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Knowledge Media Research Center

Searching and evaluating information on the Web – an (experimental) psychological perspective

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ZiF-Workshop on Web Epistemics
February 17, 2012, Bielefeld

Information resource World Wide Web

- In recent years the Web has evolved into a **major information resource**
- Easy access to huge amounts of information for everybody
- In particular Web search with regard to **medical** and **health-related** information has become very popular among laypersons (Morahan-Martin, 2004; Fox, 2006)

  - **83%** of American Web user (Pew Internet & American Life Project, 2009)
  - **79%** of German Web user (Health Care Monitoring, 2009)

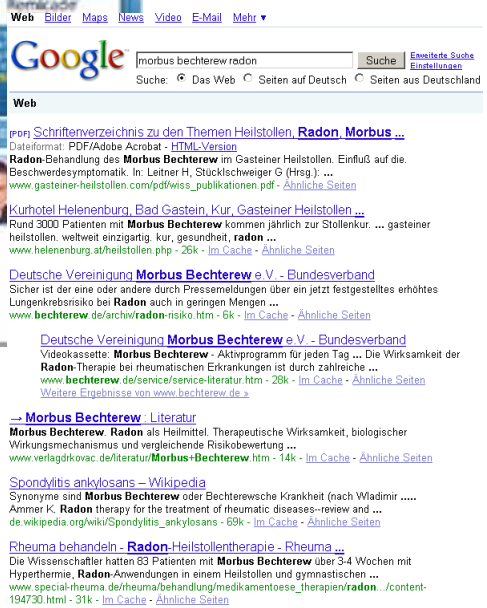
Web search about a complex health-related issue

Image, a friend asks you for advice

Web search about a complex health-related issue

Image, a friend asks you for advice

High heterogeneity of information sources on the Web



Feb 17, 2009

Arthritis Treatments Raise Shingles Risk

Certain Arthritis Drugs May Double Risk of Getting Shingles

Font size

(WebMD) Some of the powerful new drugs that offer relief to rheumatoid arthritis suffere may increase risk of a different kind of suffering: shingles .

Members of a class of drugs called TNF-alpha blockers nearly doubled the risk of herpes zoster, better known as shingles, among rheumatoid arthritis sufferers in study.

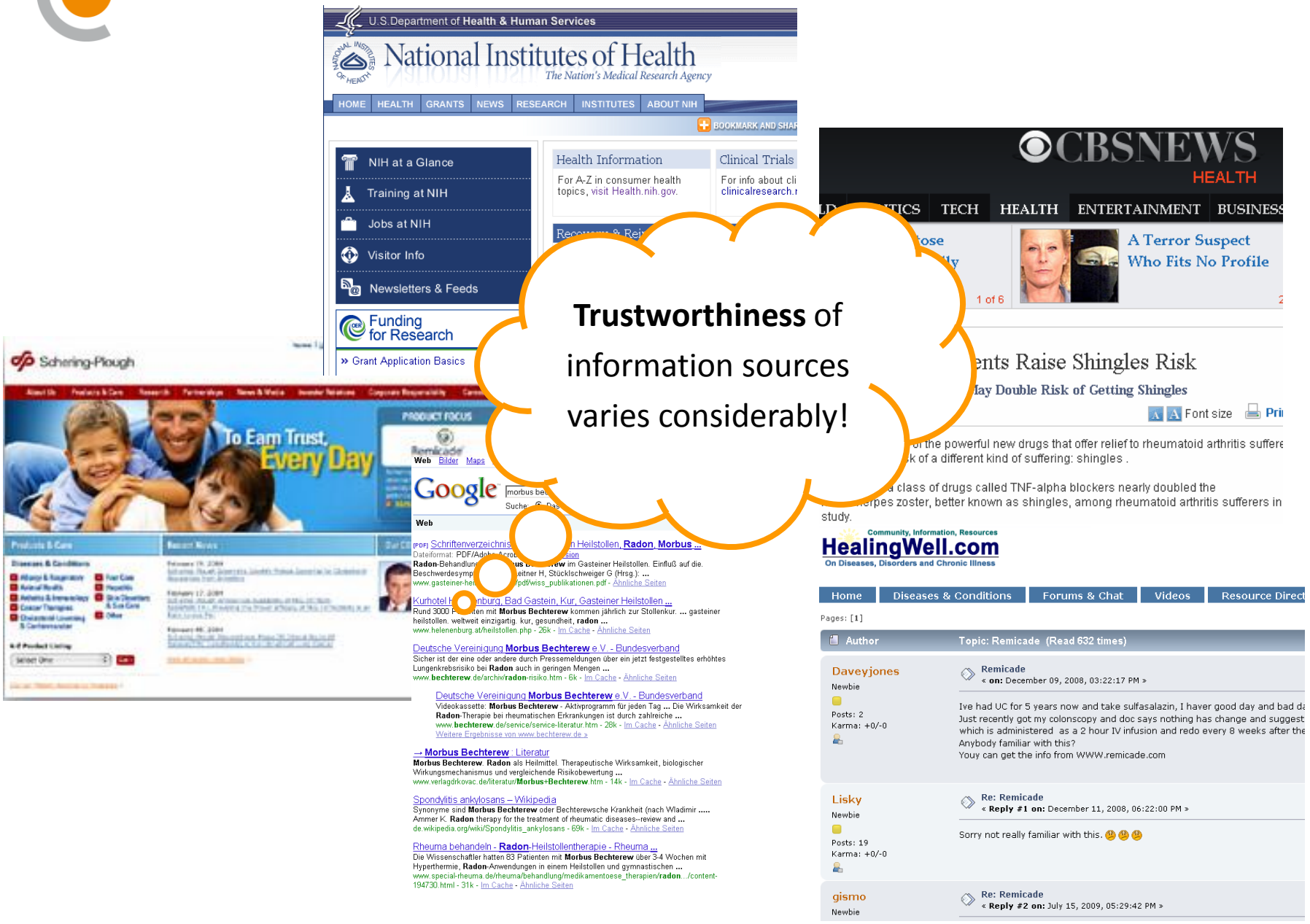
Community, Information, Resources
HealingWell.com
On Diseases, Disorders and Chronic Illness

Home | Diseases & Conditions | Forums & Chat | Videos | Resource Direct

Pages: [1]

Author	Topic: Remicade (Read 632 times)
Daveyjones Newbie Posts: 2 Karma: +0/-0	Remicade « on: December 09, 2008, 03:22:17 PM » Ive had UC for 5 years now and take sulfasalazin, I haver good day and bad da Just recently got my colonscopy and doc says nothing has change and suggest which is administered as a 2 hour IV infusion and redo every 8 weeks after the Anybody familiar with this? Youy can get the info from WWW.remicade.com
Lisky Newbie Posts: 19 Karma: +0/-0	Re: Remicade « Reply #1 on: December 11, 2008, 06:22:00 PM » Sorry not really familiar with this.
gismo Newbie	Re: Remicade « Reply #2 on: July 15, 2009, 05:29:42 PM »

High heterogeneity of information sources on the Web



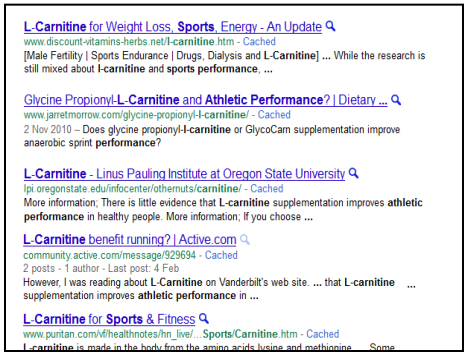
High heterogeneity of information sources on the Web

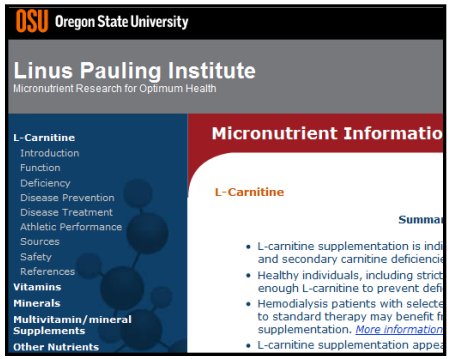
Information seeking process on the Web
(e.g., Brand-Gruwel, Wopereis, & Walraven, 2009)

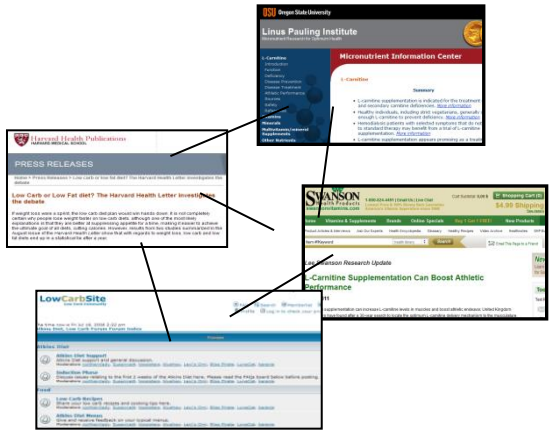
Define information problem → Search information → Scan information → Process information → Organize & present information

Evaluation phases
Gerjets, Kammerer, & Werner (2011)

- evaluation of search results
- evaluation of a Web page
- evaluation of documents collection







Information seeking process on the Web
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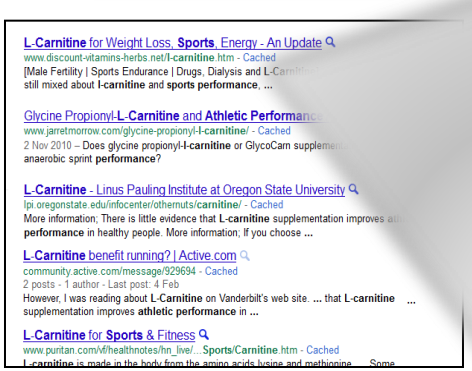
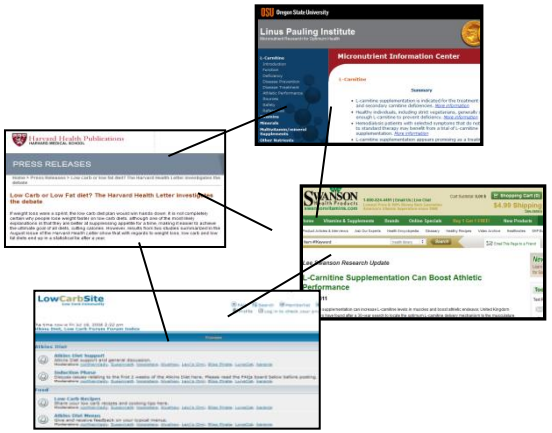


Focus on early processes



However, previous research shows:

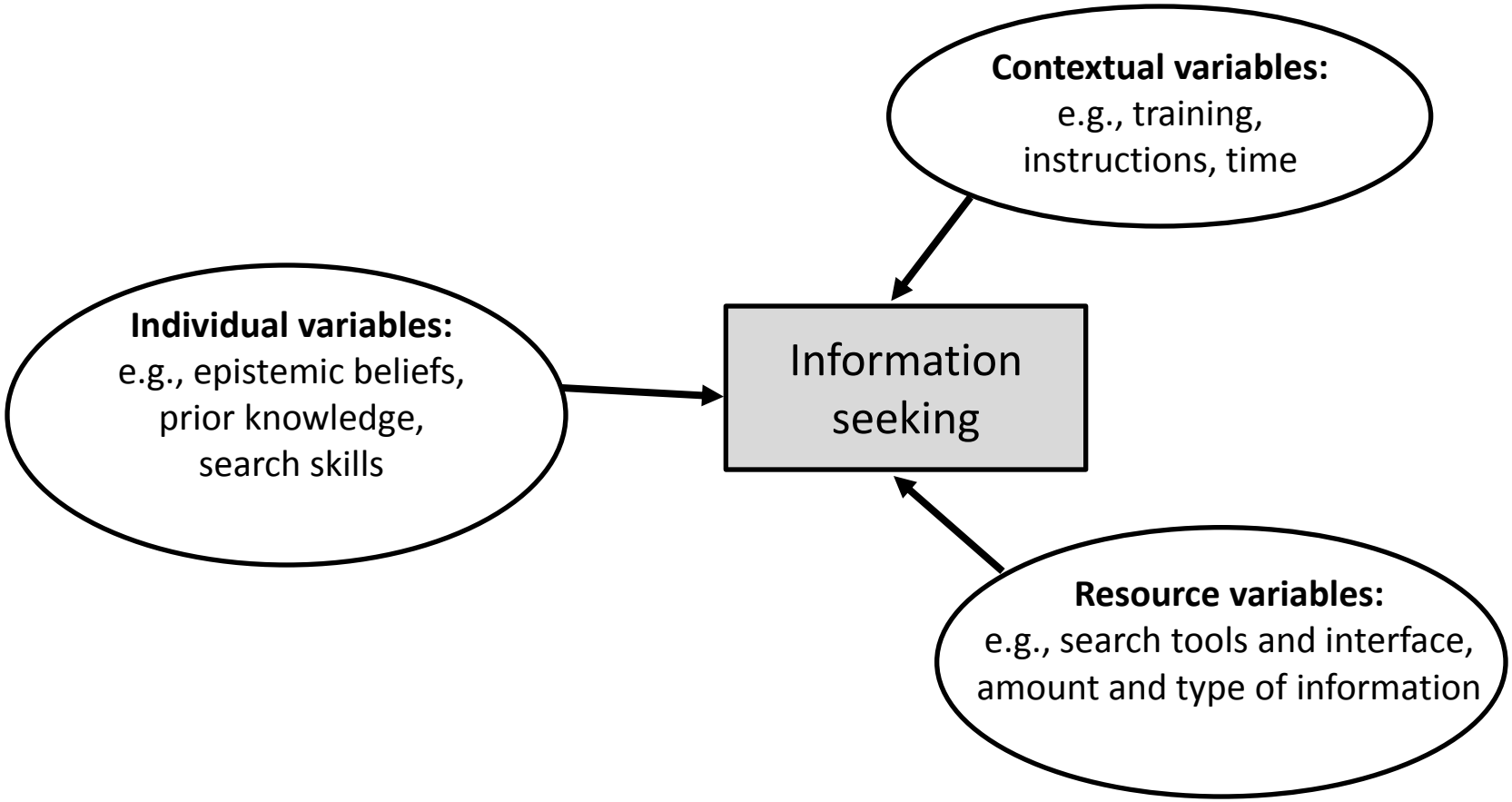
- school students, (e.g., Kuiper, 2007; Walraven et al., 2009)
- university students, (e.g., Ivanitskaya et al., 2010; Gerjets et al., 2011; Wiley et al., 2009)
- adults (e.g., Eysenbach, 2008)

… often do not critically evaluate the trustworthiness of information sources during Web search

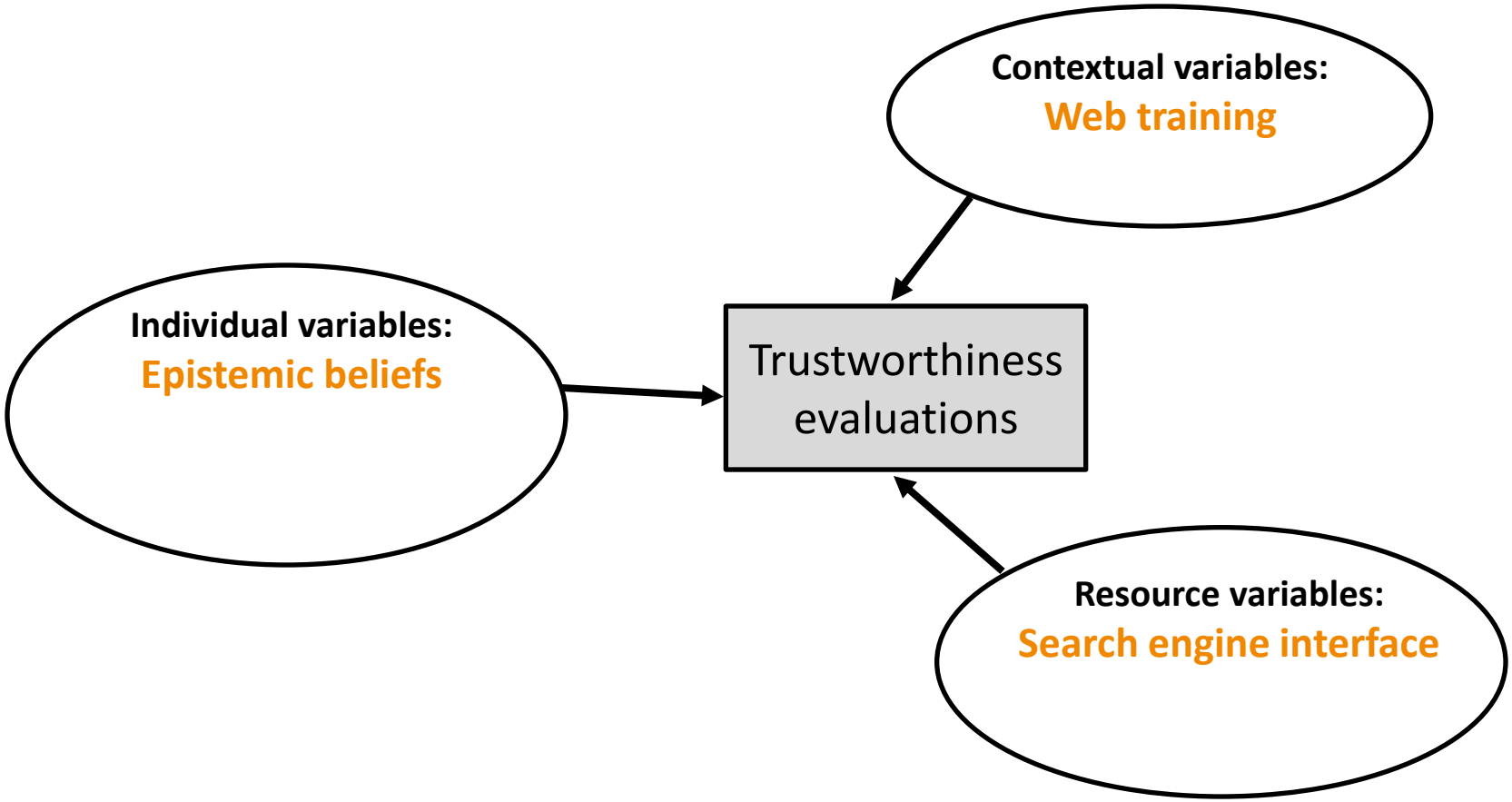
General research question: Why not? Potential influencing factors?

Potential influencing factors of information seeking activities

(Lazonder & Rouet, 2008)



Potential influencing factors of trustworthiness evaluations examined in our studies



Analysis of evaluation processes occurring during Web search

Process measures:

- **Logfile data (Mouseclicks)**
  - selection of search results
  - time on Web pages

- **Eye-tracking data**
  - total fixation duration on an object
  - sequence analyses

- **Verbal protocols (Thinking-aloud data)**
  - cued retrospective reports

Search outcome

- informed decision
- argument task

methodological triangulation

(Denzin, 1970)

INDIVIDUAL VARIABLE

STUDY 1:
The influence of epistemic beliefs

Kammerer, Bråten, Gerjets, & Strømsø (submitted)

Internet-specific epistemic beliefs

- **Internet-specific epistemic beliefs** (Strømsø & Bråten, 2010)

  individuals' personal beliefs about what knowledge and knowing is like on the Web

- Assessed with ISEQ (Internet-Specific Epistemological Questionnaire)
  (Strømsø & Bråten, 2010)

Internet-specific epistemic beliefs

Certainty and Source of Knowledge (9 items, Cronbach's α = .90)

- naïve beliefs: Web is reliable source that provides correct knowledge
- sophisticated beliefs: doubts that knowledge on the Web is correct
- e.g. „The Web contains accurate knowledge about the topics I study."
  totally disagree (1) – totally agree (5)

Need for Justification (4 items, Cronbach's α = .78)

- naïve beliefs: Web-based knowledge claims can be accepted without critical evaluation
- sophisticated beliefs: Web-based knowledge claims need to be checked against other sources, reason, and prior knowledge
- e.g., "To find out whether the study-related knowledge that I encounter on the Web is trustworthy, I try to compare knowledge from multiple sources."
  totally disagree (1) – totally agree (5)

Web search task and participants

- **Task:** Which of 2 therapies is better to treat the Bechterew‘s disease?
- **Materials:** 2 mock Google pages with 9 Web pages each
- **Participants:** 80 university students (average age: 24 years)

Results

The greater participants doubts that knowledge on the Web is correct …

the more they **verbally reflected** on the **type or credibility of sources**

the **longer they fixated** on the search results

the more search results **at the bottom** of the SERP they selected

the **less certain they were of their decisions** about which therapy to recommend

→ **Doubts that knowledge on the Web is correct trigger source evaluations**

Results

The stronger students' beliefs that knowledge claims on the Web need to be checked against other sources, reason, and prior knowledge …

the more they verbally referred to the **different parts of the search results** (URLs, title, abstract)

the more they **focused on both therapies in their argumentation** (both sides of the controversy)

→Beliefs that knowledge claims need to be justified trigger a more thorough and balanced evaluation

Conclusion

Sophisticated Internet-specific epistemic beliefs,

i.e., a **critical stance** about knowledge on the Web

seems to **stimulate source evaluations** during Web search

➢ Training to **foster such a critical stance**

CONTEXTUAL VARIABLE

STUDY 2:
Source-evaluation training for non-academic adults

Kammerer, Amann, & Gerjets (2011, *Conference of the European Association for Research on Learning and Instruction (EARLI)*)

Components of the training

Type of source

Expertise & Motives

Comparisons
across Web pages

Characteristics of the training

- Web-based and self-paced
- Training duration : ø 20 minutes
- Training contains a mix of
  - declarative information
  - concrete examples
  - interactive exercises with feedback

Example: Motives of the information provider

An author who provides information on the Web can have different motives:

1. He/she wants to share his/her personal experiences and opinions.

Example

2. He/she wants to publish neutral facts and scientific evidence.

Example

3. He/she wants to promote a product or service.

Example

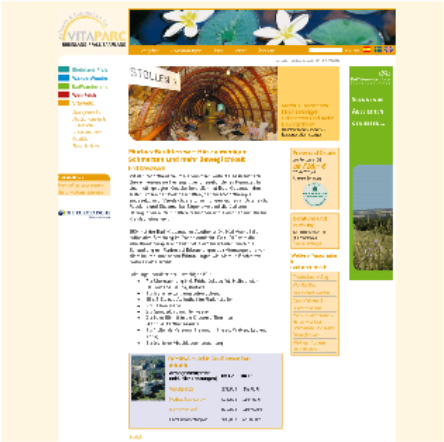
Example: Intention of the information provider

3. He/she wants to promote a product or service.

Example

Example: Commercial Web page

Stollentherapie Bad Kreuznach: **Morbus-Bechterew** ...
Hin zu weniger Schmerzen und mehr Beweglichkeit. Diese Anwendung im **Radon**stollen richtet sich speziell an **Morbus-Bechterew**-Erkrankte. **...**
www.vitaparc-rlp.de/**Radon**anwendung/index.php?pauschalenID=24 - 32k -



The intention of this information provider is to promote a product or service.
You should keep in mind, that therefore **positive aspects** might be stressed, whereas **negative aspects** might not be mentioned.
Thus, the information might be **one-sided**, but not necessarily incorrect.

Please, click on the page to enlarge it.

zurück

Excercise: What type of source am I looking for?

1. I‘m looking for personal experiences and opinions.
   - **To the excercise: What type of Web page do I need?**
2. I‘m looking for neutr ts and scientific evidence.
   - **To the excercise: What type of Web page do I need?**
3. I‘m looking for commercial providers of a product or service.
   - **To the excercise: What type of Web page do I need?**

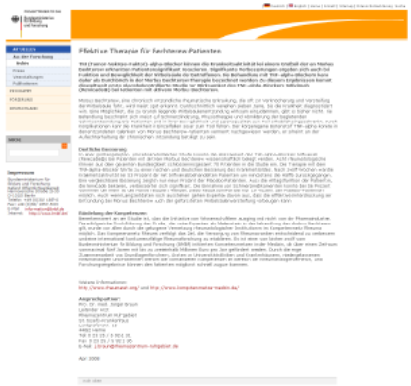
Exercise: What type of source am I looking for?

1. I‘m looking for personal experiences and opinions
   - **To the excercise: What type of Web page do I need?**

Type of Web page: Please select A, B, or C

A

B



C

Click on the pages to enlarge them and then decide whether **Web page A, B, or C** provides **personal experiences and opinions.**

Feedback with explanation

Correct!

If you are looking for other people‘s personal experiences and opinions, a forum Web page can help.

zurück

Web search task and participants

- **Task:** Does L-Carnitine supplementation enhance athletic performance?
- **Materials:** 2 mock Google pages with 9 Web pages each
- **Participants:** 51 adults (average age: 43 years)
  26 received training, 25 not

Results and Conclusion

Training group shows better source evaluation than control group:

Training leads to more thoughtful selection of Web pages

(longer time on Google)

Training stimulates Web users to focus on objective information:

- both during search

- and also with regard to the decision made

➢ A **short training** seems to be able to **foster source evaluation skills**

RESOURCE VARIABLE

Search engine interface

STUDY 3

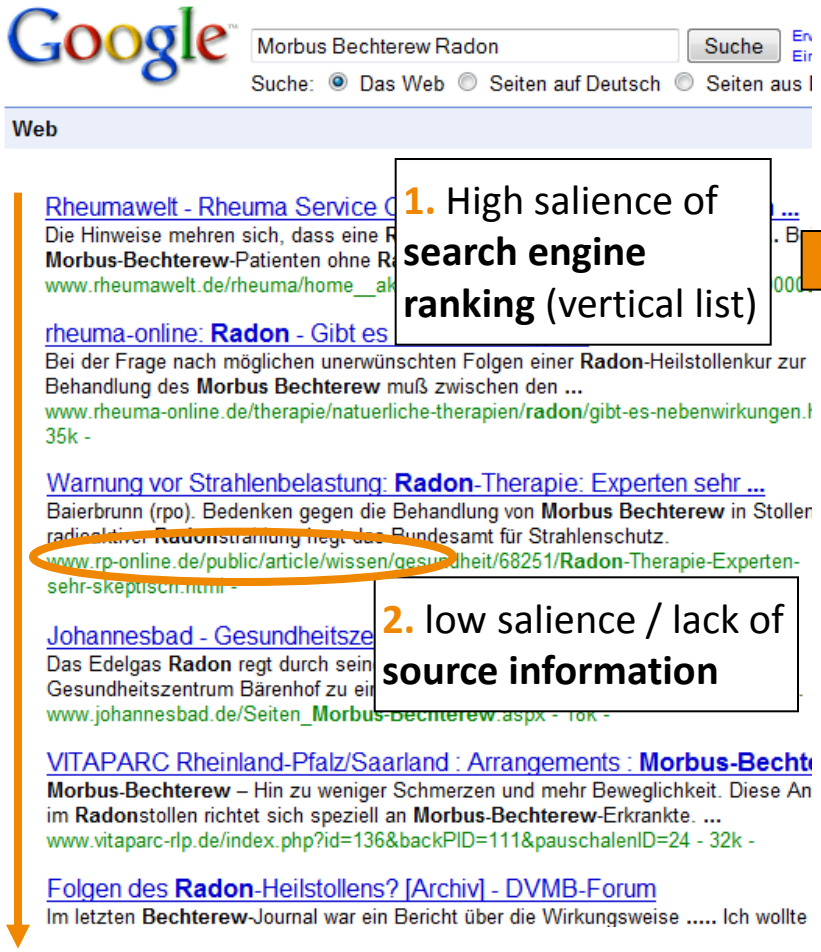
Kammerer & Gerjets (2010, *ETRA proceedings*)

STUDY 4

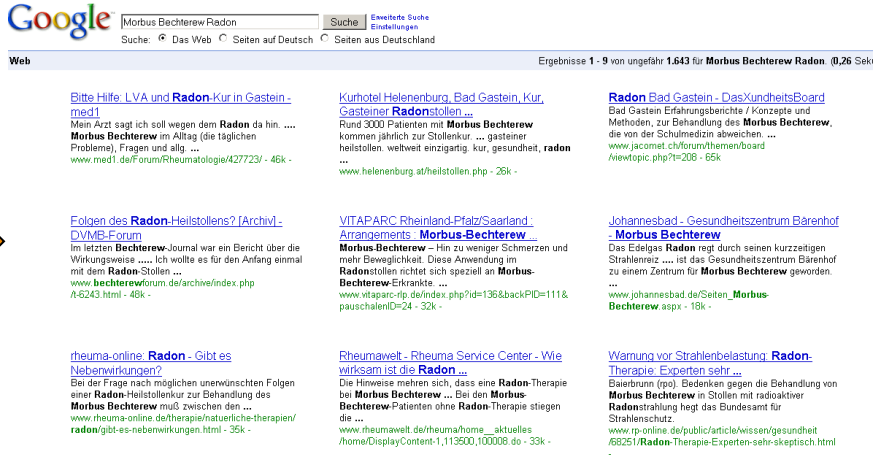
Kammerer & Gerjets (2012, *Behaviour & Information Technology*)

Two characteristics of standard search engine interfaces

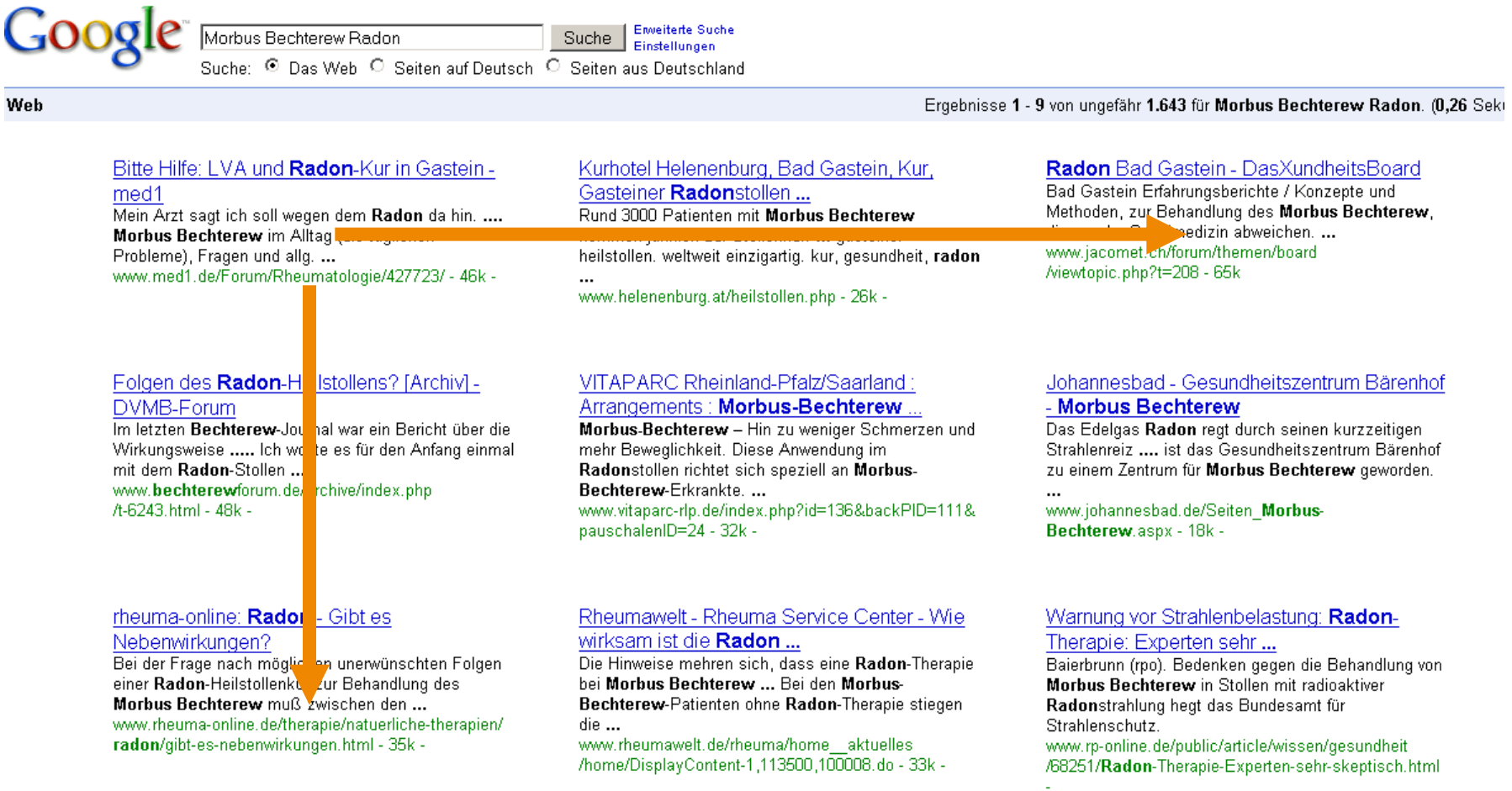
Standard interface:



Alternative interfaces:



Grid interface with reduced salience of the ranking



Two characteristics of standard search engine interfaces

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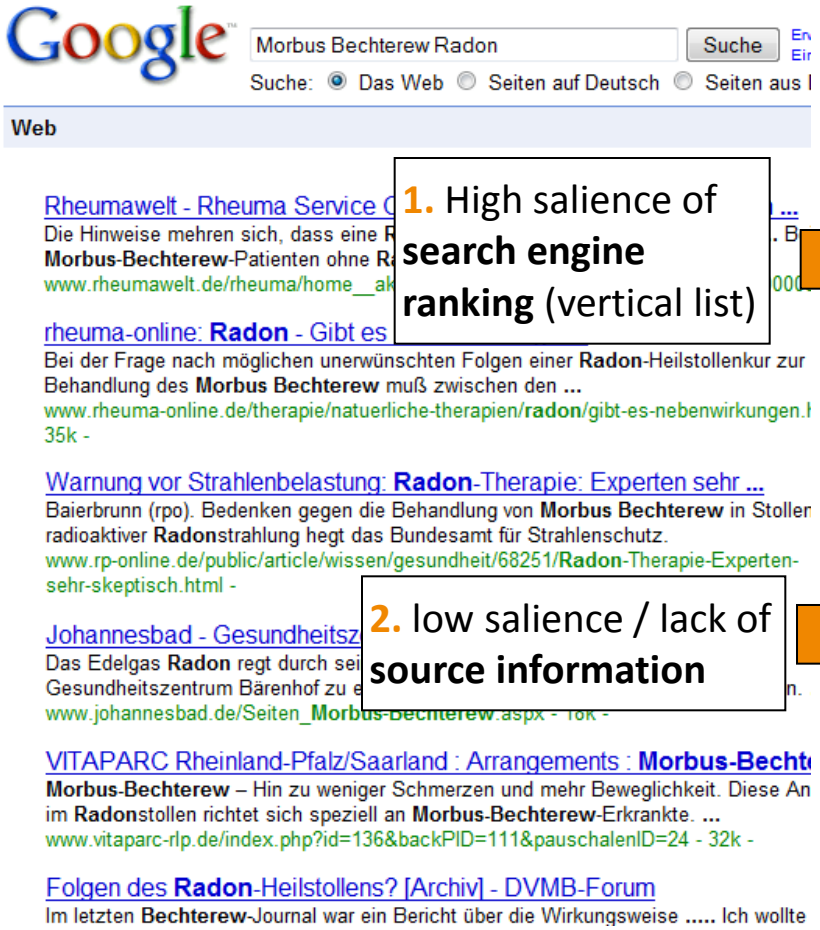
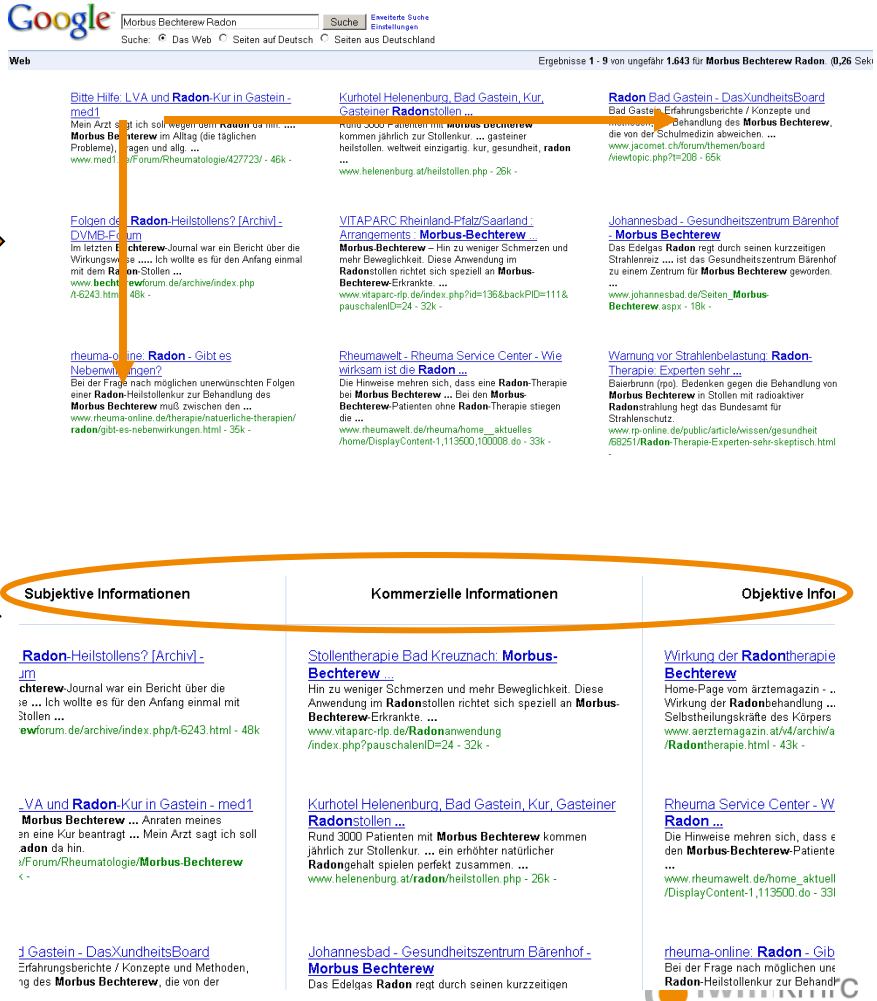


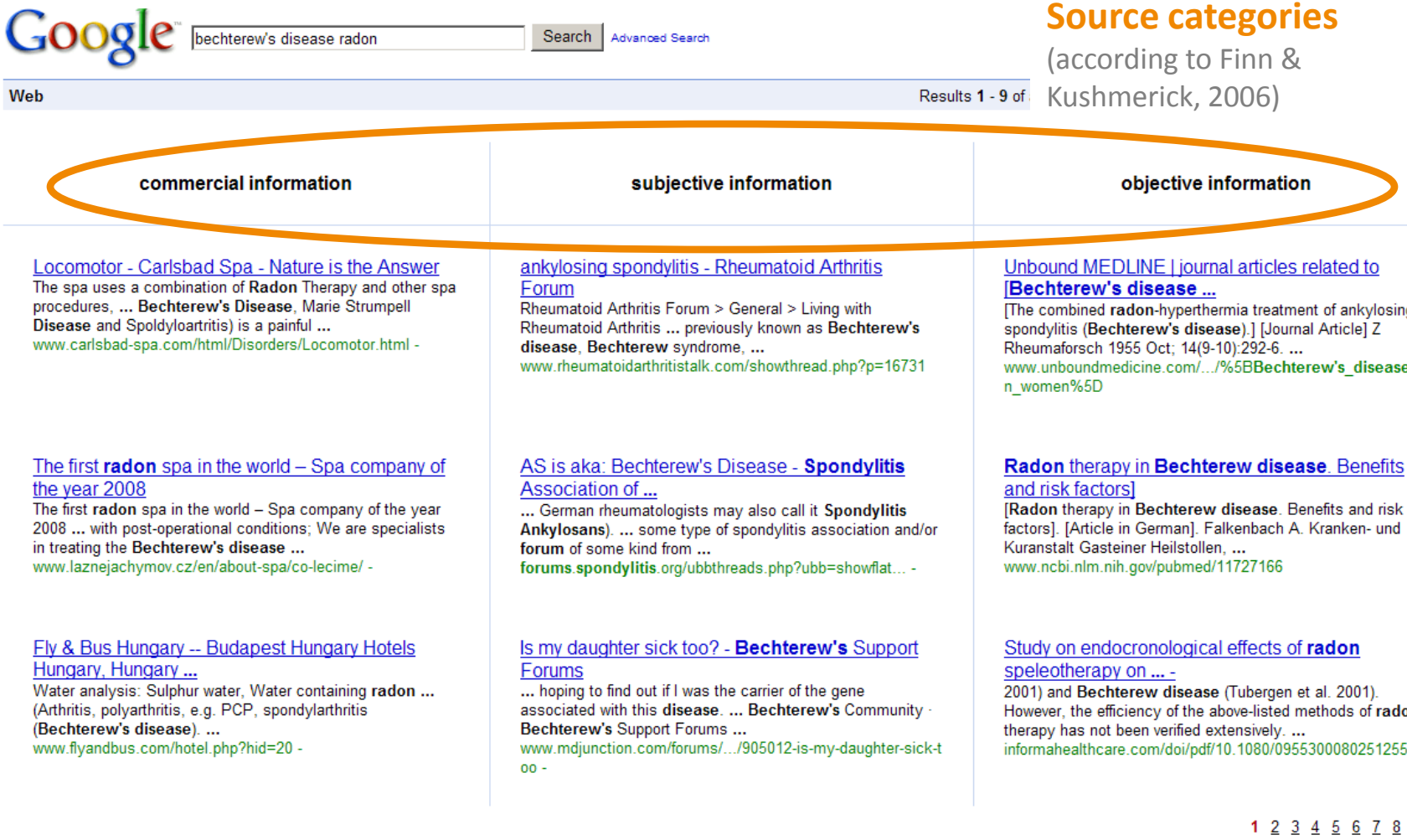
1. High salience of **search engine ranking** (vertical list)

2. low salience / lack of **source information**

Alternative interfaces:



Tabular interface with increased salience/availability of source information

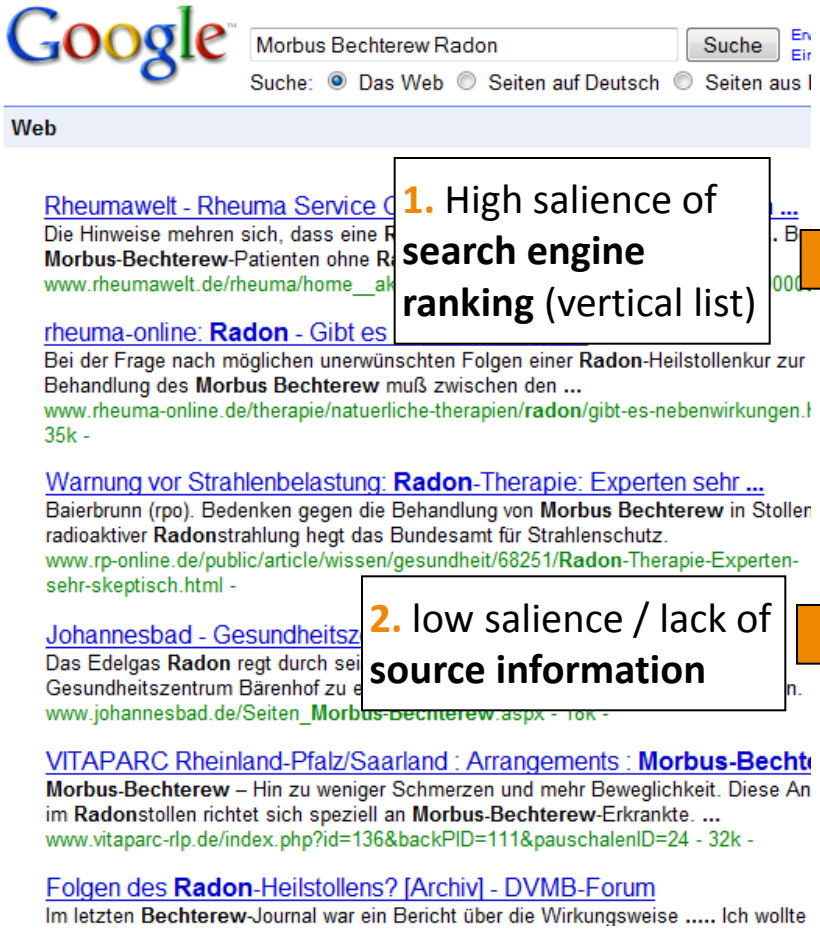


Source categories

(according to Finn & Kushmerick, 2006)

Two characteristics of standard search engine interfaces

Standard interface:



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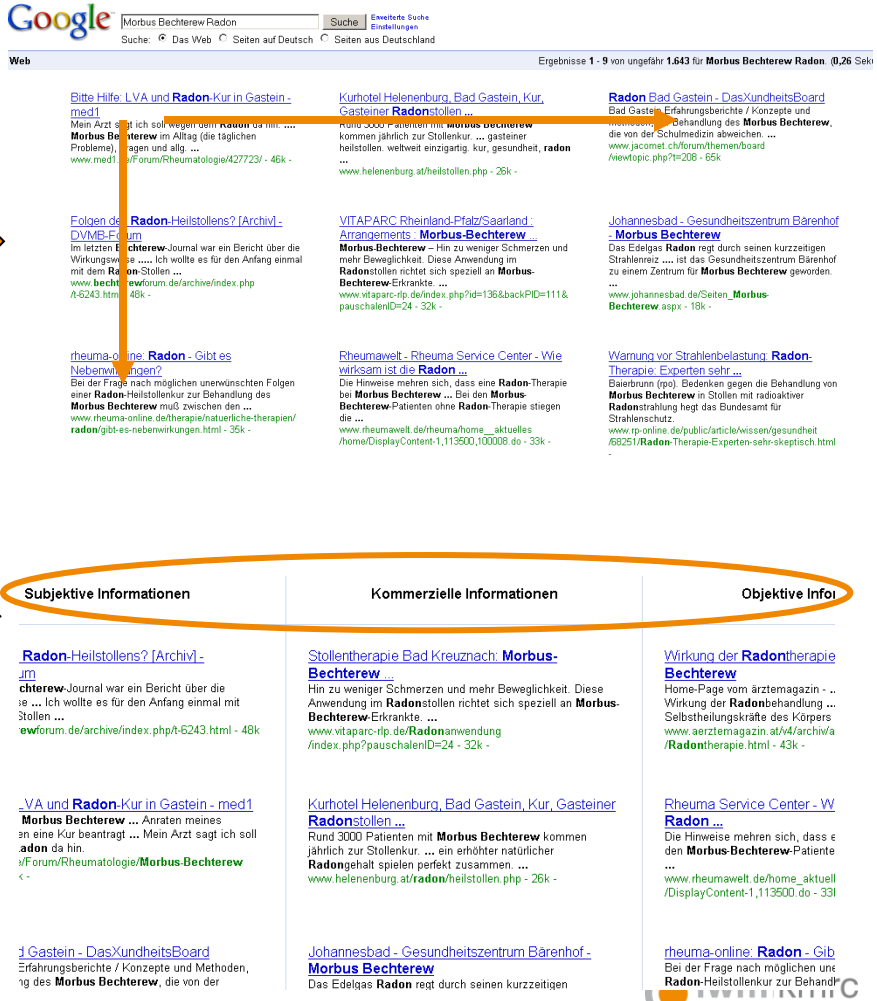
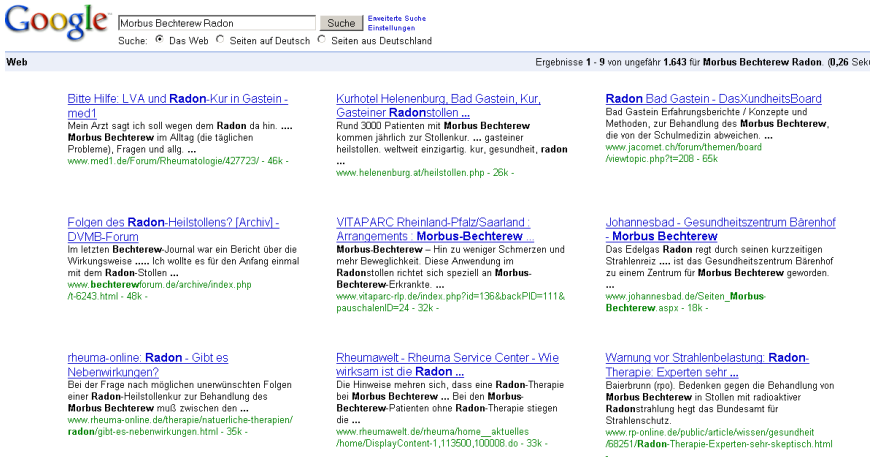
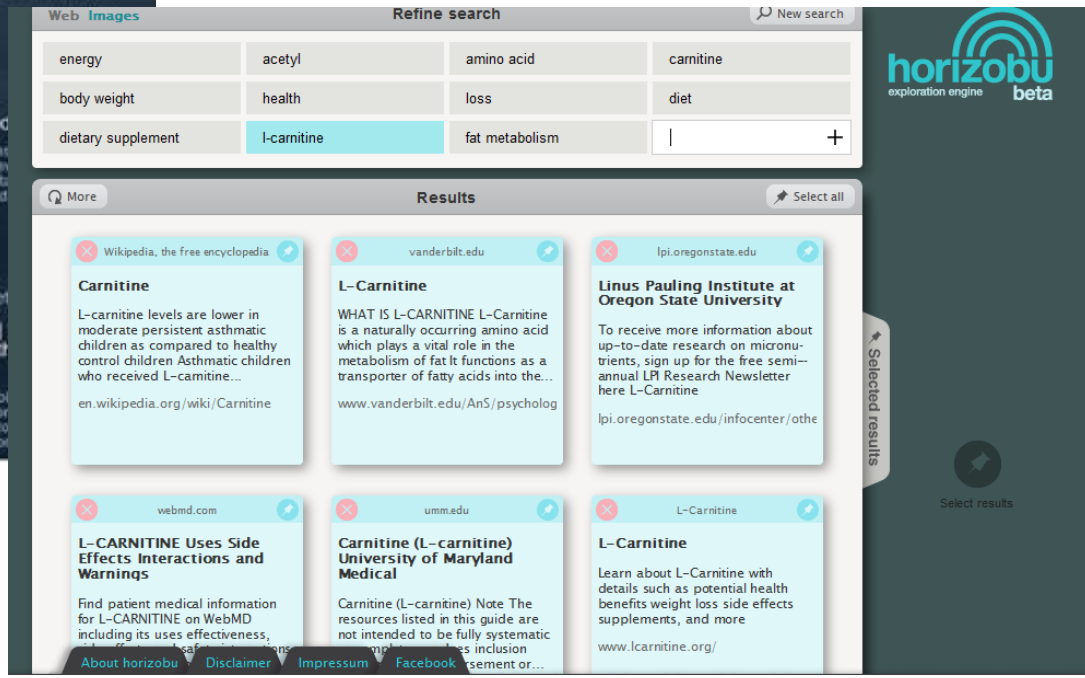


STUDY 3:
Grid interface



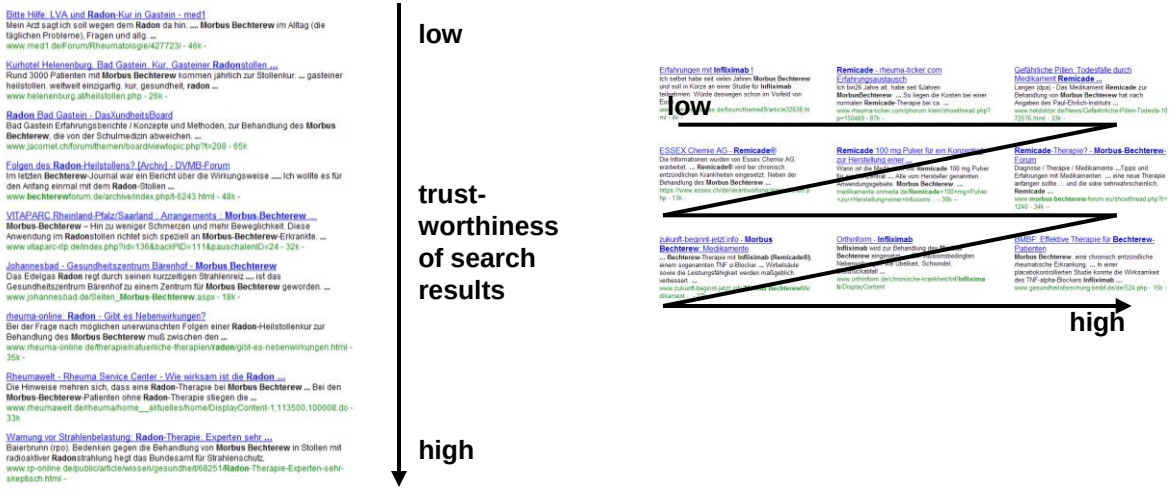
Kammerer & Gerjets (2010, *ETRA proceedings*)

Grid Interface: cf. „Viewzi“ or „Horizobu“



Web search task and participants

- **Task:** Which of 2 therapies is better to treat the Bechterew's disease?
- **Materials:** 2 mock Google pages with 9 Web pages each
- **Participants:** 40 university students (average age: 24 years)
  20 participants received list interface, 20 received grid interface



Results

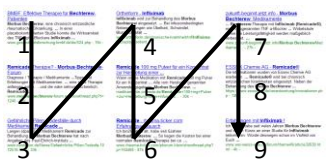
With grid interface more free exploration of search results

... than with list interface

more **heterogeneous** and **nonlinear viewing sequences** on Google page

→ viewing sequence of majority of grid-interface users

neither line-by-line nor column-by-column

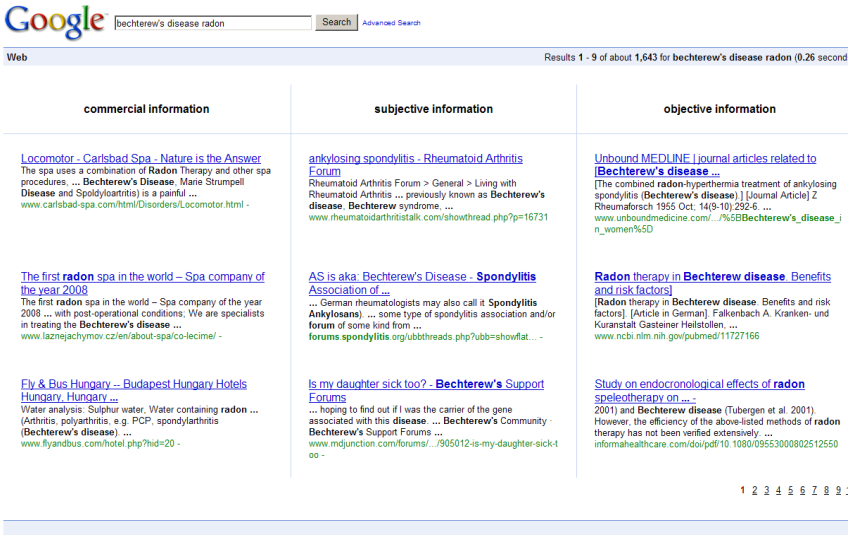


More **equal attention distribution** across all search results

→**less focus** on the search results **on the top** of the Google page

Increased selection of **most trustworthy** search results at the bottom

STUDY 3:
Tabular interface



Kammerer & Gerjets (2012, *Behaviour & Information Technology*)

Web search task and participants

- **Task:** Which of 2 therapies is better to treat the Bechterew‘s disease?
- **Materials:** 2 mock Google pages with 9 Web pages each
- **Participants:** 58 university freshmen (average age: 20.5 years)
  29 participants received list interface, 29 received tabular interface

Results

With tabular interface more source evaluations

... than with list interface

decreased attention to commercial search results

reduced selection of commercial search results

/ increased selection of objective search results

more utterances related to the type of source

Conclusion

➢A search engine interface that

- **increases the salience of source information**
- and/or **decreases the salience of the ranking of the search results**

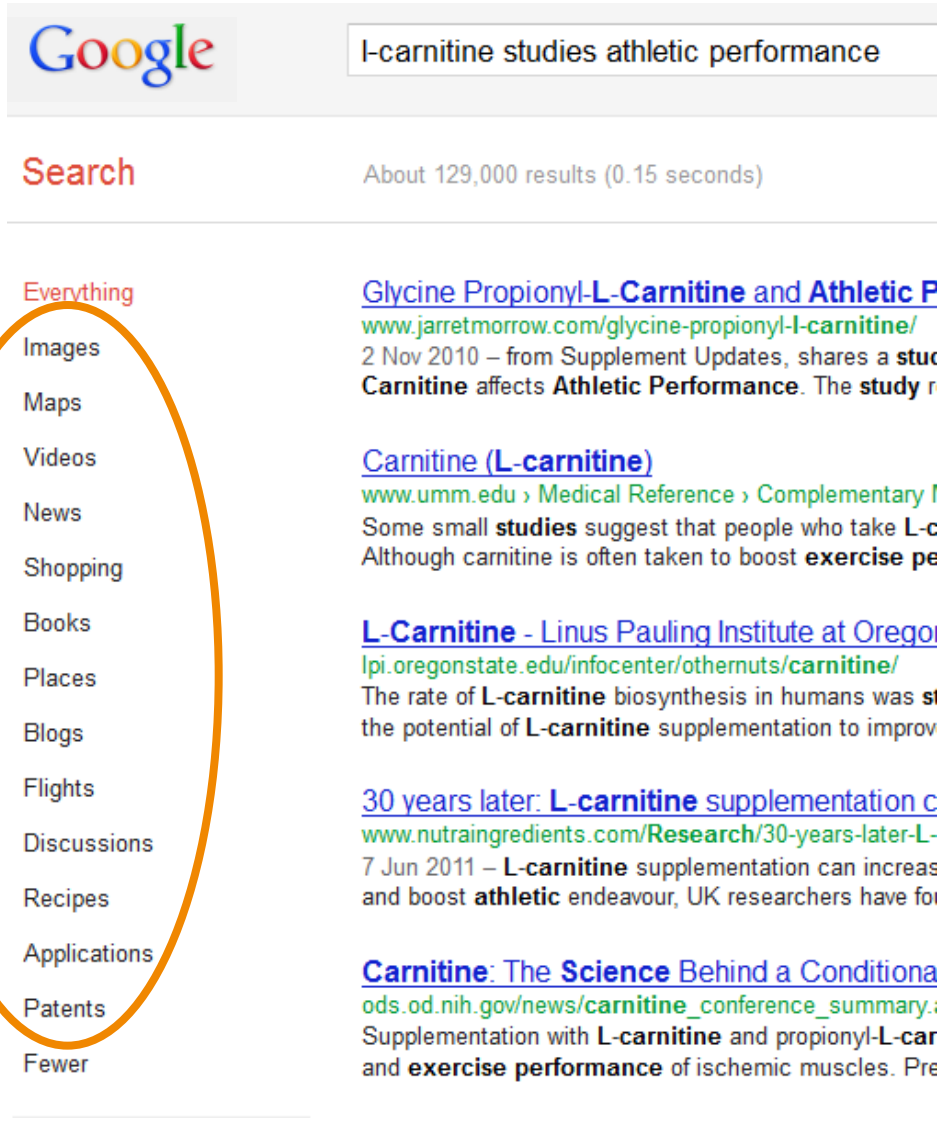
fosters the **selection of trustworthy information** during Web search

Current Google interface: Additional source information

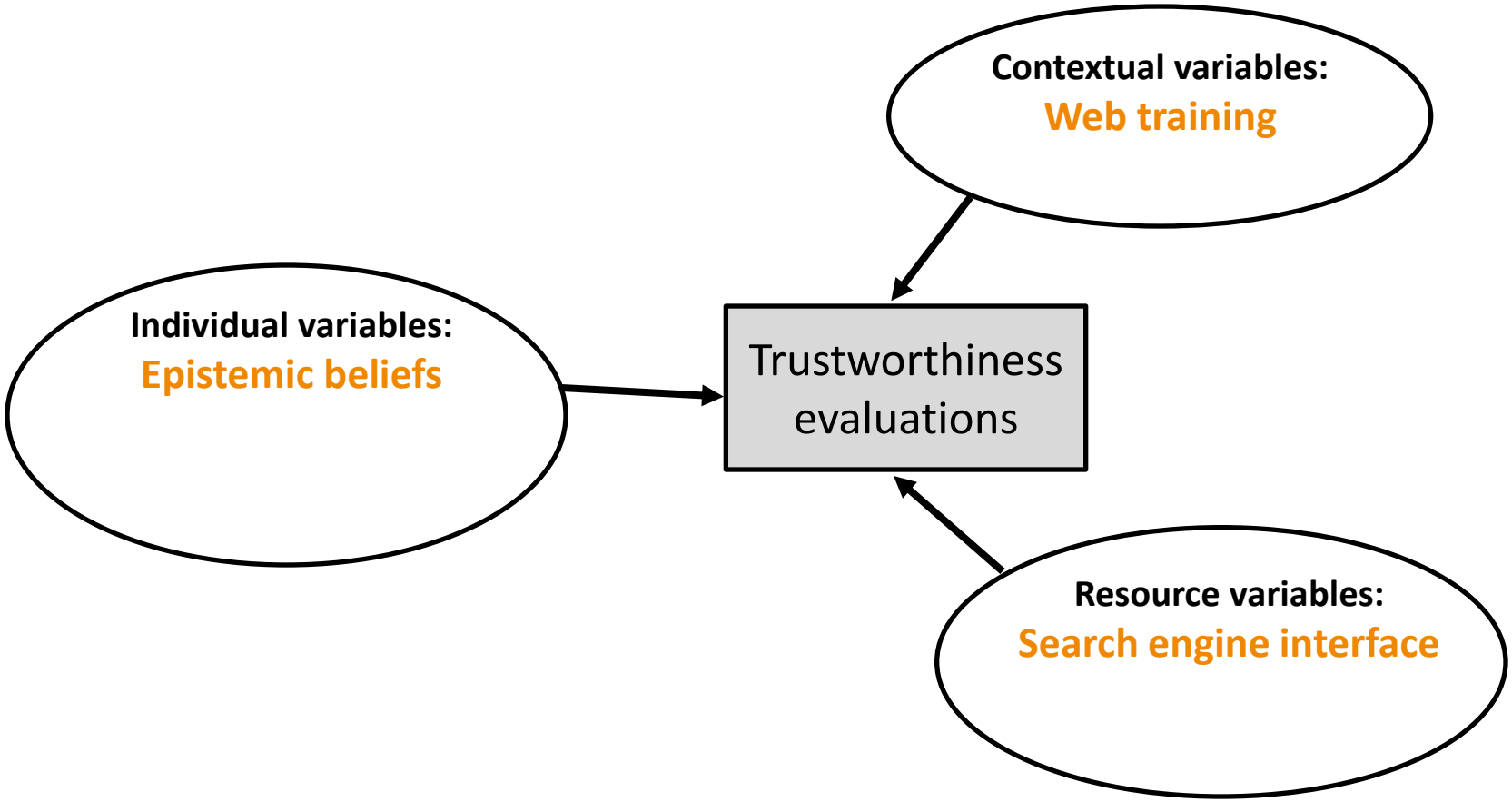
Supplemental **carnitine** and exercise
www.ajcn.org/content/72/2/618S.full
by EP Brass - 2000 - Cited by 131 - Related articles
Carnitine supplementation has been hypothesized to improve **exercise performance** ... **Carnitine** (**L**-3-hydroxytrimethylamminobutanoate) is an endogenous .... Published **studies** of **carnitine** supplementation to modify **exercise performance** in ...

L-carnitite fat burner or myth? - Mr Supplement Bodybuilding Forum
www.bodybuildingforum.com.au › Bodybuilding › Supplements
14 posts - 11 authors - 28 Nov 2011
There seems to be alot of people talking about **L-carnitine** these days and how ... Firstly, from the **studies** alone, it is suggested that we get generally get more ... and actually taking **L-carnitine** it improves **athletic performance** ...

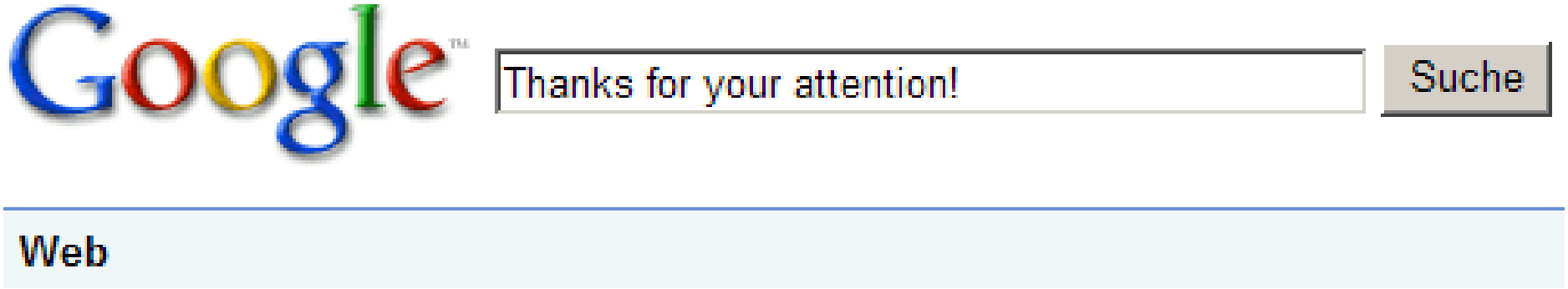
Current Google interface: Menu with filtering options



General conclusion: all three types of variables important factors



✓ **Under certain external conditions/with certain cognitive prerequisites searchers DO EVALUATE the trustworthiness of search results and of Web pages**



Contact: y.kammerer@iwm-kmrc.de

Backup

Theory of multiple documents representation

(Perfetti et al., 1999; Rouet, 2006)

Source evaluation:
- Type of source?
- Who is the author?
- Expertise? Motives?

→**Weight of arguments**