

# Optimizing the 3R study strategy to learn from text

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# Overview

- Aim and original plan of the project
- Important elements
- First experiment
- Preparation second experiment
- The future



# Aim and original plan of the project

- Optimizing the 3R study strategy
- Focus on self-testing
- Testing instructional interventions
  - Taking notes (read)
  - Answering non-specific short-answer questions (recite)
  - Selective reviewing (review)
  - Intervention study in class



# Important elements experiment 1

- Students prefer to take notes during reading (Palmatier & Bennet, 1974) and to reread text during the learning process (Karpicke, Butler, & Roediger, 2009).
- Active retrieval of information leads to better test performance compared to rereading text (Carpenter & DeLosh, 2006; Kang, McDermott, & Roediger, 2007).
- Testing can have a positive influence on learning outcomes (Karpicke & Roediger, 2008).
- In education, testing should be used more often (Leeming, 2002).



# Important elements experiment 1 (2)

- Testing effect
- The 3R study strategy
  - Read: reading a text or text passage
  - Recite: retrieving information from memory
  - Review: reviewing a text or text passage
- Adjunct questions
- Alignment



# Experiment 1: Research questions

- What is the effect of offering *different types of questions* on final test performance?
- What is the effect of *alignment* on final test performance?
- What is the effect of *adding adjunct questions* on final test performance?



# Experiment 1: Hypotheses

- Answering higher order questions (comprehension questions) leads to deeper text processing compared to answering lower order questions (factual questions). This will possibly lead to better final test performance
- Alignment between encoding and retrieving information leads to better final test performance compared to no alignment
- Offering adjunct questions within the 3R study strategy will lead to better final test performance compared to the traditional 3R study strategy



# Experiment 1: Method

- N = 131
- 5 conditions
  - Factual - factual
  - Factual - comprehension
  - Comprehension - factual
  - Comprehension – comprehension
  - 3R study strategy
- Prior knowledge test – experimental phase – final test
- Statements
- Text about the industrial revolution
- Contrasts (3R study strategy was control condition)





## Results repeated factual questions

- Participants in condition 1 performed significantly better on repeated comprehension questions than participants in condition 5 ( $p = .032$ )

### Descriptive Statistics

Dependent Variable: SOMFeitenEindtestHerhaald

Experimentele groep	Mean	Std. Deviation	N
Conditie 1	3.6552	1.00980	29
Conditie 2	2.9630	1.19233	27
Conditie 3	2.6786	.81892	28
Conditie 4	3.0909	2.48633	22
Conditie 5	2.5600	.96090	25
Total	3.0000	1.40329	131



## Results new factual questions

- Marginal differences between condition 1 and 5 ( $p = .061$ )
- Marginal differences between condition 3 and 5 ( $p = .062$ )
- Scores of participants in condition 4 and 5 are good

### Descriptive Statistics

Dependent Variable: SOMFeitenEindtestNieuw

Experimentele groep	Mean	Std. Deviation	N
Conditie 1	1.8966	1.47224	29
Conditie 2	2.1852	1.17791	27
Conditie 3	1.8929	1.06595	28
Conditie 4	2.3182	1.12911	22
Conditie 5	2.5200	1.12250	25
Total	2.1450	1.21606	131



## Results repeated comprehension questions

- Significant differences are found ( $p = .000$ )
- Participants in condition 4 outperform participants in condition 5 on repeated comprehension questions ( $p = .000$ )

### Descriptive Statistics

Dependent Variable: SOMBegripEindtestHerhaald

Experimentele groep	Mean	Std. Deviation	N
Conditie 1	1.6262	.64255	29
Conditie 2	1.6315	.53402	27
Conditie 3	1.8654	.77420	28
Conditie 4	2.5527	.76546	22
Conditie 5	1.5624	.73833	25
Total	1.8218	.76522	131



## Results new comprehension questions

- Significant differences are found ( $p = .037$ )
- Participants in condition 5 outperform participants in condition 1 ( $p = .009$ )
- Participants in condition 5 outperform participants in condition 2 ( $p = .042$ )

### Descriptive Statistics

Dependent Variable: SOMBegripEindtestNieuw

Experimentele groep	Mean	Std. Deviation	N
Conditie 1	1.0986	.48646	29
Conditie 2	1.1767	.39982	27
Conditie 3	1.3386	.55463	28
Conditie 4	1.4273	.52863	22
Conditie 5	1.4620	.51809	25
Total	1.2905	.51161	131



# Experiment 1: Conclusion

- Memory effects are found for repeated factual questions and repeated comprehension questions (effect of alignment)
- On new factual questions participants in condition 4 and 5 perform well (comprehension questions and free recall promote deeper processing)
- Scores on new comprehension questions are low, but participants in condition 5 perform well (free recall is not worse than answering comprehension questions)



# Preparation second experiment

- Shift to secondary education
- Simple design
  - Read – comprehension questions – review
  - Read – recite – review
  - Read – read – read
- Including motivation / cognitive load scale



# Future experiments

- Manipulation read phase
  - Activating prior knowledge
  - ??
  
- Manipulation review phase
  - Review of whole text / text passages
  - ??



**Thank you for your attention!**

**Questions?**

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