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Dagstuhl-Seminar "Search as Learning"



SEARCH AS LEARNING – A PSYCHOLOGICAL PERSPECTIVE

Yvonne Kammerer, Leibniz-Institut für Wissensmedien

THE INTERNET AS A KNOWLEDGE RESOURCE

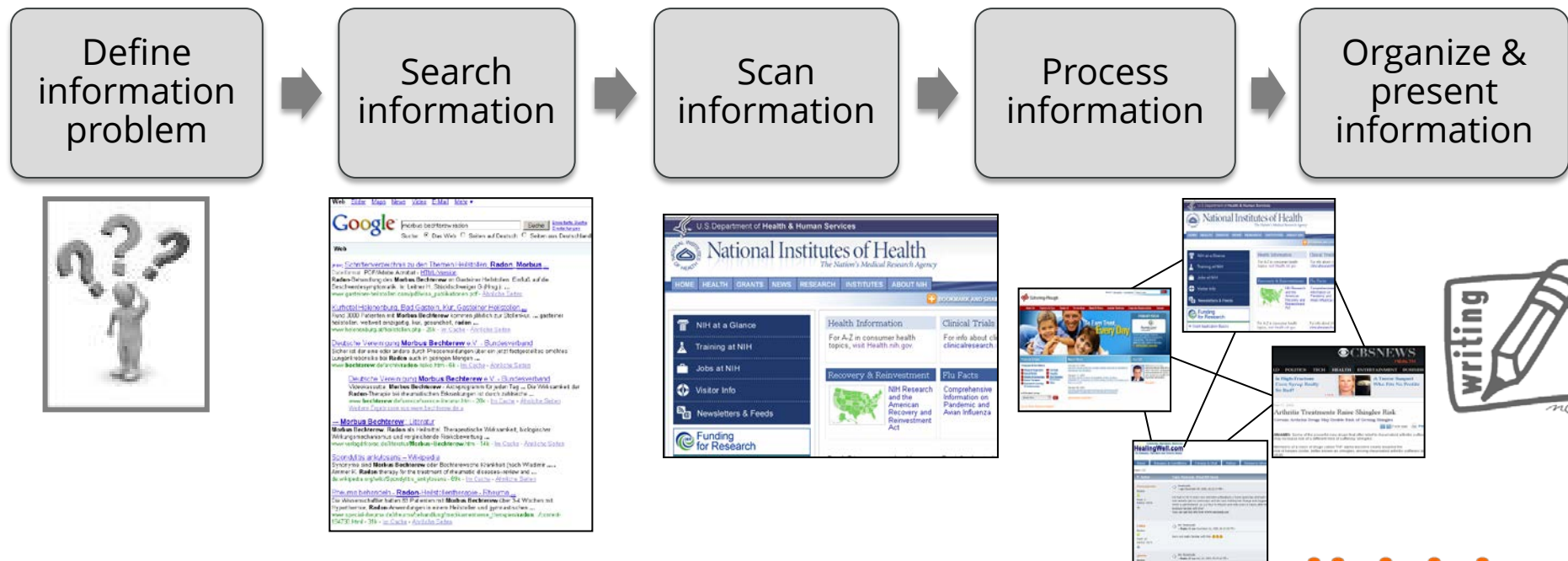
- The Internet has become a major knowledge resource for **scientific- or health-related issues**:
e.g., about the effectiveness of certain medical treatments, weight loss methods, or nutritional supplements; health risks of cell phones, etc.



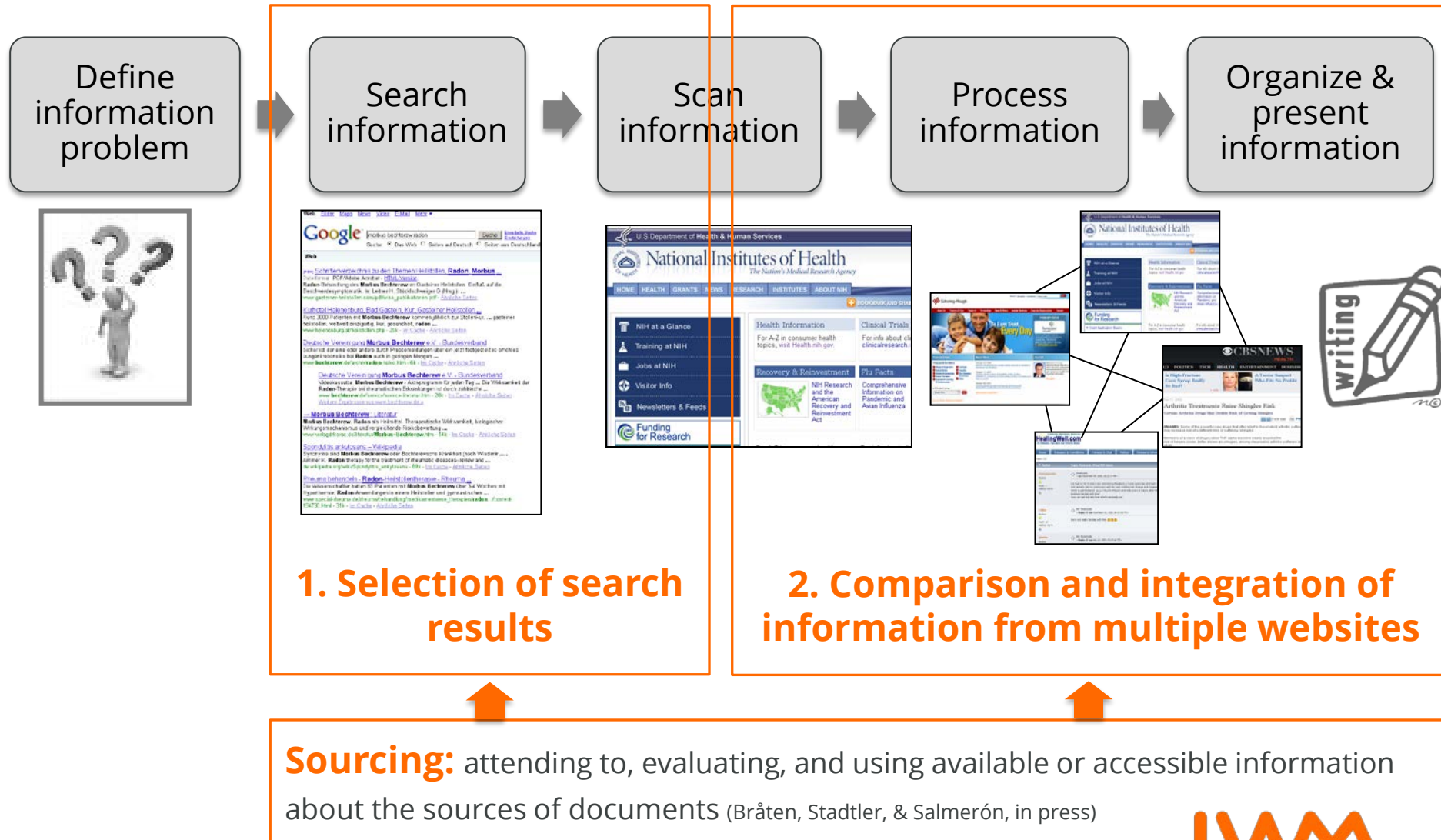
- **RESEARCH FOCUS:** Using the Internet to learn about **complex, conflicting topics** rather than simple facts
 - **ill-structured problems:** no single definite solution, but fragile and conflicting evidence
 - **high heterogeneity of information sources:** source evaluation is highly important

INFORMATION PROBLEM SOLVING ON THE INTERNET

- The process of information seeking on the Internet has been conceptualized as a problem-solving process driven by an information problem, i.e. an **information problem solving process** (Brand-Gruwel et al., 2009)
- Information problem = a problem that cannot be answered from memory, but that requires external information that must be searched for (Walraven et al., 2009)



MAIN SUBJECTS OF INVESTIGATION

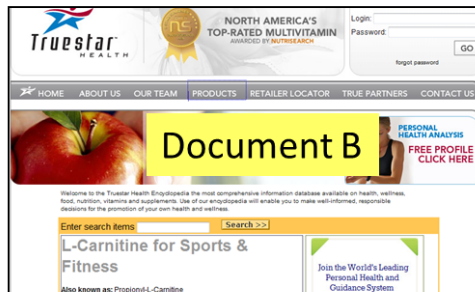
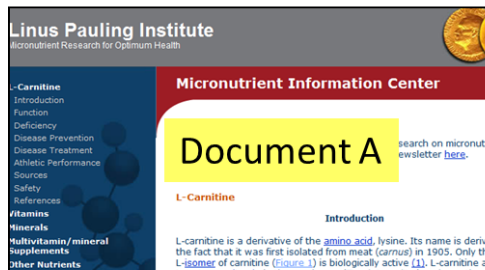


SELECTION OF SEARCH RESULTS

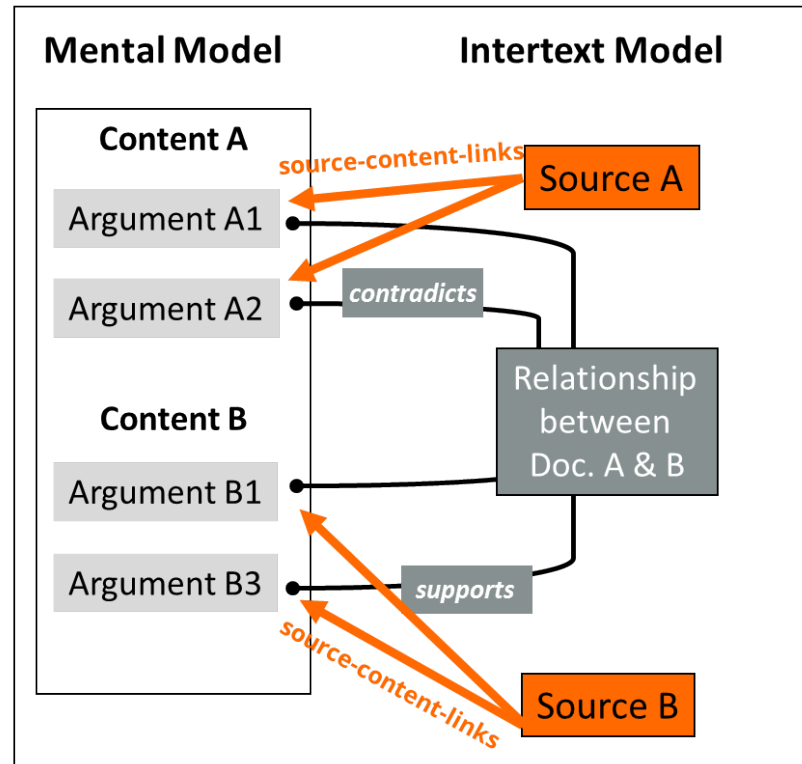
- Situation that requires choosing between a **large number of alternatives**, for which only **sparse information** (title, excerpt, and URL) is provided
 - Decision situations of high uncertainty:
individuals typically aim at maximizing the outcome (i.e., gaining valuable information) while minimizing resources (i.e., time and cognitive effort)
(cf. e.g. Pirolli, 2007)
- Instead of a systematic, that is, thorough and complete evaluation of all given information, individuals often rely on *heuristic cues* to decide which alternatives to select (e.g., Hilligoss & Rieh, 2008; Metzger et al., 2010):
- the ranking position of the search result in the SERP (Salmerón et al., 2013; Wirth et al., 2007)
 - keywords or trigger words (Pirolli, 2007; Rouet et al., 2011)
 - source cues such as the type or reputation of the website indicating the trustworthiness of an information source (Hilligoss & Rieh, 2008; Rieh, 2002)

COMPARISON AND INTEGRATION OF INFORMATION FROM MULTIPLE WEBSITES

- Documents model framework (e.g., Britt & Rouet, 2012)
- **Documents model** = the mental representation that readers ideally construct when reading multiple documents

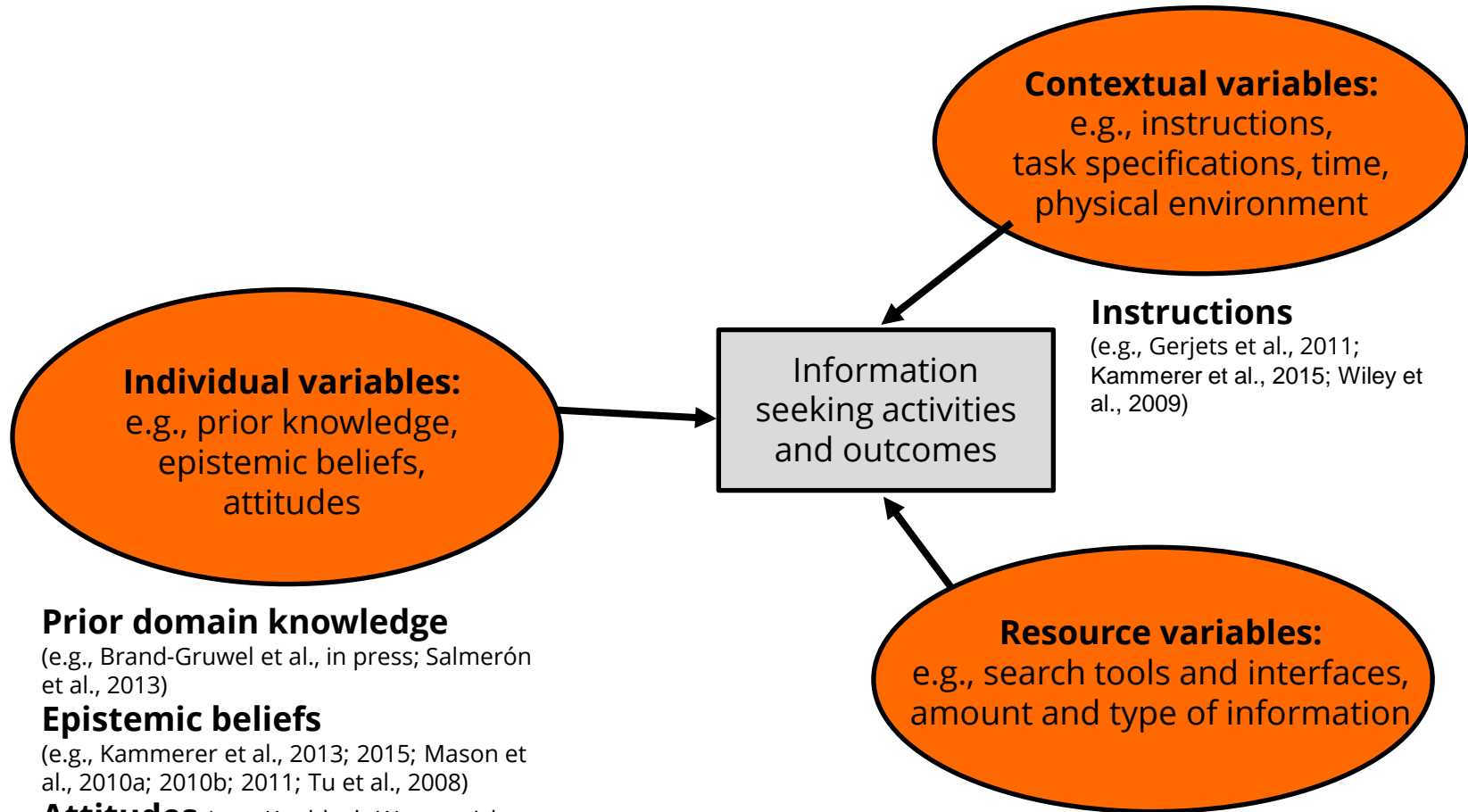


Documents Model



POTENTIAL INFLUENCING FACTORS

(LAZONDER & ROUET, 2008; ROUET & BRITT, 2011)



Contextual variables:
e.g., instructions,
task specifications, time,
physical environment

Instructions

(e.g., Gerjets et al., 2011;
Kammerer et al., 2015; Wiley et
al., 2009)

Individual variables:
e.g., prior knowledge,
epistemic beliefs,
attitudes

Prior domain knowledge

(e.g., Brand-Gruwel et al., in press; Salmerón
et al., 2013)

Epistemic beliefs

(e.g., Kammerer et al., 2013; 2015; Mason et
al., 2010a; 2010b; 2011; Tu et al., 2008)

Attitudes (e.g., Knobloch-Westerwick et
al., 2015; Schwind et al., 2012; van Strien et
al., 2016)

Resource variables:
e.g., search tools and interfaces,
amount and type of information

Search interface

(e.g., Kammerer & Gerjets, 2014; Salmerón et
al., 2010; Schwind et al., 2012; Stadtler &
Bromme, 2008)

Contradictions between documents

(e.g., Kammerer & Gerjets, 2014b)

TYPICAL METHODS – PROCESS MEASURES



THINKING ALOUD/CUED RETROSPECTIVE REPORTING:

Verbal reflections, e.g. about source evaluation, self-explanations, or comprehension monitoring (e.g., Brand-Gruwel et al., 2009; in press; Bråten et al., 2014; Gerjets et al., 2011; Goldman et al., 2012; Greene et al., 2014; Kammerer et al., 2013; Mason, Boldrin, & Ariasi, 2010a; Rieh, 2002)



EYE-TRACKING:

Attention to search results and to source cues (e.g., Brand-Gruwel et al., in press; Gerjets et al., 2011; Kammerer et al., 2013; Van Strien et al., 2016)



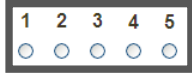
LOGFILES:

Selection of search results (amount, type, position) (e.g., García-Rodicio, 2015; Kammerer & Gerjets, 2014a; Salmerón et al., 2013)

time spent on certain types of web pages (e.g., Brand-Gruwel et al., in press; García-Rodicio, 2015; Goldman et al., 2014; Kammerer et al., 2015)

TYPICAL METHODS – OUTCOME MEASURES

RATINGS:



e.g., certainty of decision (pro/con) (e.g., Kammerer et al., 2015; Kienhues et al., 2011)

credibility ratings (e.g., Kammerer & Gerjets, 2014b; Stadler & Bromme, 2008; Van Strien et al., 2016)

ranking of websites (e.g., Goldman et al., 2014)



ARGUMENTATIVE ESSAY:

conceptual understanding (e.g., Goldman et al., 2014; Greene et al., 2014)

number of arguments, discussion of conflicting perspectives (e.g., Bråten et al., 2014;

Kammerer et al., 2013; Kammerer & Gerjets, 2014a; van Strien et al., 2016)

number of source references (e.g., Bråten et al., 2014; Kammerer & Gerjets, 2014b)

VERIFICATION OR MAPPING TASKS:

inference verification / recognition task (e.g., Goldman et al., 2012; Salmerón et al., 2010)

source-content mapping task (e.g., Kammerer et al., 2016),



LIMITATIONS DUE TO EXPERIMENTAL SETTING

- Typically no free searches on the open Internet, but:
 - given topic
 - given search terms that cannot be changed
 - predefined list of search results
 - set of preselected web pages (modified to have similar length, difficulty, etc.; hyperlinks removed)
 - single search session of limited time
 - ...

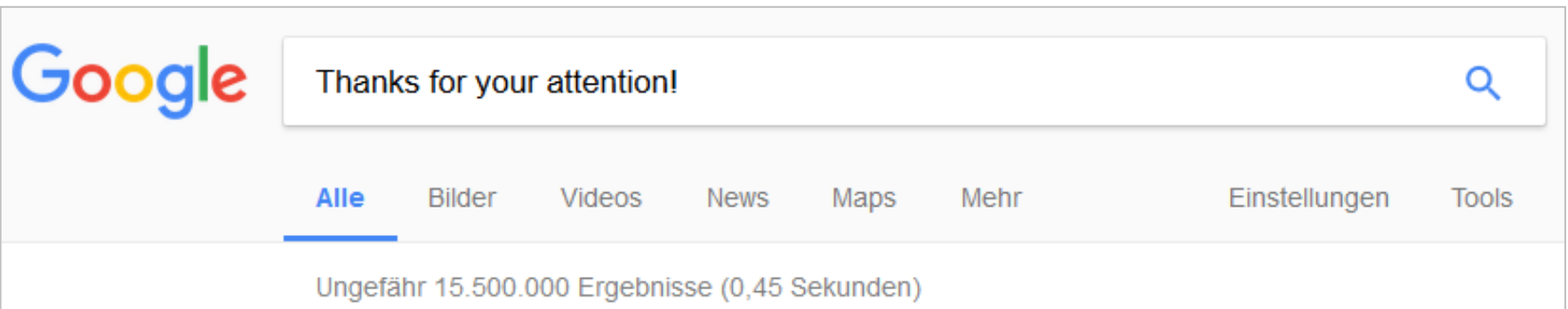
→ Combination of controlled experimental studies and naturalistic field studies

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Contact: y.kammerer@iwm-tuebingen.de