

Perceived Limits in Information Retrieval

Benno Stein
Bauhaus-Universität Weimar
webis.de

CLEF'22 · Bologna · September 5 - 8, 2022

Outline

- ① Meanings of Bias
- ② Fighting Cognitive Biases with IR
- ③ Related Research @ Webis

Meanings of Bias

“Bias” has Acquired a Derogatory Definition

A leaning of the mind; inclination; prepossession; propensity towards an object, not leaving the mind indifferent; as, education gives a bias to the mind.

[Webster's Dictionary 1913: bias]

An inclination of temperament or outlook especially; a personal and sometimes unreasoned judgment; prejudice

[Merriam-Webster 2022: bias]

Synonyms [Merriam-Webster 2022] :

Bias, Nonobjectivity, Prejudice, One-Sidedness, Tendentiousness

Synonyms [e.g. Kahneman et al. 1982, Gigerenzer et al. 2000, Roberts 2022] :

Heuristic, Rule-of thumb, Cognitive Bias

Meanings of Bias

Bias: Two Camps of Interpretation

Based on the following (and other) authorities . . .

- H. Simon (1955). A behavioral model of rational choice.
- A. Tversky, D. Kahneman (1974). Judgment under uncertainty: Heuristics and biases.
- D. Kahneman, P. Slovic, A. Tversky (1982). Judgment under uncertainty: Heuristics and biases.
- G. Gigerenzer, P. Todd, ABC Research Group (2000). Simple heuristics that make us smart.
- G. Gigerenzer, R. Hertwig, T. Pachur (2011). Heuristics: The foundation of adaptive behavior.

. . . Cleotilde Gonzalez defines:

Heuristics are the “shortcuts” that humans use to reduce task complexity in judgment and choice, and biases are the resulting gaps between normative behavior and the heuristically determined behavior.

[Oxford Handbooks Online 2017]

Meanings of Bias

Bias: Two Camps of Interpretation

Based on the following (and other) authorities . . .

- H. Simon (1955). A behavioral model of rational choice.
- A. Tversky, D. Kahneman (1974). Judgment under uncertainty: Heuristics and biases.
- D. Kahneman, P. Slovic, A. Tversky (1982). Judgment under uncertainty: Heuristics and biases.
- G. Gigerenzer, P. Todd, ABC Research Group (2000). Simple heuristics that make us smart.
- G. Gigerenzer, R. Hertwig, T. Pachur (2011). Heuristics: The foundation of adaptive behavior.

. . . Cleotilde Gonzalez defines:

Heuristics are the “shortcuts” that humans use to reduce task complexity in judgment and choice, and biases are the resulting gaps between normative behavior and the heuristically determined behavior.

[Oxford Handbooks Online 2017]

- ~ When talking about bias,
- (a) distinguish between the **procedure or algorithm** and its **effect or impact**,
 - (b) think twice before implying a negative, neutral, or positive assessment.

Meanings of Bias

Bias: A Neutral Interpretation

Heuristic:¹

A procedure, algorithm, calculus, which is not complete or not sound.

Systematic error, Bias:

The incurred consequences for not being complete or sound.

¹Various authors use the term “cognitive bias” for a heuristic that is applied by humans to judge.

HINDSIGHT BIAS



"ALTHOUGH WE GAVE HIM ALL OF THAT MONEY AND SUPPORT, I ALWAYS HAD MY DOUBTS THAT JIM COULD BUILD HIS OWN HELICOPTER."

Meanings of Bias

Connections to Statistics

Bias in algorithms

Cognitive bias

Inductive bias

Statistical bias

Bias in data

Meanings of Bias

Connections to Statistics

Bias in algorithms

Cognitive bias

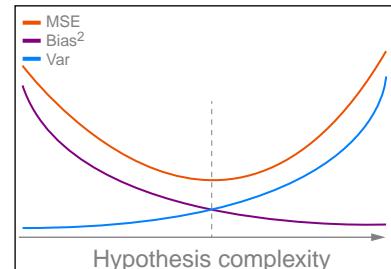
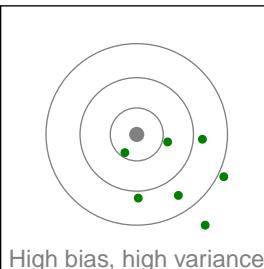
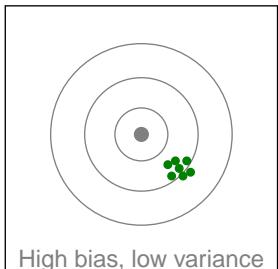
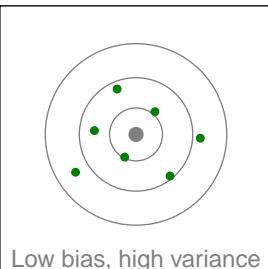
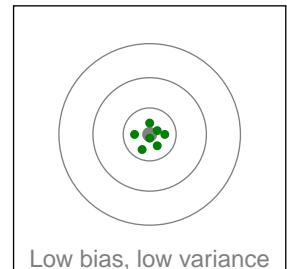
Inductive bias

Statistical bias

Bias in data

Trade unbiasedness for error reduction when learning from a sample.

E.g., bias-variance decomposition for squared error: $MSE = \text{Bias}(\hat{f})^2 + \text{Var}(\hat{f}) + \sigma^2$



Meanings of Bias

Connections to Statistics

Bias in algorithms

Cognitive bias

Inductive bias

Statistical bias

Bias in data

Trade unbiasedness for error reduction when learning from a sample.

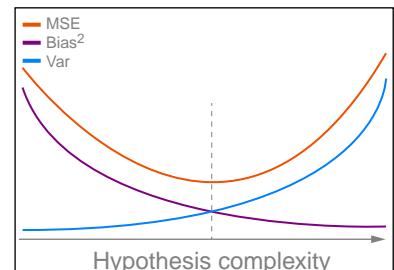
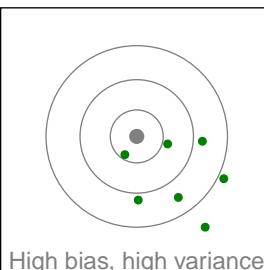
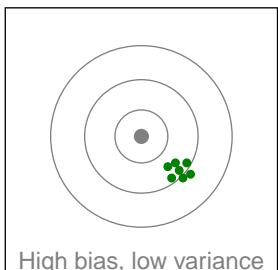
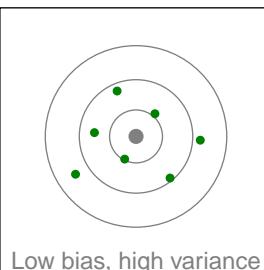
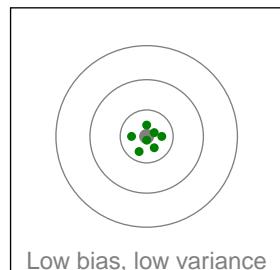
E.g., bias-variance decomposition for squared error: $MSE = \text{Bias}(\hat{f})^2 + \text{Var}(\hat{f}) + \sigma^2$

Compare to bias definition of C. Gonzales (2017):

Reduce task complexity by analyzing small samples.

Applying heuristics entail bias but reduce risk of poorly representing unseen data.

Gigerenzer et al. (2009). Homo heuristicus: Why biased minds make better inferences.



Meanings of Bias

Connections to Statistics (continued)

Bias in algorithms

Cognitive bias

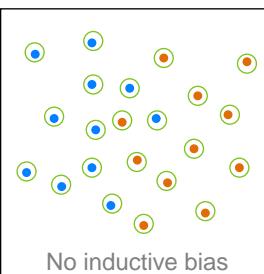
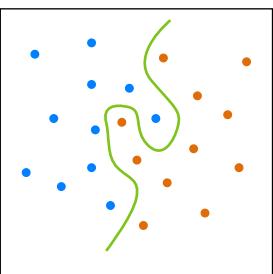
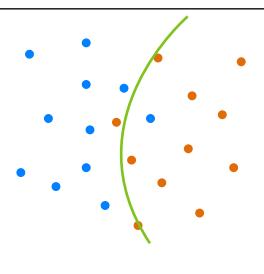
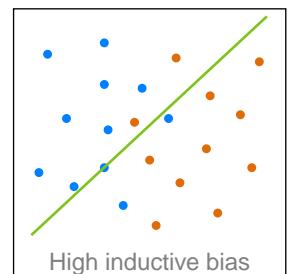
Statistical bias

Inductive bias

Bias in data

Set of assumptions used to perform induction (predict outputs for unseen inputs).

E.g., preference rules for hypotheses spaces, model parameters, data exploitation.



“Learning without bias is futile.”

- T. Mitchell (1980)
- C. Schaffer (1997)
- Dembski et al. (2009)
- G. Montañet et al. (2019)

Meanings of Bias

Connections to Statistics (continued)

Bias in algorithms

Cognitive bias

Statistical bias

Inductive bias

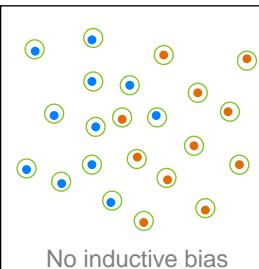
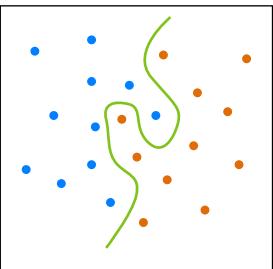
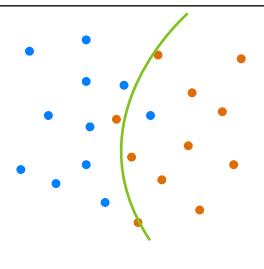
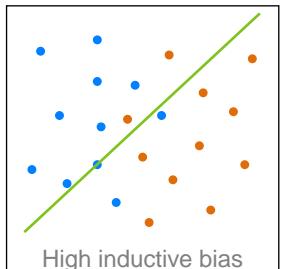
Bias in data

Set of assumptions used to perform induction (predict outputs for unseen inputs).

E.g., preference rules for hypotheses spaces, model parameters, data exploitation.

Examples of inductive biases:

- principle of parsimony, small is quick (search), nearest neighbors, maximum margin
- group equivariance, structured perception, drop out (deep learning)
- data augmentation, priors in Bayesian models (learning setup)



“Learning without bias is futile.”

- T. Mitchell (1980)
- C. Schaffer (1997)
- Dembski et al. (2009)
- G. Montañet et al. (2019)

Meanings of Bias

Connections between the Meanings of Bias (a)

Bias in algorithms

Cognitive bias

Statistical bias

Inductive bias

Bias in data

(a) Inductive and statistical bias can entail each other.

- Introducing statistical bias may be explained in terms of inductive bias.
↑
 Operationalization of inductive bias may entail statistical bias.

- Keyword: *regularization*

Example: LASSO (least absolute shrinkage and selection operator)

- Inductive bias: minimum features
↑
 Statistical bias: constrain absolute value of model parameters

Meanings of Bias

Connections between the Meanings of Bias (b)

Bias in algorithms

Inductive bias

Statistical bias

Cognitive bias

Bias in data

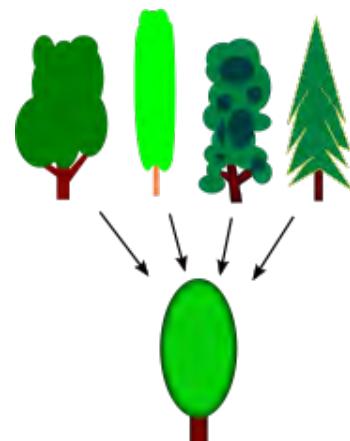
(b) Cognitive and inductive bias can entail each other.

- Ensuring inductive bias will become manifest as a cognitive bias.
↑
 Certain cognitive biases inspired inductive biases in machine learning.

- Keyword: *concept learning*

Example: CART (classification and regression tree)

- Cognitive bias: representativeness heuristic, stereotyping
↑
 Inductive bias: minimize description length



Meanings of Bias

Connections between the Meanings of Bias (continued)



(a) Inductive and statistical biases . . .

- are optimized against a (mathematical) loss function—but,
- trading bias against variance is an alchemical discipline.

(b) Cognitive biases depend on . . .

- cultural backgrounds,
- the zeitgeist,
- they are individually experienced, and, in particular,
- there is no unified value system for their mathematical quantification.

Meanings of Bias

Connections between the Meanings of Bias (continued)



(a) Inductive and statistical biases ...

- are optimized against a (mathematical) loss function—but,
- trading bias against variance is an ~~chemical~~ discipline.

(b) Cognitive biases depend on

- cultural backgrounds,
- the zeitgeist,
- they are individually experienced, and, in particular,
- there is no unified value system for their mathematical quantification.

Source of misunderstandings

Meanings of Bias

Connections to Information Retrieval

Bias in algorithms

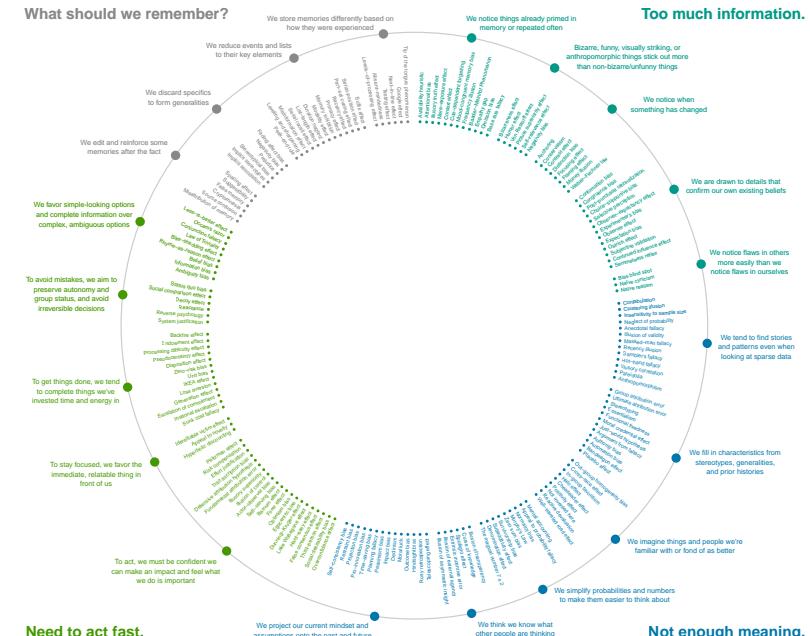
Cognitive bias

Inductive bias

Statistical bias

Bias in data

Extent to which IR is challenged.



Meanings of Bias

Connections to Information Retrieval

Bias in algorithms

Cognitive bias

Bias in data

Inductive bias

Statistical bias



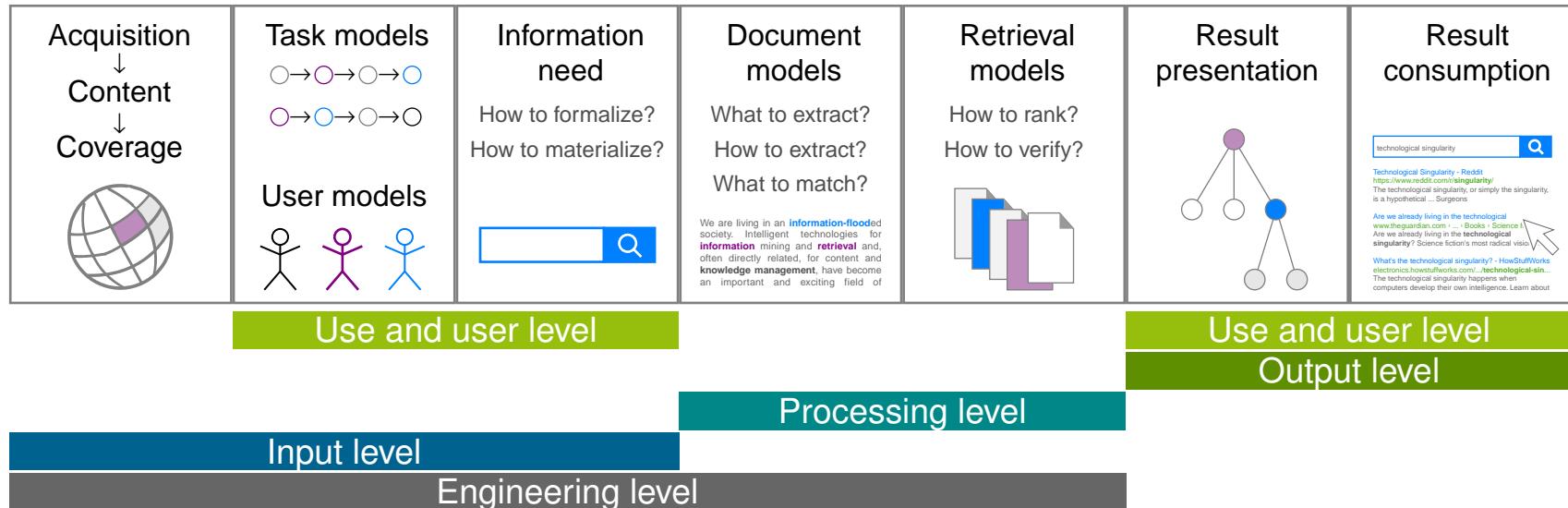


Fighting Cognitive Biases with IR

Fighting Cognitive Biases with IR

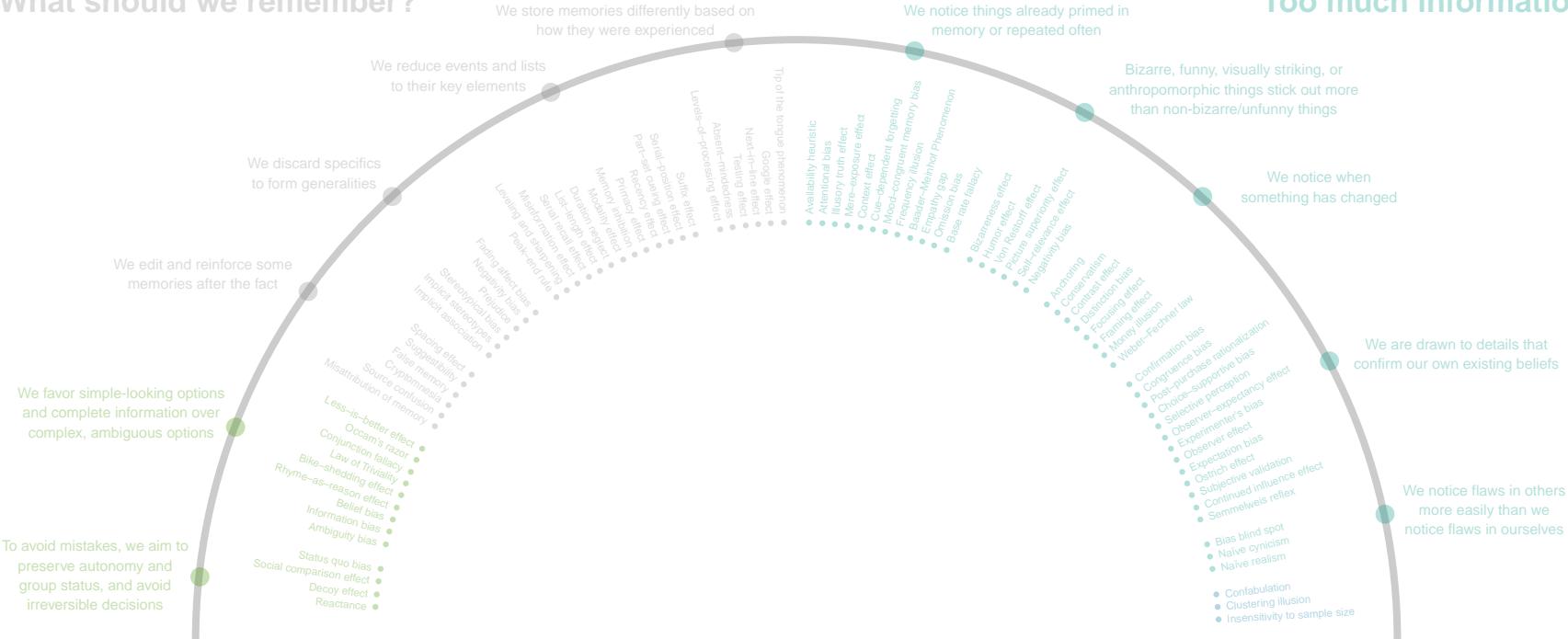
The Heart of IR is Evaluation

- Brenda Dervin, Michael Nilan (1986). Information needs and uses.
- * Tefko Saracevic (1995). Evaluation of evaluation in information retrieval.
- Ellen Voorhees (2001). The philosophy of information retrieval evaluation.
- William Webber (2009). When did the Cranfield tests become the “Cranfield paradigm”?



Too much information.

What should we remember?

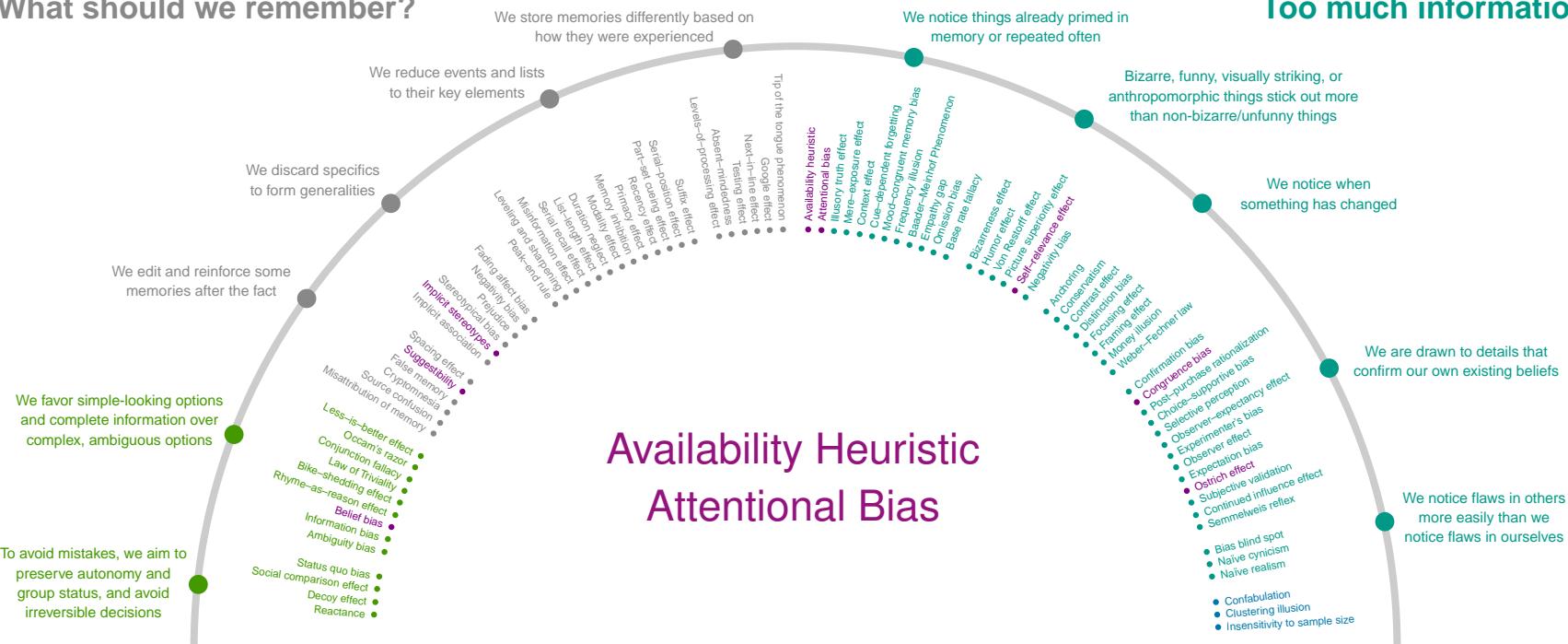


Acquisition ↓ Content ↓ Coverage	Task models User models	Information need	Document models	Retrieval models	Result presentation	Result consumption
<p>We are living in an information-flooded society. Intelligent technologies for information mining and retrieval and, often directly related, for content and knowledge management, have become an important and exciting field of</p>	<p>○ → ○ → ○ → ○ ○ → ○ → ○ → ○</p>	<p>How to formalize? How to materialize?</p>	<p>What to extract? How to extract? What to match?</p>	<p>How to rank? How to verify?</p>		<p>Technological singularity - Reddit https://www.reddit.com/r/singularity/ The technological singularity, or simply the singularity, is a hypothetical point in time</p> <p>Are we already living in the technological singularity? www.theguardian.com/technology/2013/jul/17/are-we-already-living-in-the-technological-singularity Science fiction's most radical vision What's the technological singularity? - HowStuffWorks electronics.howstuffworks.com/technology-singularity.htm The technological singularity happens when computers develop their own intelligence. Learn about</p>

SOTA: Contextualization of IR deficits (not countermeasures) in the cognitive bias codex.

- Leif Azzopardi (2021). Cognitive biases in search: a review and reflection of cognitive biases in information retrieval.

What should we remember?



Availability Heuristic Attentional Bias

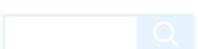
Acquisition
↓
Content
↓
Coverage



Task models
→○→ →○
○→○→ →○

User models
○○○

Information need
How to formalize?
How to materialize?



Document models
What to extract?
How to extract?
What to match?

We are living in an **Information-flooded** society. Intelligent technologies for information mining and retrieval and, often directly related, for content and knowledge management, have become an important and exciting field of

Retrieval models
How to rank?
How to verify?



Result presentation
○○○

Result consumption
Technological Singularity - Health
<https://www.ncbi.nlm.nih.gov/singularity/>
Technological singularity, or simply the singularity, is a hypothetical point

Are we already living in the technological singularity? - Health
<https://www.ncbi.nlm.nih.gov/singularity/>
Are we already living in the technological singularity? - Science
<https://www.ncbi.nlm.nih.gov/singularity/>
Will we ever live in the technological singularity? - Technology
<https://www.ncbi.nlm.nih.gov/singularity/>
Components overlap their own intelligence. Learn about

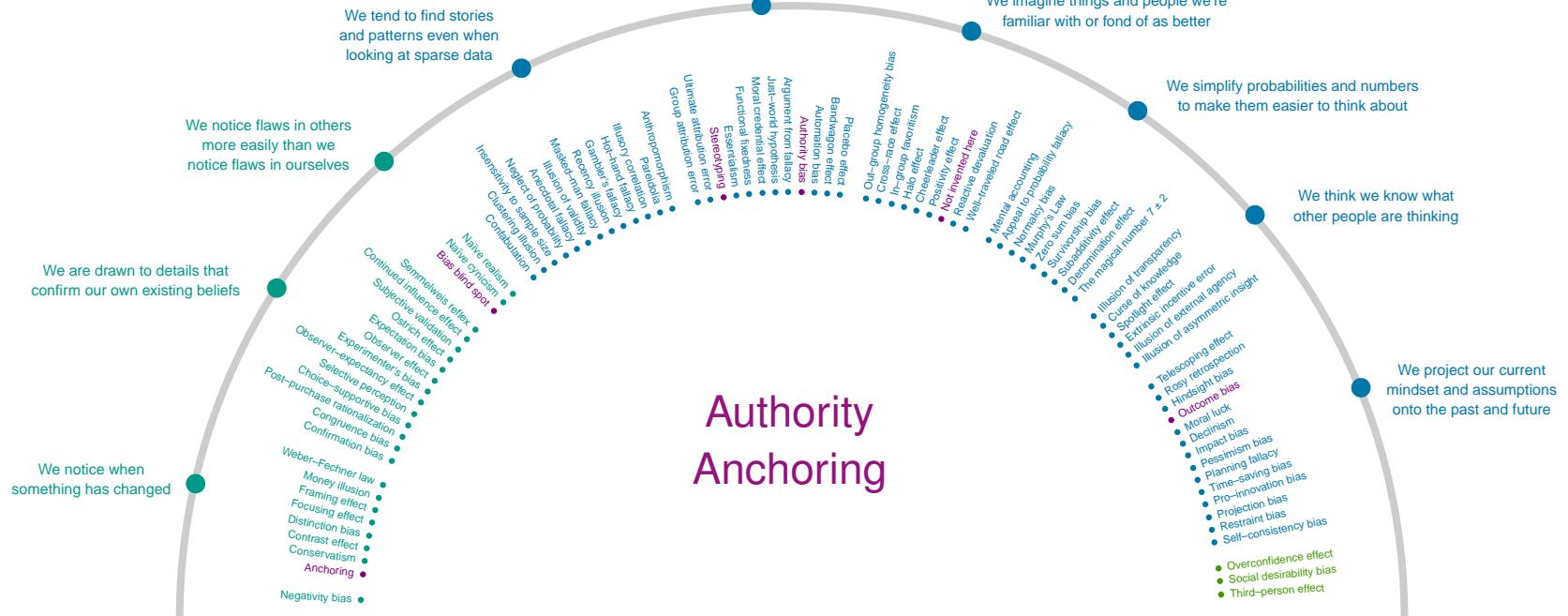
IR systems can assist in systematic and fair review.

- M. Grossman, G. Cormack, A. Roegiest (2016). TREC 2016 total recall track overview.
- A. Olteanu et al. (2021). FACTS-IR: Fairness, accountability, confidentiality, transparency, and safety in IR.

Too much information.

We fill in characteristics from stereotypes, generalities, and prior histories

Not enough meaning.

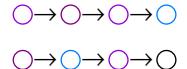


Authority Anchoring

Acquisition
↓
Content
↓
Coverage



Task models



User models



Information need

How to formalize?
How to materialize?



Document models

What to extract?
How to extract?
What to match?

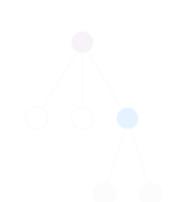
We are living in an Information-flooded society. Intelligent technologies for information mining and retrieval and, often directly related, for content and knowledge management, have become an important and exciting field of

Retrieval models

How to rank?
How to verify?



Result presentation



Result consumption

Technological Singularity - Hype
<https://www.ncbi.nlm.nih.gov/singularity/>, or simply the singularity, is a hypothetical singularity.

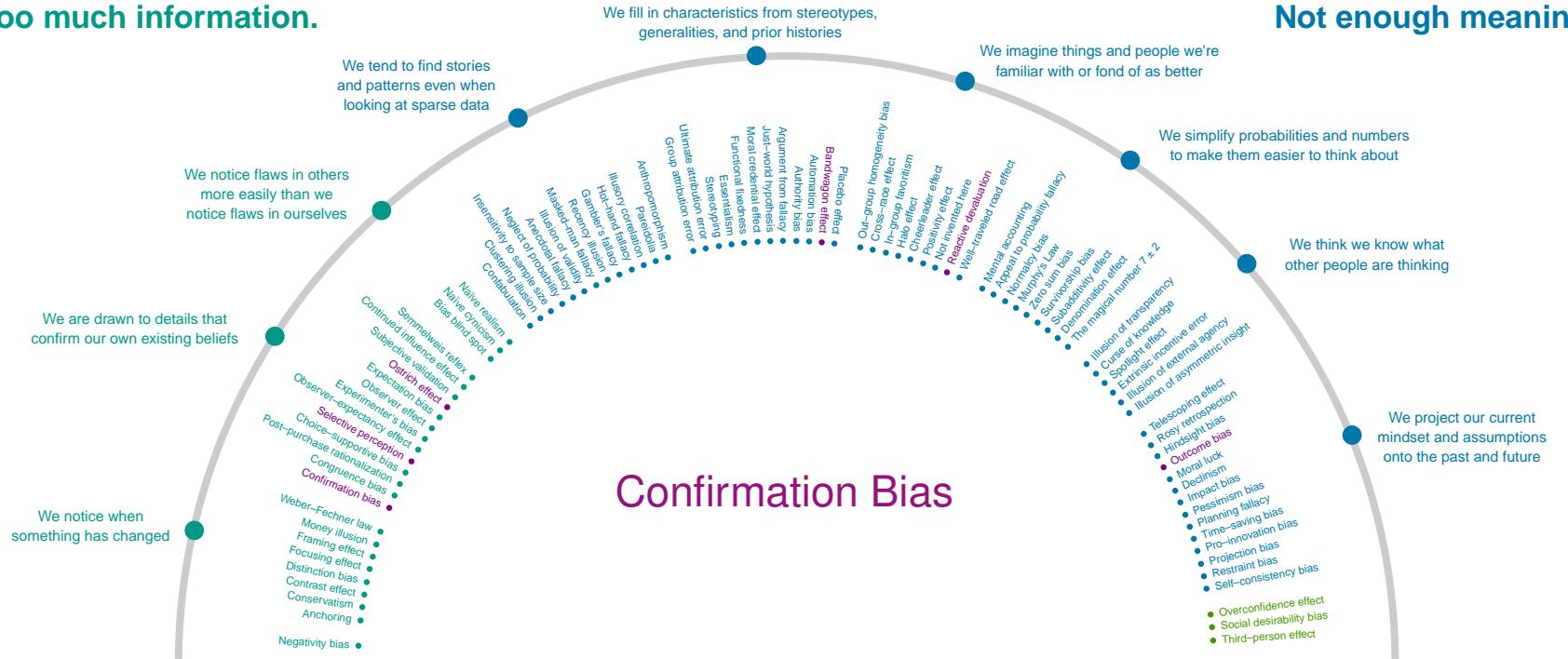
Are we already living in the technological singularity? Are we still in the pre-singularity phase? Science fiction's most radical vision.

Will we ever live in the technological singularity? Neurodivergent individuals, neurotypical individuals, and AI systems differ in their own intelligence. Learn about

User models can incorporate biases.

- T. Joachims et al. (2005). Accurately interpreting clickthrough data as implicit feedback.
- N. Chen et al. (2022). Constructing better evaluation metrics by incorporating the anchoring effect into the user model

Too much information.



Confirmation Bias

Acquisition
↓
Content
↓
Coverage



Task models
○ → ○ → ○ → ○
○ → ○ → ○ → ○



Information need
How to formalize?
How to materialize?



Document models
What to extract?
How to extract?
What to match?

We are living in an Information-flooded society. Intelligent technologies for information mining and retrieval and, often directly related, for content and knowledge management, have become an important and exciting field of

Retrieval models
How to rank?
How to verify?



Result presentation



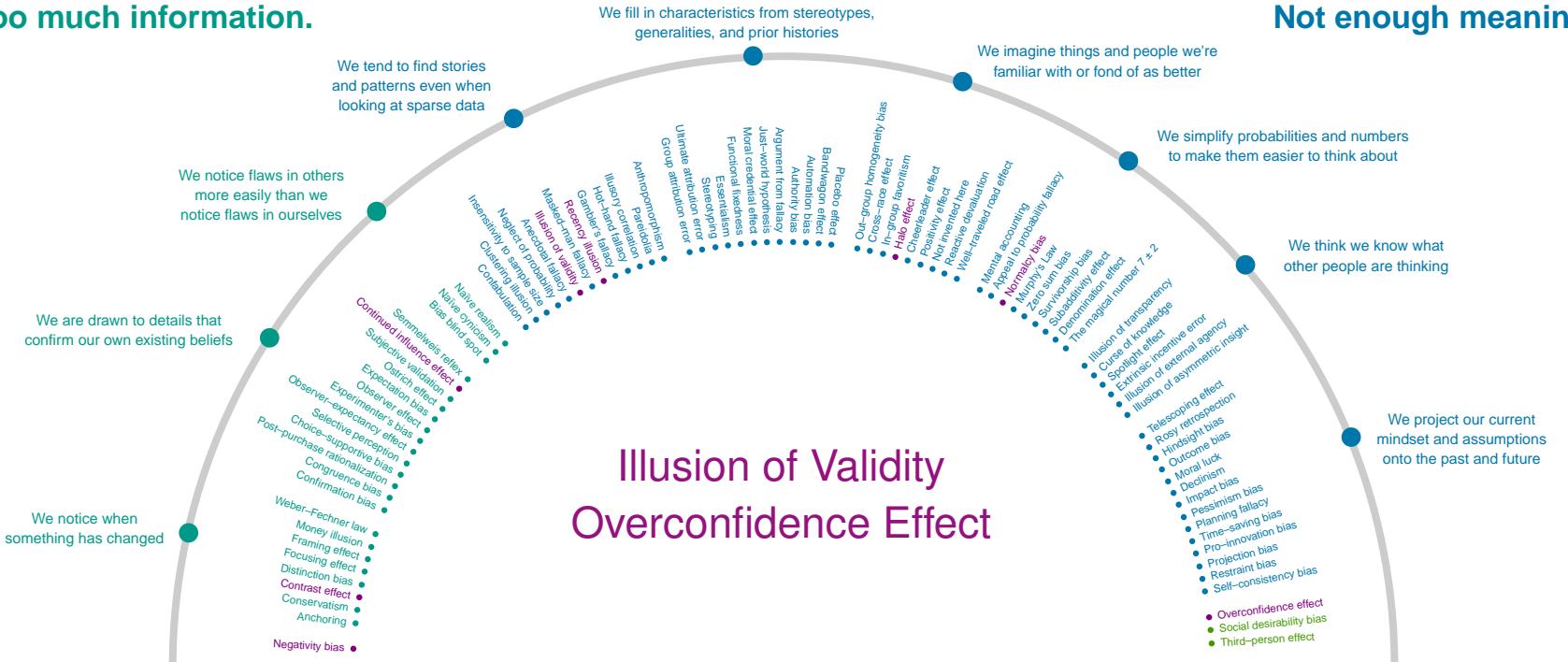
Result consumption



Query assistance (auto-completion, suggestion) can nudge searchers towards critical queries.

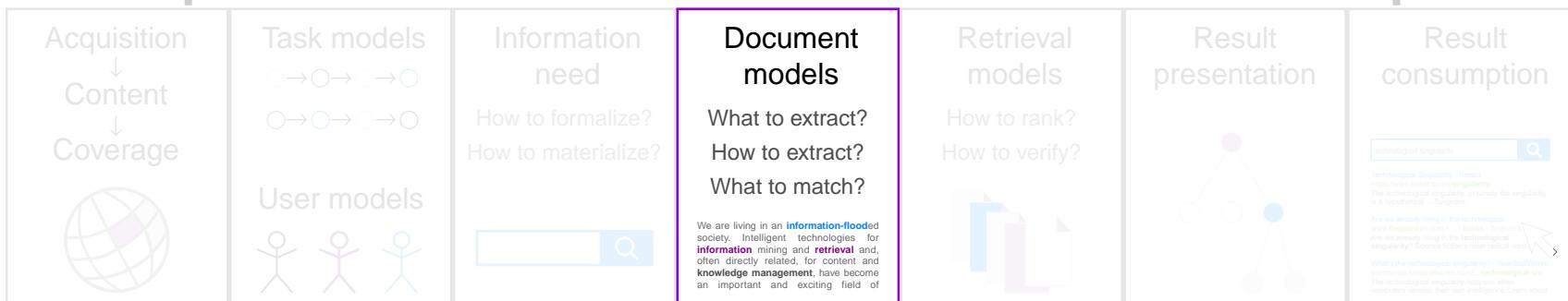
- Y. Yamamoto, T. Yamamoto (2018). Query priming for promoting critical thinking in web search.
- S. Pothirattanachaikul et al. (2020). Analyzing the effects of “People also ask” on search behaviors and beliefs.

Too much information.



Not enough meaning.

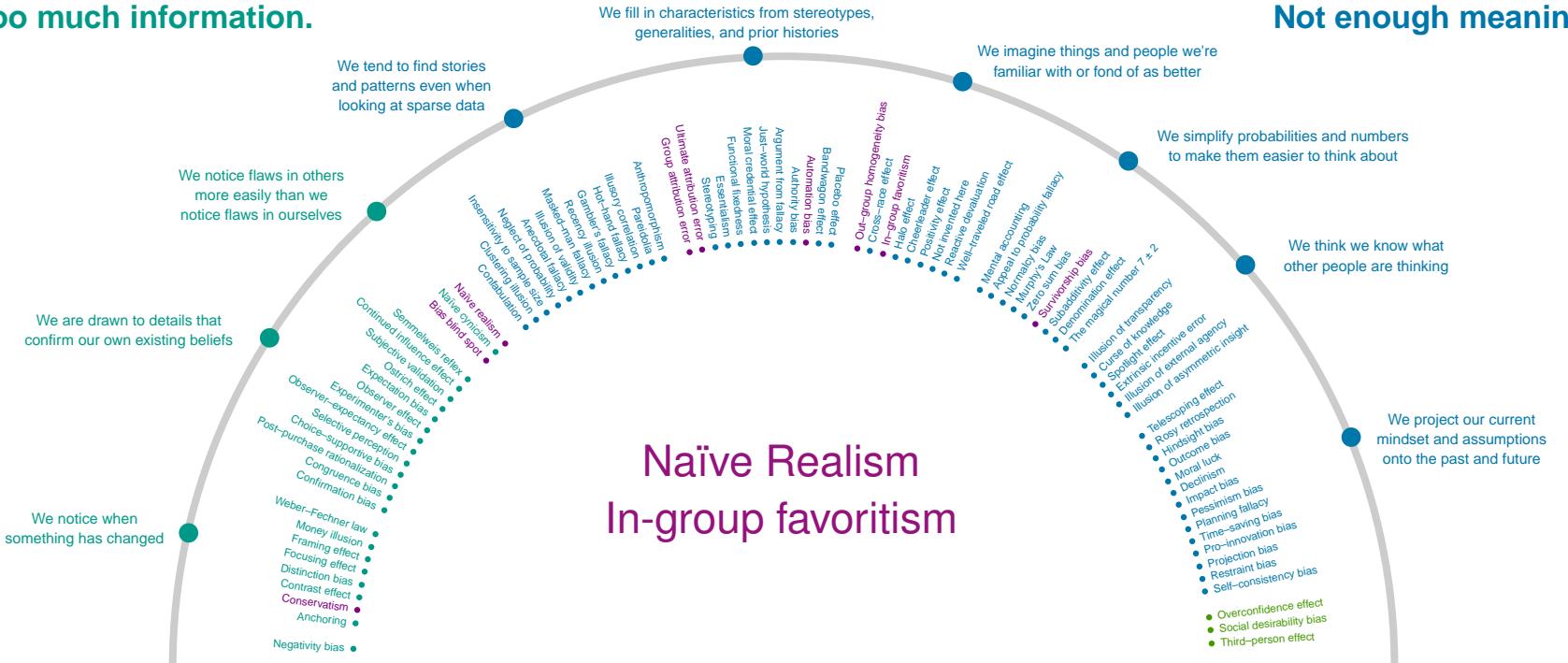
Illusion of Validity Overconfidence Effect



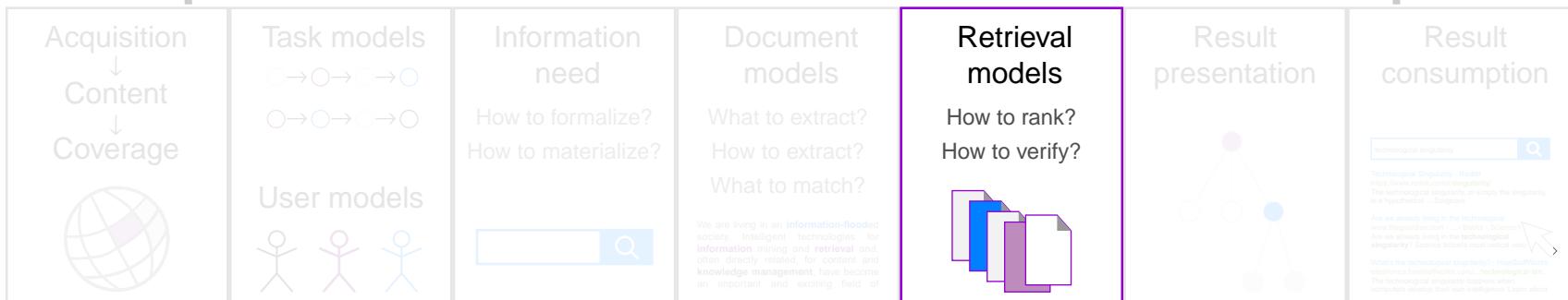
IR systems can assist in checking claim veracity.

- P. Nakov et al. (2022). Overview of the CLEF'22 CheckThat! lab task on detecting previously fact-checked claims.
- Y. Qu et al. (2021). Human-in-the-loop systems for truthfulness: A study of human and machine confidence.

Too much information.



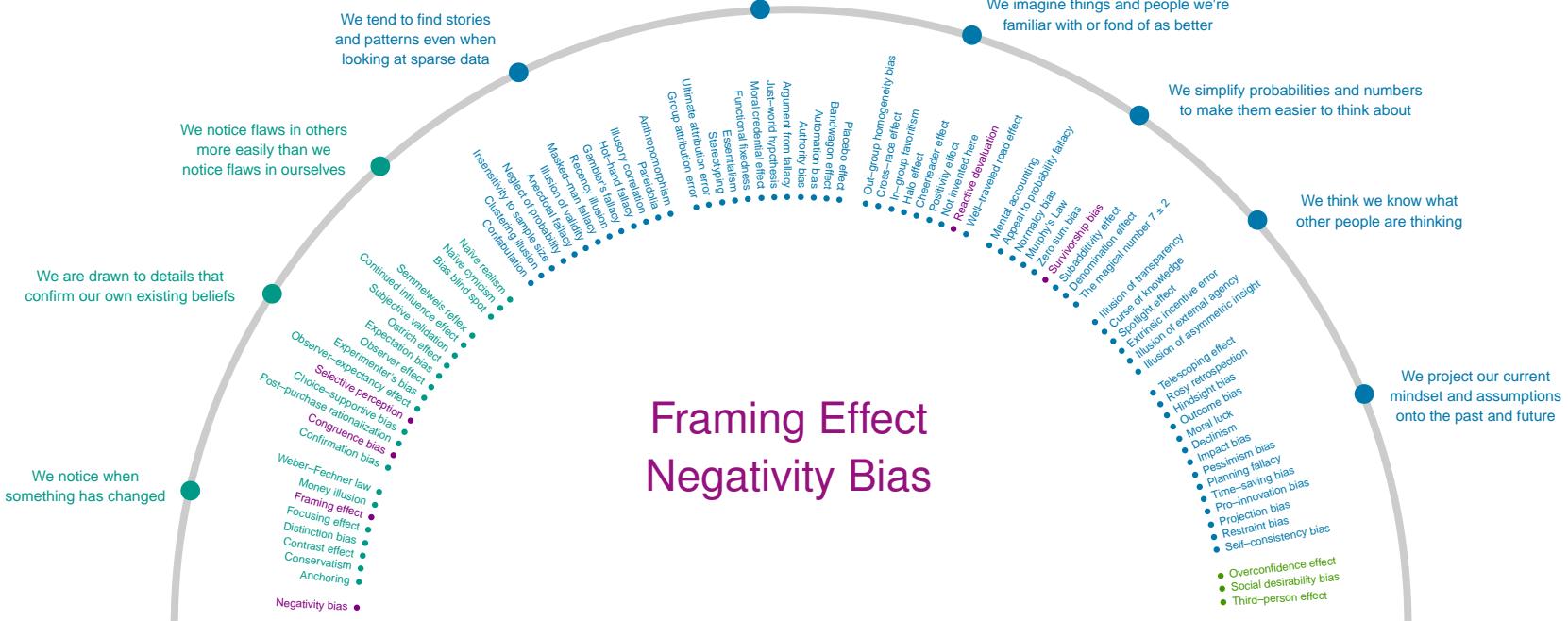
Not enough meaning.



Result lists can be tweaked to reflect normative distributions.

- M. Ekstrand et al. (2022). Overview of the TREC'21 fair ranking track.
- P. Sapiezynski et al. (2019). Quantifying the impact of user attention on fair group representation in ranked lists.

Too much information.



Framing Effect Negativity Bias

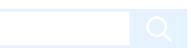
Acquisition
↓
Content
↓
Coverage



Task models
○ → ○ → ... → ○
○ → ○ → ... → ○



Information need
How to formalize?
How to materialize?



Document models
What to extract?
How to extract?

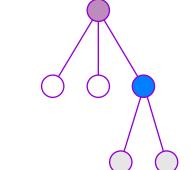
What to match?

We are living in an Information-flooded society. Intelligent technologies for information mining and retrieval and, often directly related, for content and knowledge management, have become an important and exciting field of

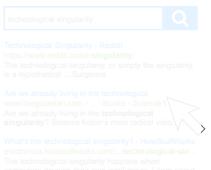
Retrieval models
How to rank?
How to verify?



Result presentation



Result consumption

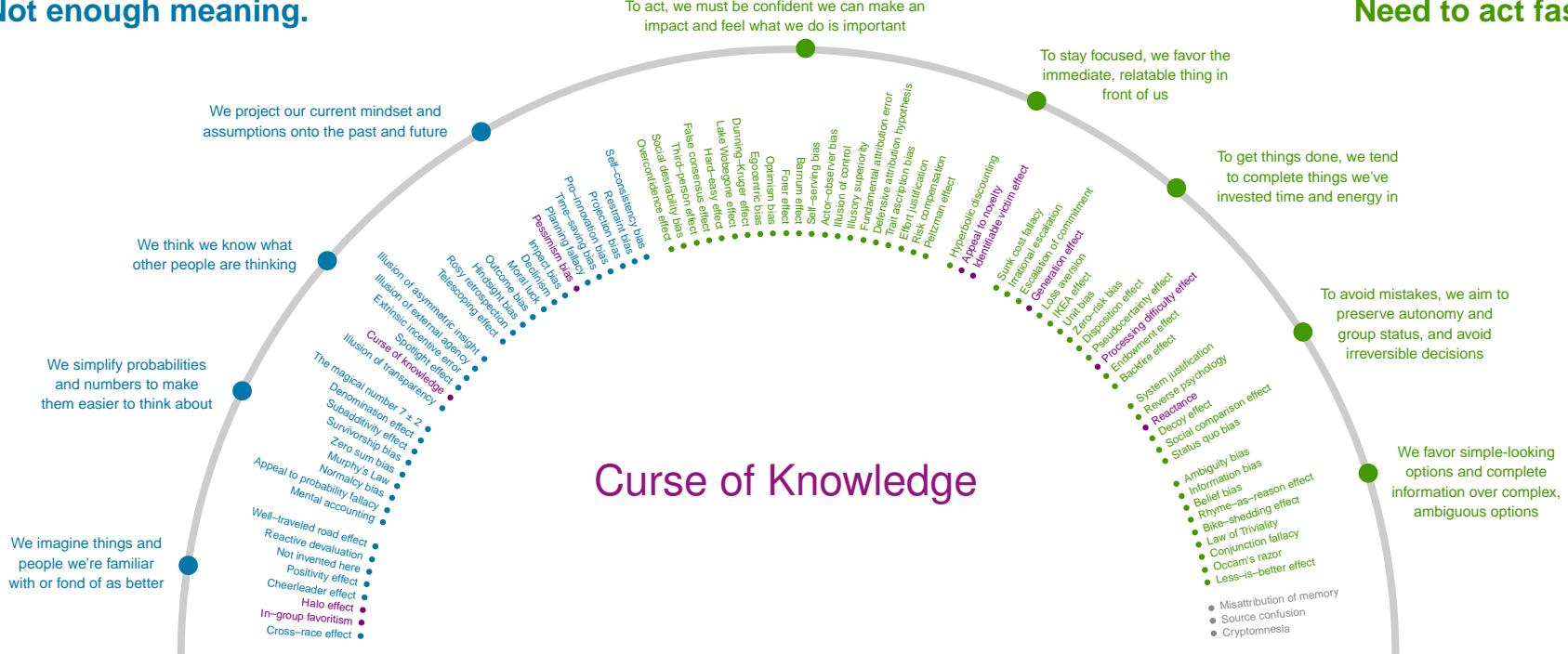


Result captions (title + snippet + URL in a SERP) can be changed to influence user behavior.

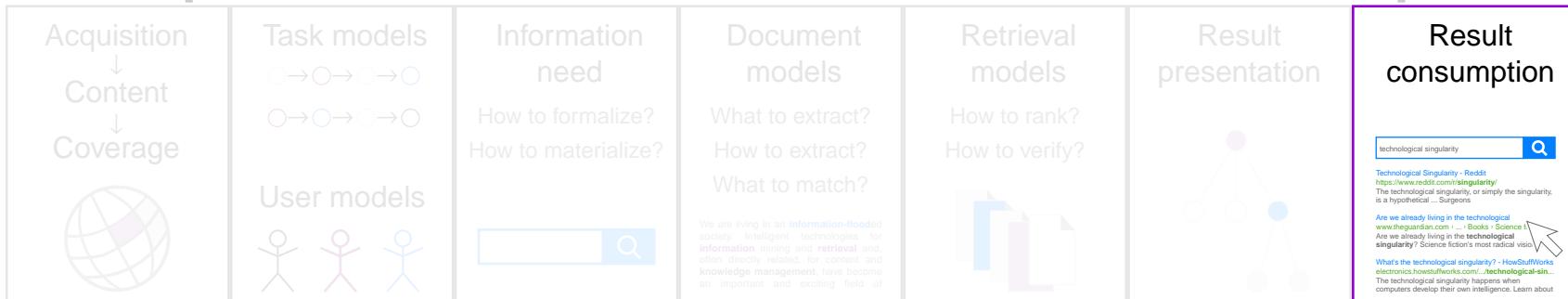
- C. Clarke et al. (2007). The influence of caption features on clickthrough patterns in web search.
- R. W. White (2013). Beliefs and biases in web search.

Not enough meaning.

Need to act fast.



Curse of Knowledge



Complex documents can be simplified to make them more accessible.

- L. Ermakova et al. (2022). Overview of the CLEF'22 SimpleText task on query biased simplification of scientific texts.
- M. Maddela et al. (2021). Controllable text simplification with explicit paraphrasing.



Related Research @ Webis



Cat / Lifespan

15 years

Domesticated



Feedback

How Long Do Cats Live? | petMD

www.petmd.com/blogs/thedailyvet/.../how_long_do_cats_live-11496 ▾
Aug 8, 2011 - This question, typically rephrased as, "How long will my cat (or d horse, etc.) live," is something veterinarians hear on a daily basis.

Aging Cats: Changes, Health Problems, Food, and More | WebMD

pets.webmd.com/cats/guide/aging-cats-qa ▾
WebMD veterinarian experts answer common questions cat owners have ... What can you expect as your cat ages? ... Q: How long do cats usually live?

What Is the Life Span of the Common Cat? - Cats - About.com

cats.about.com/About_Home/Cats ▾
How long is the common cat supposed to live? Questions and answers from the Guide to Cats.

Ageing - How long do cats live | Adelaide Animal Hospital

adelaidevet.com.au/pet.../how-long-do-cats-live-ageing-and-your-feline ▾
Life expectancy depends on many things, including one important factor - whether the cat is an indoor-only cat or an outdoor cat. Indoor cats generally live from 12-18 years. Many may live to be in their early 20s. The oldest reported cat lived to be a

Cat

Animal

The domestic cat or the feral cat is a small, typically furry, carnivorous mammal. They are often called house cats when kept as indoor pets or simply cats when there is no need to distinguish them from other felids and felines. [Wikipedia](#)

Scientific name: Felis catus

Lifespan: 15 years (Domesticated)

Gestation period: 64 – 67 days



How does Google know when my cat will die?

23. September 2015 by Konrad Lischka, in [Blog @en](#)



How long do cats live? Exactly 15 years says Google.com. Not "10 to 15", not "about 15 years", but "15 years". That sounds like a definitive answer. It's Google's answer to the search query "[How long do cats live](#)".

Related Research @ Webis

Dilemma of the Direct Answer

“A user’s choice between convenience and diligence when using an information retrieval system.”

What is the speed of light?

the speed of light =

299 792 458 m / s

[More info](#)

Speed of light

Unit of speed



The speed of light in vacuum, commonly denoted c , is a universal physical constant important in many areas of physics. Its exact value is defined as 299792458 metres per second. [Wikipedia](#)

[About Featured Snippets](#) [Feedback](#)

What can be done about overpopulation?
[More info](#)

5 possible solutions to overpopulation

- Empower women. Studies show that women with access to reproductive health services find it easier to break out of poverty, while those who work are more likely to use birth control. ...
- Promote family planning. ...
- Make education entertaining. ...
- Government incentives.

Jul 10, 2017

 <https://www.positivenews.news> › society

[5 possible solutions to overpopulation - Positive News - Positive News](#)

[About Featured Snippets](#) [Feedback](#)

What is the impact of CRISPR/Cas9?

The discovery of **CRISPR/Cas9**, a branch of the bacterial adaptive immune system, as a potential genomic editing tool holds the promise of facile targeted cleavage. Its novelty lies in its RNA-guided endonuclease activity, which enhances its efficiency, scalability, and ease of use.

 <https://www.ncbi.nlm.nih.gov> › pub...

[The Impact of CRISPR/Cas9-Based Genomic Engineering on Biomedical ...](#)

[About Featured Snippets](#) [Feedback](#)

- M. Potthast, M. Hagen, B. Stein (2020). The dilemma of the direct answer.

Related Research @ Webis

Dilemma of the Direct Answer (continued)

Direct answers amplify various cognitive biases, among others:

1. Authority bias.

Puts forward the single result with the authority of the search engine.

2. Confirmation bias / overconfidence.

Likely the most prominent answer, thus confirming people already believing in it.

3. Naive realism / survivorship bias.

Suggests a “simple” one-answer truth.

4. Mere-exposure effect / illusory truth effect.

Expose users to just one answer (mere exposure increases the liking of ideas).

5. Outgroup homogeneity bias.

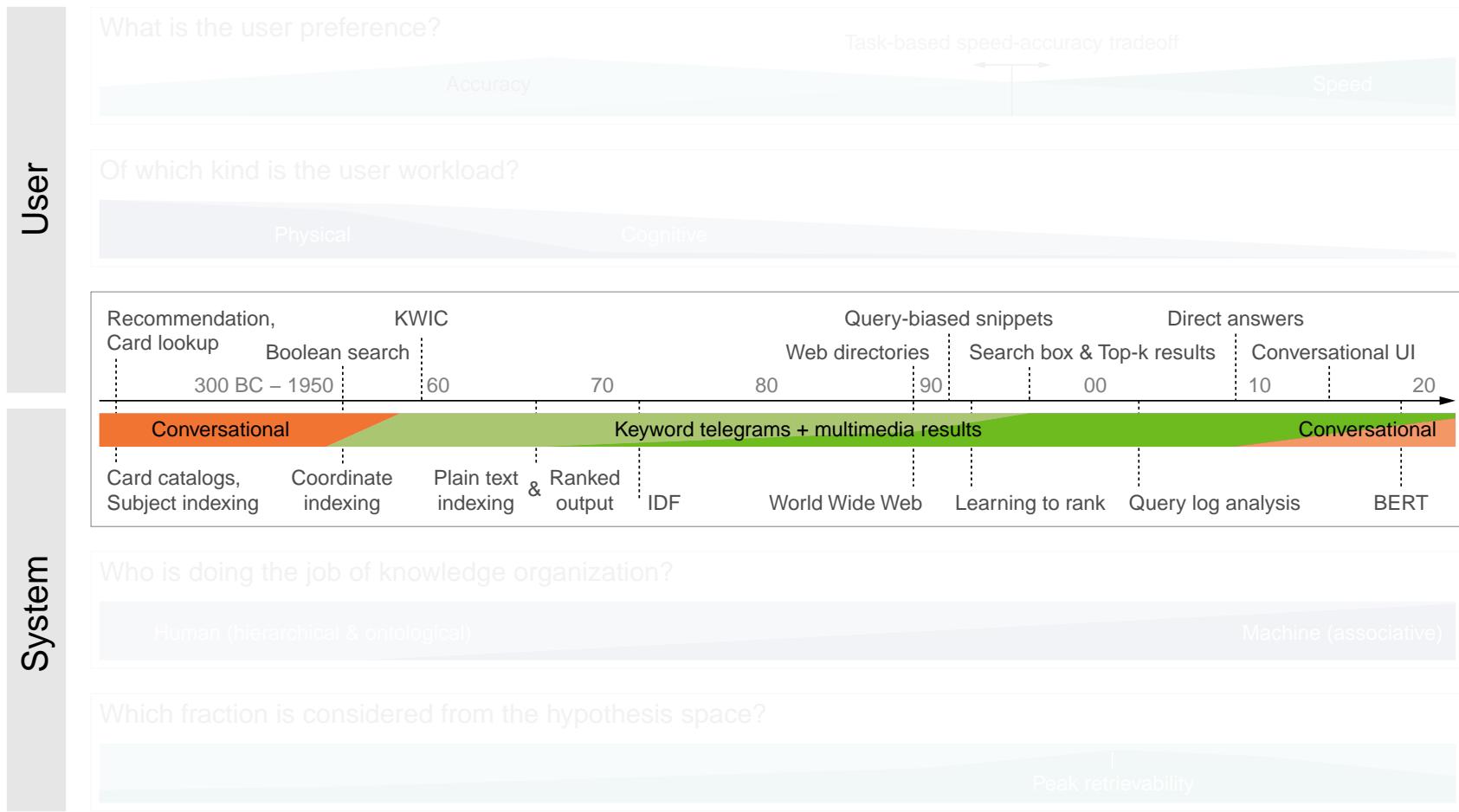
Implies a well-accepted opinion.

6. Reactance.

If the direct answer not the one that one believes in, it can cause reactance in users.

Related Research @ Webis

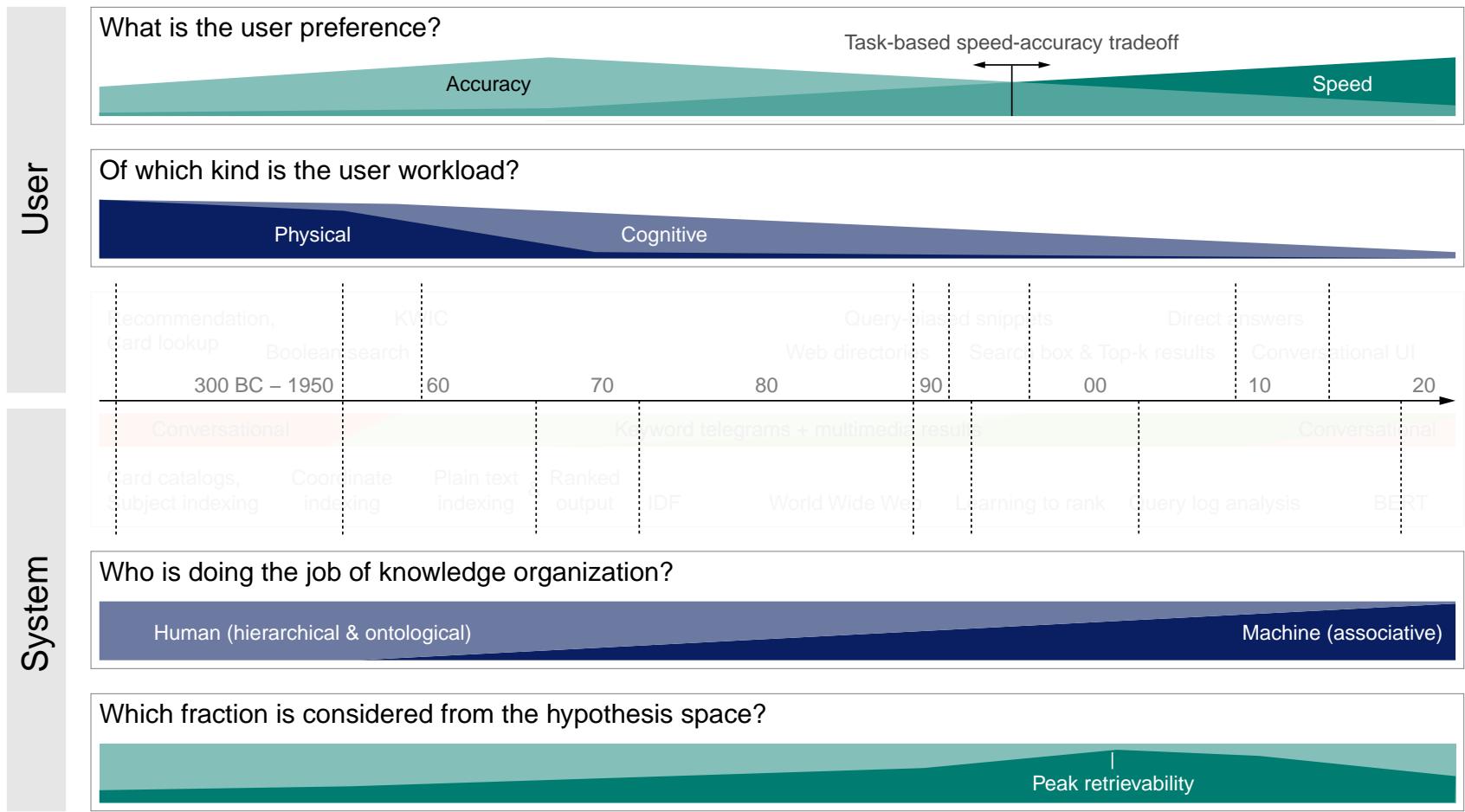
Dilemma of the Direct Answer (continued)



- M. Potthast, M. Hagen, B. Stein (2020). The dilemma of the direct answer.

Related Research @ Webis

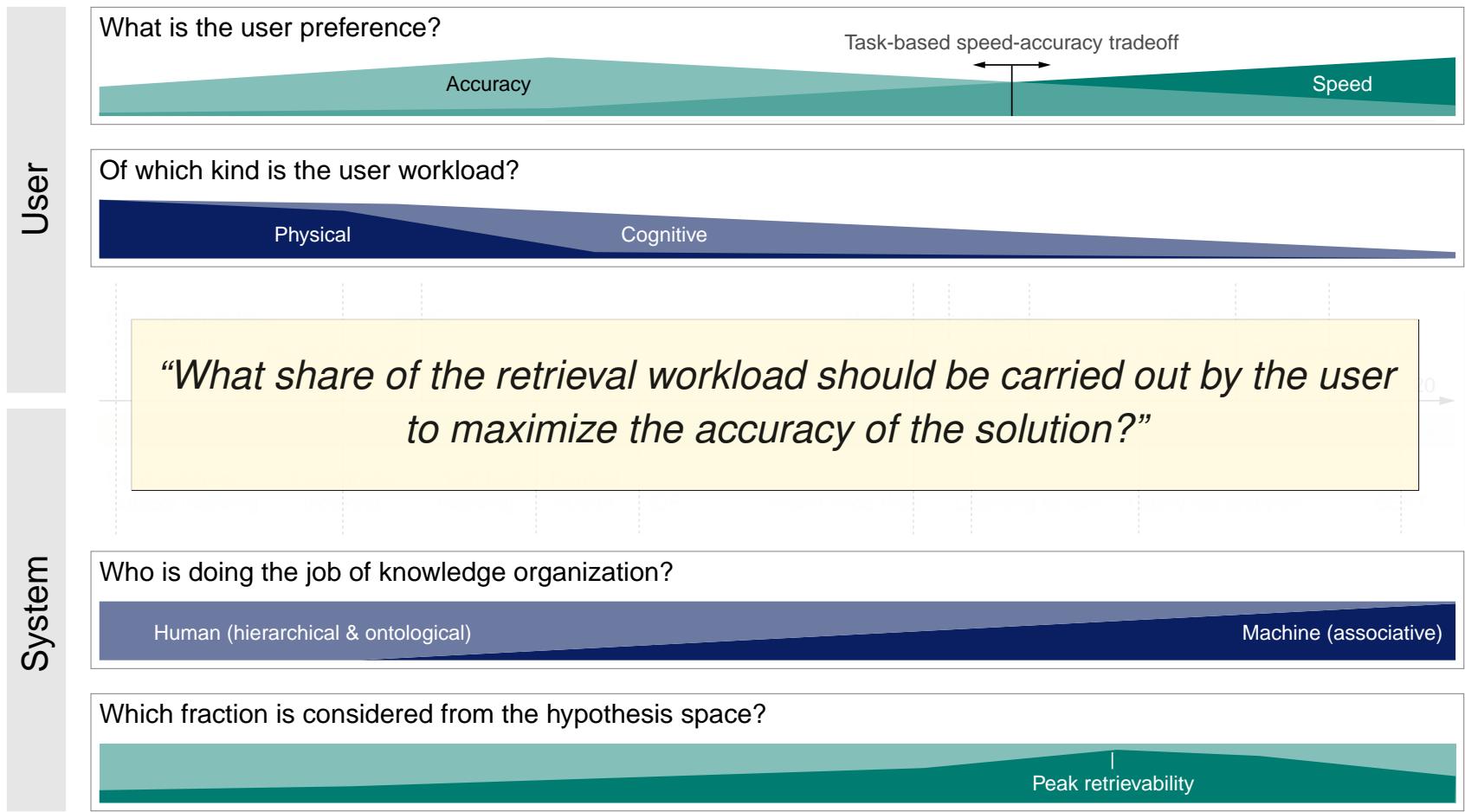
Dilemma of the Direct Answer (continued)



- M. Potthast, M. Hagen, B. Stein (2020). The dilemma of the direct answer.

Related Research @ Webis

Dilemma of the Direct Answer (continued)



- M. Potthast, M. Hagen, B. Stein (2020). The dilemma of the direct answer.

Related Research @ Webis

Information Retrieval and the Balance of Responsibilities

Direct Answer

Rationalization

Bias Analytics

Reframing

Information Labeling

SERP Axiomatization

Conversation Control

Medical Retrieval



More power to the machine?



Empower the user?

- support deliberation
- raise awareness
- demonstrate mechanisms
- provide meta information
- ...

Related Research @ Webis

(1) Rationalize Answers → Information Seeker Deliberation

Direct Answer
Rationalization
Bias Analytics
Reframing
Information Labeling
SERP Axiomatization
Conversation Control
Medical Retrieval

□ An argument search engine for the web.

Released: 2017.

Ca. 350,000 arguments over ca. 1,200 topics.

Evidence types: discussions, news, people.

□ Making arguments “digestible” with images.

CLEF'22 Touché lab on image retrieval for arguments.

Ca. 20,000 images over 50 topics

□ What are the values behind arguments?

Mapping arguments on 20 value categories.

Basis: Schwartz et al. value continuum (2012).

Classification performance: F_1 up to 0.8, mean: 0.3.

-
- H. Wachsmuth et al. (2017). Building an argument search engine for the web.
 - J. Kiesel et al. (2021). Image retrieval for arguments using stance-aware query expansion.
 - J. Kiesel et al. (2022). Identifying the human values behind arguments.

Related Research @ Webis

(1) Rationalize Answers → Values Behind Arguments

Direct Answer

Rationalization

Bias Analytics

Reframing

Information Labeling

SERP Axiomatization

Conversation Control

Medical Retrieval

The screenshot shows a web browser window with the URL <https://www.args.net/search.html?query=vegetarianism&submit=Search>. The page title is "vegetarianism". The search results are presented in two columns: "PRO" on the left and "CON" on the right. Each column contains several arguments listed as underlined text links, each with a "Show full argument" link and a "score" indicator.

- PRO**
 - [Although I'm a vegetarian, I would be against a law...](#)
▶ Show full argument
Although I'm a vegetarian, I would be against a law against eating meat as unconstitutional. ... Yes, the animals people eat should be killed humanely, and that can be legislated, but **vegetarianism** should be a choice. ...
<https://www.debate.org/debates/vegetarianism/1/> score ↗
 - [Vegetarianism generally helps the environment](#)
▶ Show full argument
Vegetarianism generally helps the environment
http://www.debatepedia.org/en/index.php/Debate:_Vegetarianism score ↗
 - [Vegetarianism is important in the fight against global...](#)
▶ Show full argument
Vegetarianism is important in the fight against global warming
http://www.debatepedia.org/en/index.php/Debate:_Vegetarianism score ↗
 - [Vegetarianism reduces exposure to dioxins found in...](#)
▶ Show full argument
Vegetarianism reduces exposure to dioxins found in meats/dairy
http://www.debatepedia.org/en/index.php/Debate:_Vegetarianism score ↗
 - [Even if they did, it still doesn't justify the eating of...](#)
▶ Show full argument
Even if they did, it still doesn't justify the eating of meat. ... I didn't bring religion into this debate but almost all of the major religions (even the ones that allow meat eating like Judaism and Christianity) agree that ...
<https://www.debate.org/debates/Vegetarianism/6/> score ↗
 - [Would someone who is against it please debate me on this...](#)
▶ Show full argument
Would someone who is against it please debate me on this and explain why? ... I don't understand how you can be against people choosing not to eat animals.
<https://www.debate.org/debates/Vegetarianism/7/> score ↗
 - [You said you ARE "against" vegetarianism you should have...](#)
▶ Show full argument
- CON**
 - [I am also "against" the Patriots, but I would never argue...](#)
▶ Show full argument
I am also "against" the Patriots, but I would never argue that people don't have the right to root for them. ... I am against **Vegetarianism** because I do not think it is a moral imperative to be a vegetarian, reducing **vegetarianism** ...
<https://www.debate.org/debates/Vegetarianism/2/> score ↗
 - [I don't think that is so much being against vegetarianism...](#)
▶ Show full argument
I don't think that is so much being against **vegetarianism** or those who are, but at least for me it's partially about PETA, which has not been the most peaceful organization of late. ... It is a personal choice and not something a ...
<https://www.debate.org/debates/Vegetarianism/1/> score ↗
 - [Vegetarians are healthy due to their health-consciousness...](#)
▶ Show full argument
Vegetarians are healthy due to their health-consciousness not vegetarianism.
http://www.debatepedia.org/en/index.php/Debate:_Vegetarianism score ↗
 - [Vegetarianism would cause the extinction of domesticated...](#)
▶ Show full argument
Vegetarianism would cause the extinction of domesticated animals.
http://www.debatepedia.org/en/index.php/Debate:_Vegetarianism score ↗
 - [I think it is the way they phrased it and I agree with...](#)
▶ Show full argument
I think it is the way they phrased it and I agree with you. ... Though I eat meat, I would have a serious issue with outlawing **vegetarianism**.
<https://www.debate.org/debates/Vegetarianism/1/> score ↗
 - [My opponent must argue that a vegan diet is healthier....](#)
▶ Show full argument
My opponent must argue that a vegan diet is healthier. ... Please begin your argument.
<https://www.debate.org/debates/Vegetarianism/9/> score ↗
 - [I will resupport my arguments and conclude this debate....](#)
▶ Show full argument

- S. Schwartz et al. (2012). Refining the theory of basic individual values.

→ valueeval.webis.de. SemEval'23 ValueEval task on human value detection.

Related Research @ Webis

(1) Rationalize Answers → Values Behind Arguments

Direct Answer

Rationalization

Bias Analytics

Reframing

Information Labeling

SERP Axiomatization

Conversation Control

Medical Retrieval

Screenshot of the args platform showing search results for "vegetarianism". The interface includes a search bar, navigation links (All, Discussions, News, People), and a topic space view showing 279 arguments retrieved in 1.0 ms.

PRO [Although I'm a vegetarian, I would be against a law...](#)
▶ Show full argument
Although I'm a vegetarian, I would be against a law against eating meat as unconstitutional. ... Yes, the animals people eat should be killed humanely, and that can be legislated, but **vegetarianism** should be a choice. ...
<https://www.debate.org/debates/Vegetarianism/1> score ↗

CON [I am also "against" the Patriots, but I would never argue...](#)
▶ Show full argument
I am also "against" the Patriots, but I would never argue that people don't have the right to root for them. ... I am against **Vegetarianism** because I do not think it is a moral imperative to be a vegetarian, reducing **vegetarianism**...
<https://www.debate.org/debates/Vegetarianism/2> score ↗

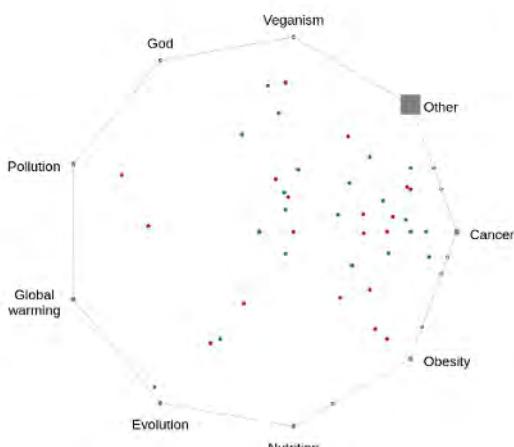
CON [I don't think that is so much being against vegetarianism...](#)
▶ Show full argument
I don't think that is so much being against **vegetarianism** or those who are, but at least for me it's partially about PETA, which has not been the most peaceful organization of late. ... It is a personal choice and not something a...
<https://www.debate.org/debates/Vegetarianism/1> score ↗

PRO [Vegetarianism generally helps the environment](#)
▶ Show full argument
Vegetarianism generally helps the environment
http://www.debatepedia.org/en/index.php/Debate:_Vegetarianism score ↗

CON [Vegetarians are healthy due to their health-consciousness...](#)
▶ Show full argument
Vegetarians are healthy due to their health-consciousness not **vegetarianism**.
http://www.debatepedia.org/en/index.php/Debate:_Vegetarianism score ↗

PRO [Vegetarianism is important in the fight against global...](#)
▶ Show full argument
Vegetarianism is important in the fight against global warming
http://www.debatepedia.org/en/index.php/Debate:_Vegetarianism score ↗

CON [Vegetarianism would cause the extinction of domesticated...](#)
▶ Show full argument



- S. Schwartz et al. (2012). Refining the theory of basic individual values.

→ valueeval.webis.de. SemEval'23 ValueEval task on human value detection.

Related Research @ Webis

(1) Rationalize Answers → Values Behind Arguments

Direct Answer

Rationalization

Bias Analytics

Reframing

Information Labeling

SERP Axiomatization

Conversation Control

Medical Retrieval

Screenshot of the args platform showing search results for "vegetarianism". The interface includes a search bar, navigation links (All, Discussions, News, People), and a topic space view showing 279 arguments retrieved in 1.0 ms.

PRO [Although I'm a vegetarian, I would be against a law...](#)
▶ Show full argument
Although I'm a vegetarian, I would be against a law against eating meat as unconstitutional. ... Yes, the animals people eat should be killed humanely, and that can be legislated, but **vegetarianism** should be a choice. ...
<https://www.debate.org/debates/Vegetarianism/1> score ↗

CON [I am also "against" the Patriots, but I would never argue...](#)
▶ Show full argument
I am also "against" the Patriots, but I would never argue that people don't have the right to root for them. ... I am against **Vegetarianism** because I do not think it is a moral imperative to be a vegetarian, reducing **vegetarianism**...
<https://www.debate.org/debates/Vegetarianism/2> score ↗

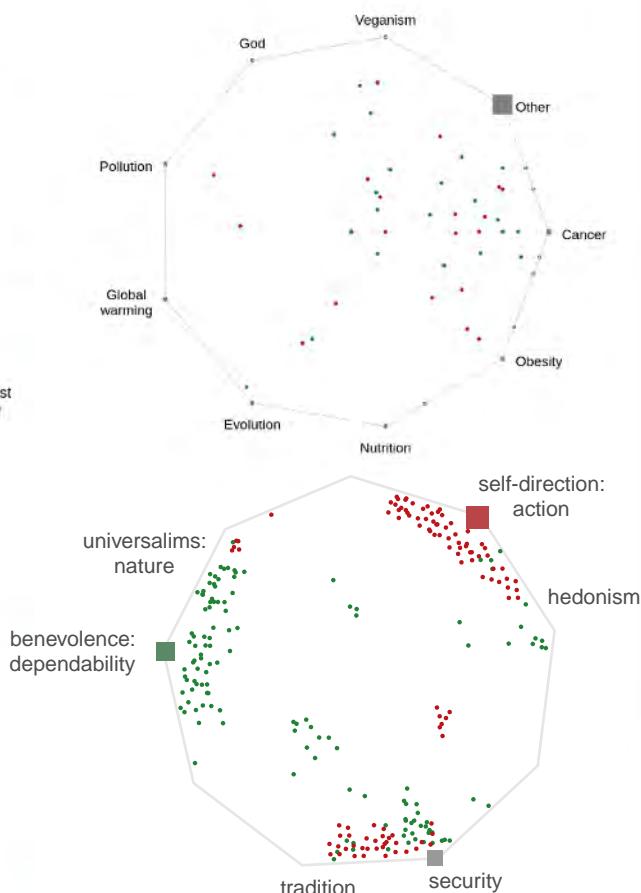
CON [I don't think that is so much being against vegetarianism...](#)
▶ Show full argument
I don't think that is so much being against **vegetarianism** or those who are, but at least for me it's partially about PETA, which has not been the most peaceful organization of late. ... It is a personal choice and not something a...
<https://www.debate.org/debates/Vegetarianism/1> score ↗

PRO [Vegetarianism generally helps the environment](#)
▶ Show full argument
Vegetarianism generally helps the environment
http://www.debatepedia.org/en/index.php/Debate:_Vegetarianism score ↗

CON [Vegetarians are healthy due to their health-consciousness...](#)
▶ Show full argument
Vegetarians are healthy due to their health-consciousness not **vegetarianism**.
http://www.debatepedia.org/en/index.php/Debate:_Vegetarianism score ↗

PRO [Vegetarianism is important in the fight against global...](#)
▶ Show full argument
Vegetarianism is important in the fight against global warming
http://www.debatepedia.org/en/index.php/Debate:_Vegetarianism score ↗

CON [Vegetarianism would cause the extinction of domesticated...](#)
▶ Show full argument



- S. Schwartz et al. (2012). Refining the theory of basic individual values.
→ valueeval.webis.de. SemEval'23 ValueEval task on human value detection.

Related Research @ Webis

(1) Rationalize Answers → Values Behind Arguments

Direct Answer

Rationalization

Bias Analytics

Reframing

Information Labeling

SERP Axiomatization

Conversation Control

Medical Retrieval

Deep Translate: The word digestible - Translator X vegetarianism - English X Vegetarianism - English X https://www.arses.net/search.html?query=vegetarianism&submit=Search

150x

args vegetarianism

All Discussions News People

Topic: Vegetarianism - 229 arguments retrieved in 1.0 ms

PRO Although I'm a vegetarian, I would be against a law...

Show full argument

Although I'm a vegetarian, I would be against a law against eating meat as unconstitutional. ... Yes, the animals people eat should be killed humanely and the law should be...

<https://www.debate.org/debates/Vegetarianism/1> score +

CON I am also "against" the Patriots, but I would never argue...

Show full argument

I am also "against" the Patriots, but I would never argue that people don't have the right to root for them. ... I am against Vegetarianism because I do not think it is a moral imperative to be a vegetarian, reducing vegetarianism...

<https://www.debate.org/debates/Vegetarianism/2> score +

CON I don't think that is so much being against vegetarianism...

Show full argument

I don't think that is so much being against vegetarianism or those who support it at least for me it's partially about PETA, which has not been the most peaceful organization of late. ... It is a personal choice and not something...

<https://www.debate.org/debates/Vegetarianism/1> score +

PRO Vegetarianism generally helps the environment...

Show full argument

Vegetarianism generally helps the environment...

http://www.debatepedia.org/en/index.php/Debate_Vegetarianism score +

CON Vegetarians are healthy due to their health consciousness not vegetari...

Show full argument

Vegetarians are healthy due to their health consciousness not vegetari...

http://www.debatepedia.org/en/index.php/Debate_Vegetarianism score +

PRO Vegetarianism is important in the fight against global warming...

Show full argument

Vegetarianism is important in the fight against global warming...

http://www.debatepedia.org/en/index.php/Debate_Vegetarianism score +

CON Vegetarianism would cause the extinction of domesticated...

Show full argument

53

- S. Schwartz et al. (2012). Refining the theory of basic individual values.

→ valueeval.webis.de. SemEval'23 ValueEval task on human value detection.

Personal focus
Social focus
Growth, Anxiety-free
Self-transcendence
Hedonism
Achievement
dominance
resources
Power:
If-enhancement
nce

Related Research @ Webis

(2) Annotate Bias → Raise Reader Awareness

Direct Answer

Rationalization

Bias Analytics

Reframing

Information Labeling

SERP Axiomatization

Conversation Control

Medical Retrieval

Trump says “we'll do the emergency” if border talks fail

Trump says gun policy with 82 percent support has ‘not much political support (to put it mildly).’ Donald Trump is trying to defend his “school safety” plan, which doesn’t call for an age limit on assault weapon purchases (but does support arming teachers).

Predictably, his claims about those age limits are all about deflecting and obfuscating (or, to be less polite, are full of crap):

....on 18 to 21 age limits, watching court cases and rulings before acting.

States are making this decision.

Things are moving rapidly on this, but not much political support (to put it mildly).

Yes, on this one single issue in his entire life, Trump is “watching court cases and rulings before acting.”

I’m so sure.

And “states are making this decision”?

The thing about states making a decision about who can buy guns is that people—and guns—can cross state lines, and often do.

That’s why federal action is so important. But this takes the cake: “not much political support (to put it mildly).”

If you only talk to Republican politicians elected with the help of the National Rifle Association, sure. But an NPR poll that talked to more than just NRA Republicans found 82 percent support for raising the legal age to purchase guns to 21. That’s a lot of support (to put it mildly).

unbiased biased

- W. Chen et al. (2020). Analyzing political bias and unfairness in news articles at different levels of granularity.
- W. Chen et al. (2020). Detecting media bias in news articles using gaussian bias distributions.
- W. Chen et al. (2018). Learning to flip the bias of news headlines.

Related Research @ Webis

(2) Annotate Bias → Raise Reader Awareness

Direct Answer

Rationalization

Bias Analytics

Reframing

Information Labeling

SERP Axiomatization

Conversation Control

Medical Retrieval

Trump says “we'll do the emergency” if border talks fail

Trump says gun policy with 82 percent support has ‘not much political support (to put it mildly).’ Donald Trump is trying to defend his “school safety” plan, which doesn’t call for an age limit on assault weapon purchases (but does support arming teachers).

Predictably, his claims about those age limits are all about deflecting and obfuscating (or, to be less polite, are full of crap):

....on 18 to 21 age limits, watching court cases before acting.

States are making this decision.

Things are moving rapidly on this, but not political support (to put it mildly).

Yes, on this one single issue in his entire Trump is “watching court cases and rulings before acting.”

I’m so sure.

And “states are making this decision”?

The thing about states making a decision about who can buy guns is that people—and guns—can cross state lines, and often do.

That’s why federal action is so important. But this takes the cake: “not much political support (to put it mildly).”

If you only talk to Republican politicians elected

Data:

6,964 news articles on 111 topics from 41 publishers.

Selected results:

Political bias: $F_1 = 0.75$

Unfairness: $F_1 = 0.83$

Non-objectivity: $F_1 = 0.75$

Technology:

Recurrent neural networks.

Bias pattern:

Start with neutral tone, bias maximum within 3. or 4. quartile.

- W. Chen et al. (2020). Analyzing political bias and unfairness in news articles at different levels of granularity.
- W. Chen et al. (2020). Detecting media bias in news articles using gaussian bias distributions.
- W. Chen et al. (2018). Learning to flip the bias of news headlines.

Related Research @ Webis

(3) Reframe News → Demonstrate Framing Mechanisms

Direct Answer

Rationalization

Bias Analytics

Reframing

Information Labeling

SERP Axiomatization

Conversation Control

Medical Retrieval

Economic Frame (original)

Key Congressional backers of the measure [...] wanted a flexible spending limit.

Implicit in the debate and the stalemate that left the bill to die when Congress adjourned was a recognition that the cost of immigration reform would be high, although no one knew how high. Without reform, though, the presence of what may be six million illegal aliens in this country exacts an economic and social toll.

Legality Frame (reframed)

Key Congressional backers of the measure [...] wanted a flexible spending limit.

“It’s time for Congress to take action,” says a spokesman for the bill’s sponsors, who want a flexible spending limit. Without reform, though, the presence of what may be six million illegal aliens in this country exacts an economic and social toll.

Crime Frame (reframed)

Key Congressional backers of the measure [...] wanted a flexible spending limit.

“Illegal aliens’ is a growing problem in the country,” says a spokesman for the measure’s sponsors. Without reform, though, the presence of what may be six million illegal aliens in this country exacts an economic and social toll.

- K. Budzynska et al. (2022). Framing in communication: From theories to computation.
- W. Chen et al. (2021). Controlled neural sentence-level reframing of news articles.
- Y. Ajjour, M. Alshomary, H. Wachsmuth, B. Stein (2019). Modeling frames in argumentation.

Related Research @ Webis

(3) Reframe News → Demonstrate Framing Mechanisms

Direct Answer

Rationalization

Bias Analytics

Reframing

Information Labeling

SERP Axiomatization

Conversation Control

Medical Retrieval

Economic Frame (original)

Key Congressional backers of the measure [...] wanted a flexible spending limit.

Implicit in the debate and the stalemate that left the bill to die when Congress adjourned was a recognition that the cost of immigration reform would be high, although no one knew how high. Without reform, though, the presence of what may be six million illegal aliens in this country exacts an economic and social toll.

Legality Frame (reframed)

Key Congressional backers of the measure [...] wanted a f

“It’s time for Congress to take action,” says a spokesman
flexible spending limit. Without reform, though, the presence of what may be six million illegal aliens in this country exacts an economic and social toll.

Crime Frame (reframed)

Key Congressional backers of the measure [...] wanted a f

“Illegal aliens’ is a growing problem in the country,” say
sponsors. Without reform, though, the presence of what may be six million illegal aliens in this country exacts an economic and social toll.

Data:

35,700 frame annotated sentence triples.

Selected results:

Topic consistency: 1.71 crowd rating [0; 2]

Coherence: 1.64 crowd rating [0; 2]

Framing: 1.65 crowd rating [0; 2]

Technology:

Sentence-level fill-in-the-blank with transformer sequence-to-sequence models.

Training strategies: frame pretraining, named entity preservation, adversarial learning

- K. Budzynska et al. (2022). Framing in communication: From theories to computation.
- W. Chen et al. (2021). Controlled neural sentence-level reframing of news articles.
- Y. Ajjour, M. Alshomary, H. Wachsmuth, B. Stein (2019). Modeling frames in argumentation.

Related Research @ Webis

(4) An Information Nutrition Label → Provide Meta Information

Direct Answer

Rationalization

Bias Analytics

Reframing

Information Labeling

SERP Axiomatization

Conversation Control

Medical Retrieval

TRUMP'S ATTACK ON SESSIONS OVER CLINTON PROSECUTION HIGHLIGHTS HIS OWN 'WEAK' STANCE



by ADAM SHAW | 25 Jul 2017 | 5,500

President Trump's decision Tuesday to attack Attorney General Jeff Sessions over Sessions' "position" on Hillary Clinton's various scandals only serves to highlight Trump's own hypocrisy on the issue — and is likely to fuel concerns from his base who see

INFORMATION NUTRITION LABEL		
Best before: Jan 1, 2018		
Per 1,000 words		Recommended daily allowance
Fact	30%	60%
Opinion	40%	20%
Controversy	9.0	—
Emotion	6.7	1.3
Topicality	8.7	5.0
Reading level	4.0	8.0
Technicality	2.0	—
Authority	4.3	9.0
Viralness	—	1.0
Additional substances: advertising, subscription, invective, images (2), tweets, video clips		
Traces: product placement		



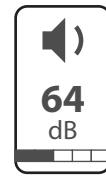
verbosity



virality



verifiability



emotionality



reliability

- T. Gollub, M. Potthast, B. Stein (2018). Shaping the information nutrition label.
- N. Fuhr et al. (2017). An information nutritional label for online documents.

Related Research @ Webis

(4) An Information Nutrition Label (continued)

Direct Answer

Rationalization

Bias Analytics

Reframing

Information Labeling

SERP Axiomatization

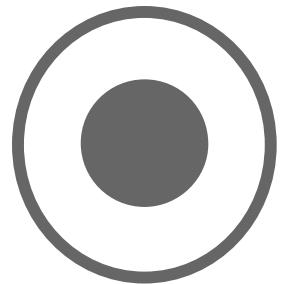
Conversation Control

Medical Retrieval

“It is not our intention to say what is true or what is false, right or wrong, and in particular not what is good or bad.*

That is, an Information Nutrition Label is not a substitute for a moral compass.”

* Norbert Fuhr, Anastasia Giachanou, Gregory Grefenstette, Iryna Gurevych, Andreas Hanselowski, Kalervo Jarvelin, Rosie Jones, Yiqun Liu, Josiane Mothe, Wolfgang Nejdl, Isabella Peters, Benno Stein @ Schloss Dagstuhl (2017)



Summary

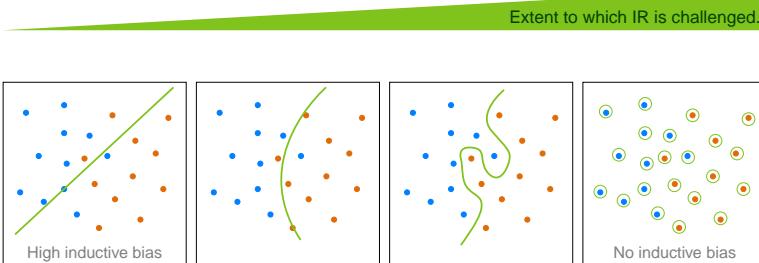
Bias in algorithms

Cognitive bias

Inductive bias

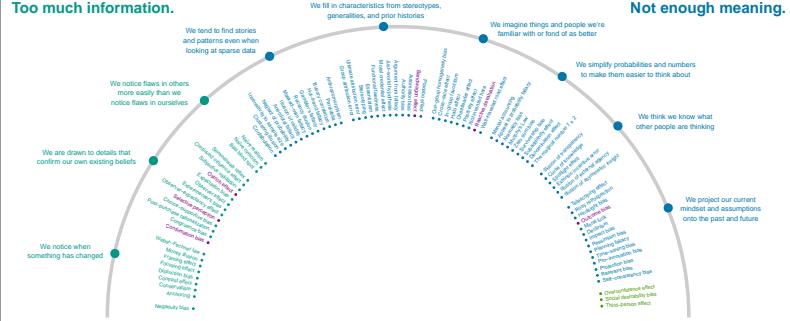
Statistical bias

Bias in data



The meanings of bias, and their connections.

Too much information.



Fighting cognitive biases with IR.

What is the user preference?

Accuracy

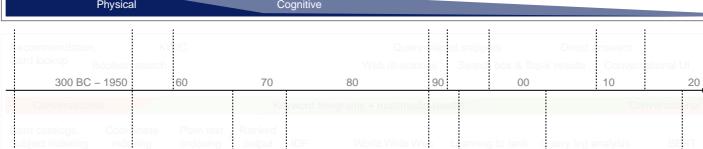
Task-based speed-accuracy tradeoff

Speed

Of which kind is the user workload?

Physical

Cognitive



Who is doing the job of knowledge organization?

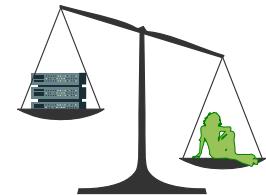
Human (hierarchical & ontological)

Machine (associative)

Which fraction is considered from the hypothesis space?

Peak retrievability

Direct answers—the pride of IR?



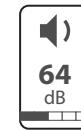
verbosity



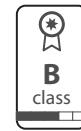
virality



verifiability



emotionality



reliability

More power to machines—or, empower the user?



J. Ajjour



J. Bevendorff



A. Bondarenko



W. Chen



M. Fröbe



N. Glaser



M. Ghosen



T. Gollub



J. Kiesel



E. Körner



N. Kolyada



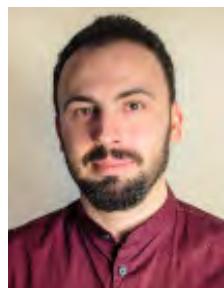
M. Völkske



M. Wiegmann



M. Wolska



K. Al-Khatib



M. Hagen



M. Potthast



B. Stein



H. Wachsmuth

Thank You!

AVAILABILITY HEURISTIC



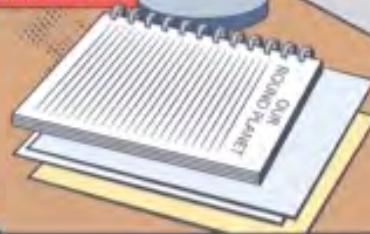
"THEY MUST HAVE A DEATH WISH TO SWIM IN THAT WATER."

ANCHORING EFFECT



"BREATH-TAKING ISN'T IT? THE SELLER WANTED 5,000 BUT I GOT IT FOR JUST 4,500!"

CONFIRMATION BIAS



"AHA! I KNEW IT!"

FRAMING EFFECT

THANKS TO OUR AGGRESSIVE
STANCE ON CLIMATE CHANGE,
THIS GOVERNMENT HAS
REDUCED CARBON EMISSIONS
BY ALMOST 5%!

CARBON EMISSIONS REDUCED BY
JUST 4.6% IN LAST 5 YEARS



CURSE OF KNOWLEDGE

An introduction into Goncharov polylogarithms

$$\begin{aligned} \text{SL}_2 &= \text{SL}(V) = \text{SL}(\mathbb{C}[x_1^{\pm 1}, x_2^{\pm 1}, x_3^{\pm 1}, x_4^{\pm 1}, \dots]) \\ &\cong \text{SL}(\mathbb{C}[x_1^{\pm 1}, x_2^{\pm 1}, x_3^{\pm 1}, x_4^{\pm 1}, \dots]) \\ \text{GL}_2 &= \text{GL}(V) = \text{GL}(\mathbb{C}[x_1^{\pm 1}, x_2^{\pm 1}, x_3^{\pm 1}, x_4^{\pm 1}, \dots]) \\ &\cong \text{GL}(\mathbb{C}[x_1^{\pm 1}, x_2^{\pm 1}, x_3^{\pm 1}, x_4^{\pm 1}, \dots]) \\ \text{SL}_2 &= \text{SL}(V) = \text{SL}(\mathbb{C}[x_1^{\pm 1}, x_2^{\pm 1}, x_3^{\pm 1}, x_4^{\pm 1}, \dots]) \\ &\cong \text{SL}(\mathbb{C}[x_1^{\pm 1}, x_2^{\pm 1}, x_3^{\pm 1}, x_4^{\pm 1}, \dots]) \end{aligned}$$



"WELL I DON'T KNOW HOW YOUR LECTURES WENT, BUT I CAN'T SEEM TO GET THROUGH TO THESE PEOPLE!"