-592. doi: 10.1016/j.chb.2015.04.067

◇ Book

- Ladel, S., Knopf, J., & Weinberger, A. (Eds.). (2018). *Digitalisierung und Bildung* (1st ed.). Springer Fachmedien Wiesbaden

◇ Book chapter

- Weinberger, A. (2018). Orchestrierungsmodelle und -szenarien technologie-unterstützten Lernens. In S. Ladel, J. Knopf, & A. Weinberger (Eds.), *Digitalisierung und Bildung* (pp. 117–139). Springer Fachmedien Wiesbaden. https://doi.org/10.1007/978-3-658-18333-2_7

◇ Conference papers

- Schmitt, L., & Weinberger, A. (2016, August). Dyadic argumentation of elementary school children with a reflective tool. *Earli SIG 26 (Argumentation, Dialogue and Reasoning)*.

APA Advice

- ◇ Ensure to always consult the rules from the latest edition of the APA style. Currently, we're on the 7th Edition
- ◇ You can rely on software and web services for managing and correctly writing your references. However cross-check that the service complies with the latest edition of APA
 - ◇ Some suggestions: BibTeX, Google scholar, **mybib.com**, citationmachine.net

SELF-PACED ACTIVITIES

Self-paced APA activity 1

Instructions: Write the correct reference (as in a reference list)
The answer is in the next slide!

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Self-paced APA activity 1 ANSWER

Loeffler, J., Raab, M., & Cañal-Bruland, R. (2016). A Lifespan Perspective on Embodied Cognition. *Frontiers in Psychology*, 7.

<https://doi.org/10.3389/fpsyg.2016.00845>

Self-paced APA activity 2

Instructions: Write the correct reference (as in a reference list)
The answer is in the next slide!

- ◇ Title: Content Analysis: An Introduction To Its Methodology
- ◇ Type: Book
- ◇ Authors: Klaus Krippendorff
- ◇ Year: 2012
- ◇ ISBN: 1483307034
- ◇ Publisher: Sage
- ◇ 456 pages
- ◇ Location: Thousand Oaks, California

Self-paced APA activity 2 ANSWER

Krippendorff, K. H. (2013). *Content Analysis - 3rd Edition : an Introduction to Its Methodology*. Sage Publications, Inc

Self-paced APA activity 3

Instructions: For the following publications, identify if they are a journal article, conference proceeding, or a book chapter

The answer is in the next slide!

- Bransford, J. D., & Schwartz, D. L. (1999). Rethinking transfer: A simple proposal with multiple implications. *Review of Research in Education*, 24, 61–100.
- Clark, H. H. (1985). Language use and language users. In G. Lindzey & E. Aronson (Eds.), *Handbook of social psychology* (3rd ed., pp. 179–231). New York: Harper and Row.
- Clark, H. H., & Wilkes-Gibbs, D. (1986). Referring as a collaborative process. *Cognition*, 22(1), 1–39.
- D'Angelo, S., & Begel, A. (2017, May). Improving communication between pair programmers using shared gaze awareness. In *Proceedings of the 2017 CHI Conference on Human Factors in Computing Systems* (pp. 6245–6290). New York: ACM.
- Dillenbourg, P., Lemaignan, S., Sangin, M., Nova, N., & Molinari, G. (2016). The symmetry of partner modelling. *International Journal of Computer-Supported Collaborative Learning*, 11(2), 227–253.
- Gergle, D., & Clark, A. T. (2011). See what i'm saying?: Using dyadic mobile eye tracking to study collaborative reference. In *Proceedings of the ACM 2011 conference on Computer supported cooperative work* (pp. 435–444). ACM.
- Hayes, A. F., & Krippendorff, K. (2007). Answering the call for a standard reliability measure for coding data. *Communication methods and measures*, 1(1), 77–89.
- Jermann, P., Mullins, D., Nüssli, M.-A., & Dillenbourg, P. (2011). Collaborative gaze footprints: Correlates of interaction quality. *CSCL2011 Conference Proceedings. Volume I - Long Papers*, 184–191.
- Mason, L., Pluchino, P., & Tornatora, M. C. (2015). Eye-movement modeling of text and picture integration during reading: Effects on processing and learning. *Contemporary Educational Psychology*, 14, 172–187.

From: Schneider, B., Sharma, K., Cuendet, S., Zufferey, G., Dillenbourg, P., & Pea, R. (2018). Leveraging mobile eye-trackers to capture joint visual attention in co-located collaborative learning groups. *International Journal of Computer-Supported Collaborative Learning*, 241–261. <http://doi.org/10.1007/s11412-018-9281-2>

Self-paced APA activity 3 ANSWER

- Bransford, J. D., & Schwartz, D. L. (1999). Rethinking transfer: A simple proposal with multiple implications. *Review of Research in Education*, 24, 61–100. **Journal article**
- Clark, H. H. (1985). Language use and language users. In G. Lindzey & E. Aronson (Eds.), *Handbook of social psychology* (3rd ed., pp. 179–231). New York: Harper and Row. **Book chapter**
- Clark, H. H., & Wilkes-Gibbs, D. (1986). Referring as a collaborative process. *Cognition*, 22(1), 1–39. **Journal article**
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- Dillenbourg, P., Lemaignan, S., Sangin, M., Nova, N., & Molinari, G. (2016). The symmetry of partner modelling. *International Journal of Computer-Supported Collaborative Learning*, 11(2), 227–253. **Journal article**
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- Mason, L., Pluchino, P., & Tornatora, M. C. (2015). Eye-movement modeling of text and picture integration during reading: Effects on processing and learning. *Contemporary Educational Psychology*, 14, 172–187. **Journal article**

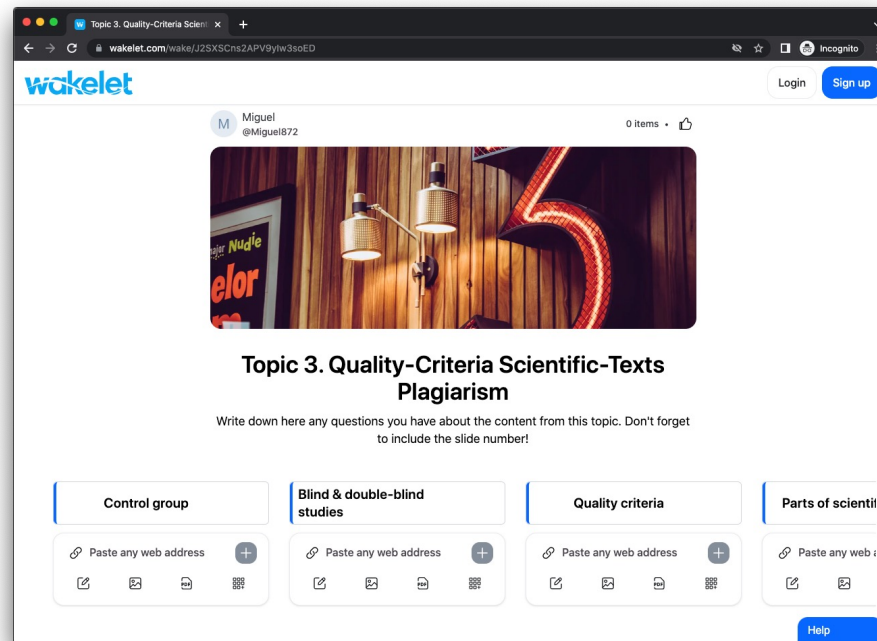
IMPORTANT!

Now that we have covered the topic of APA and how to cite. It will be obligatory for now on to cite your references, both in-next and in the bibliography, using APA style!

Reminder

Ask it in the wakelet!

- ❖ For this and all future topics, write any questions or comments you have about the topic in the respective wakelet
- ❖ <https://wakelet.com/i/invite?code=a7jwlxov>



END OF THE TOPIC!

QUESTIONS?

**SHARE THEM SO WE CAN DISCUSS THEM
DURING THE SEMINAR SESSION!**