

# Perspective is everything: a deeper look into skewed data

Get to know your own biases to improve your life.

Debora Stickler  
Women in Data Science 2024

# Tennis is the healthiest sport



AY LEARN TENNIS 101 RESOURCES HEALTH & SAFETY ADULTS



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FE EXPECTANCY

Fitness

## Science Says This Sport Is Best For Increasing Life Expectancy

u can play.

\* Kurse für Anfänger und Fortgeschrittene  
\* Ausrüstung leihweise  
\* preiswerte Mitgliedschaften  
Täglich geöffnet 10-22 Uhr, Preise ab 8€/Einheit

rating	Sport	cardio endurance	strength	muscle endurance	flexibility	calories rating (cal)	injury risk	total
1	squash	4.5	3	5	3	5 (517)	2	22.5
2	rowing	5	4	5	3	2 (302)	3	22
3	rock climbing	1	5	4	5	5 (475)	2	22
4	swimming	4.75	3	5	3	2 (345)	3	20.75
5	cross-country skiing	5	3.5	5	3	2 (345)	1	20.5
6	basketball	4	3	5	4	2 (302)	1	19
7	cycling	5	3	5	4	4 (431)	1	19
8	running	5	3	4	1.5	4 (431)	1	18.5
9	modern pentathlon	4.5	3	5	3	1 (264)	2	18.5
10	boxing	3.5	3	5	2	2 (302)	2	17.5

© forbes-magazin (forbes list of healthiest sports)

## The Best Sport for a Longer Life? Try Tennis.

People who played tennis, badminton or soccer tended to live longer than those who cycled, swam or jogged.

- <https://www.nytimes.com/2018/09/05/well/move/the-best-sport-for-a-longer-life-try-tennis.html>
- <https://www.tennisct.com/increased-life-expectancy>
- <https://www.healthdigest.com/1344159/science-says-best-sport-increase-life-expectancy-tennis-pickle-ball/>

# Squash is the healthiest sport

- In 2010 Forbes conducted a survey to determine the healthiest sport.
- Considering four physiological components of fitness (cardiorespiratory endurance, muscular strength, muscular endurance and flexibility), plus injury risk and energy expenditure, they determined the healthiest sports.

rating	Sport	cardio endurance	strength	muscle endurance	flexibility	calories rating (cal)	injury risk	total
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7	cycling	5	3	5	4 (or 1?)	4 (431)	1	19 *
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# Tennis is the healthiest sport

- In 2018 the study “Various Leisure-Time Physical Activities Associated With Widely Divergent Life Expectancies: The Copenhagen City Heart Study” was published.
- It claims, that tennis increases the life expectancy on average by 9.7 years
- Study Scope: 1991 – 2017
- 8577 healthy men and women

Sport	Increased Life Expectancy
Tennis	9.7 years
Badminton	6.2 years
Soccer	4.7 years
Cycling	3.7 years
Swimming	3.4 years
Jogging	3.2 years

# Tennis is the healthiest sport

This is an example of a **base rate fallacy**, which is the tendency to ignore relevant statistical information in favor of case-specific information.

**TABLE 1. Characteristics According to Different Types of Sports in Leisure-Time for the 5674 Individuals Engaging in At Least 1 Sport<sup>a,b,c</sup>**

Characteristic	Sedentary physical activity (N=1042)	Health club activities (N=206)	Swimming (N=936)	Calisthenics (N=1533)	Cycling (N=4833)	Jogging (N=504)	Soccer (N=184)	Badminton (N=388)	Tennis (N=167)	Other activities (N=755)
Education										
<Middle school	45	14	23	25	26	7	11	8	4	18
Middle school	35	36	38	39	37	25	37	42	22	37
High school	11	25	18	17	17	31	27	24	27	23
University	8	26	21	19	20	37	25	27	48	22
Household income										
Low	54	26	36	37	31	23	18	23	30	30
Moderate	30	35	36	39	38	37	42	32	23	38
High	16	39	28	24	31	40	39	44	47	32

The numbers in the table are percentages.

Schnohr, et al., *Various Leisure-Time Physical Activities Associated With Widely Divergent Life Expectancies: The Copenhagen City Heart Study*, Mayo Clinic Proceedings, Volume 93, Issue 12, 2018, Pages 1775-1785, ISSN 0025-6196, <https://doi.org/10.1016/j.mayocp.2018.06.025>.

# Attractiveness Bias



**Which image do you find more visually pleasing?**

Monet, *The Artist's Garden at Giverny*, 1900

Rembrandt, *The Night Watch*, 1642

# Attractiveness Bias



**Which image do you find the most visually pleasing?**

# Attractiveness Bias

- **Red:** passion, love, excitement, urgency
- **Orange:** warmth, enthusiasm, energy, creativity
- **Yellow:** happiness, optimism, positivist, clarity
- **Green:** growth, harmony, balance, nature
- **Blue:** trust, calmness, professionalism, reliability
- **Purple:** luxury, creativity, imagination, spirituality
- **Black:** elegance, sophistication, power, authority
- **White:** purity, simplicity, cleanliness, clarity

**gh contrast.**

that we are likely to  
specially a strong

les prefer females  
areas.

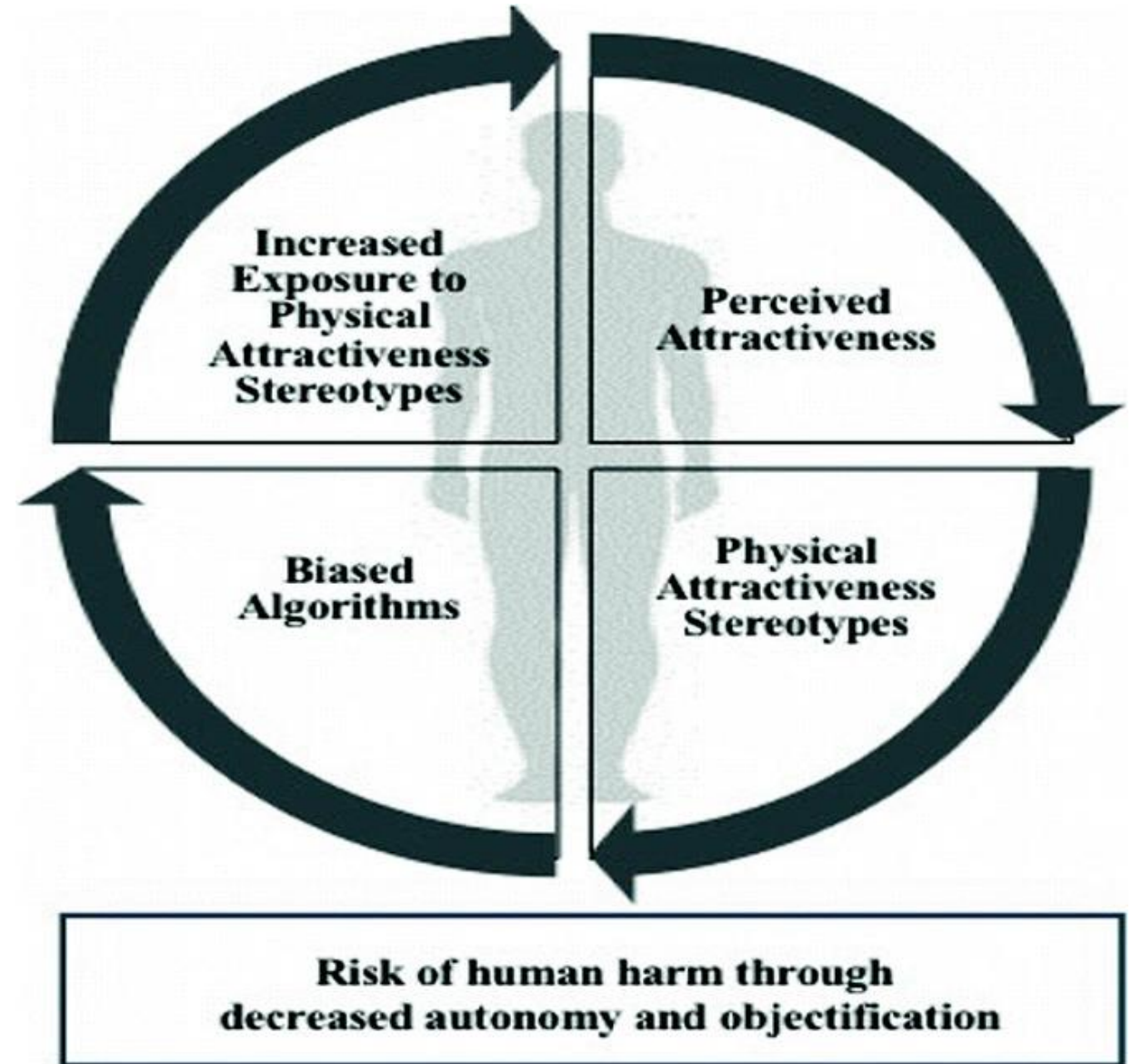
motions, draw you  
appeal to us.



# Attractiveness Bias

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- We can understand, that this preference of colours can easily influence us to make certain decisions, trust people more and overall influence us significantly.
- It spans way further than just judging people's physical attractiveness and includes information design, etc.



# Dunning-Kruger Effect



The image is a screenshot of the NBC News website. At the top, there is a dark blue navigation bar with the NBC News logo on the left and several menu items: ISRAEL-IRAN, OLYMPICS: 100 DAYS, POLITICS, U.S. NEWS, WORLD, BUSINESS, SPORTS, NBC NEWS TIPLINE, and WATCH LIVE. Below the navigation bar, the word "CORONAVIRUS" is written in small white capital letters. The main headline is in large, bold, white text: "Trump suggests 'injection' of disinfectant to beat coronavirus and 'clean' the lungs". Below the headline, a sub-headline in smaller white text reads: "A Homeland Security official, under questioning from reporters, later said federal laboratories are not considering such a treatment option."

**NBC NEWS** ISRAEL-IRAN OLYMPICS: 100 DAYS POLITICS U.S. NEWS WORLD BUSINESS SPORTS NBC NEWS TIPLINE ● WATCH LIVE

CORONAVIRUS

## Trump suggests 'injection' of disinfectant to beat coronavirus and 'clean' the lungs

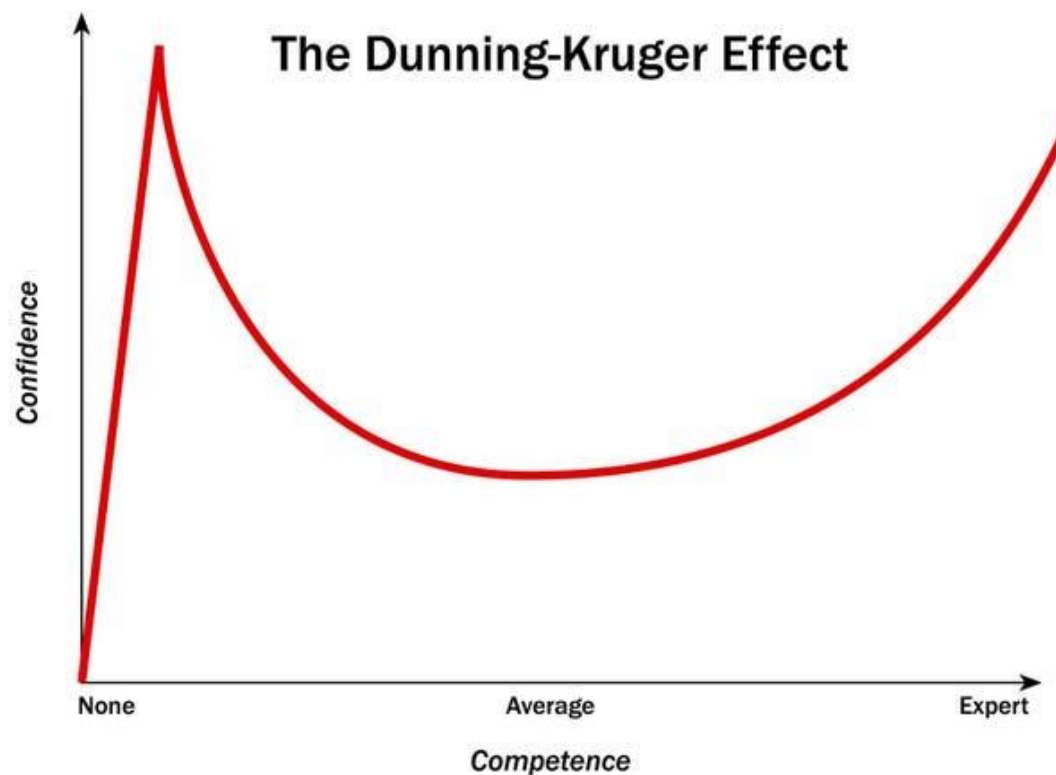
A Homeland Security official, under questioning from reporters, later said federal laboratories are not considering such a treatment option.

<https://www.nbcnews.com/politics/donald-trump/trump-suggests-injection-disinfectant-beat-coronavirus-clean-lungs-n1191216>

# Dunning-Kruger Effect

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The Dunning-Kruger effect proposes that individuals with the lowest abilities in a domain are also the ones showing the strongest tendency towards overestimation. (Dunning, Kruger, 1999)

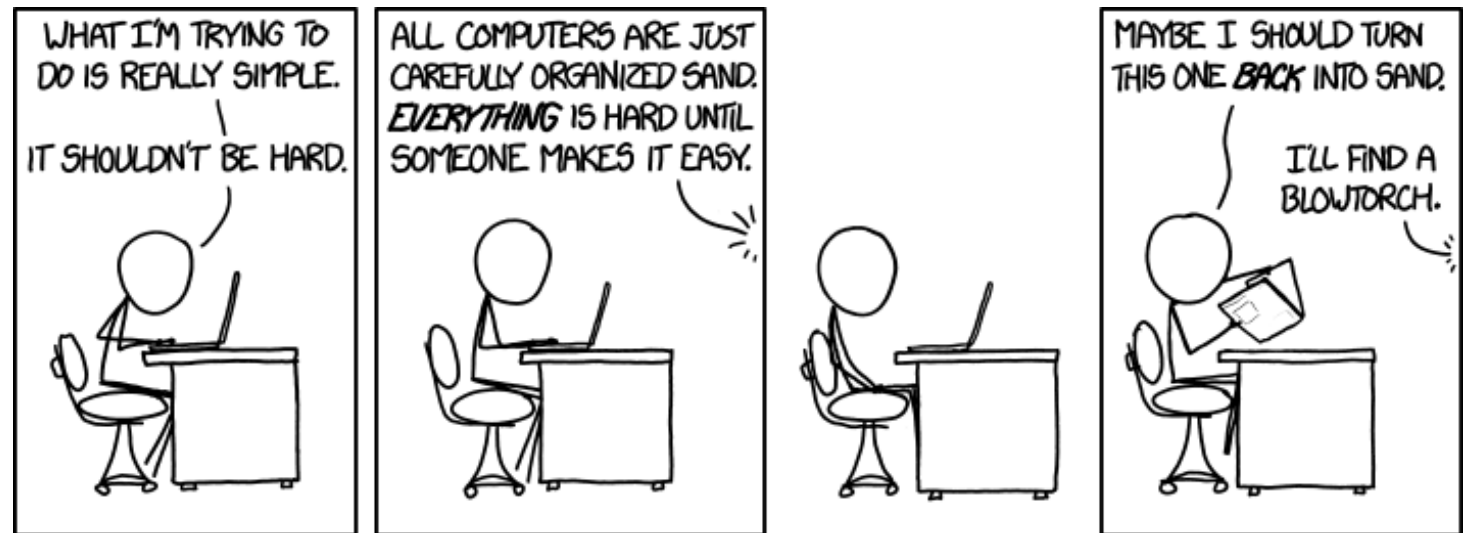


Graph: <https://www.independent.co.uk/arts-entertainment/books/features/how-meryl-streep-showed-us-why-the-least-able-have-no-idea-of-their-own-incompetence-a7205316.html>

# Dunning-Kruger Effect

- A 2021 study by Jørgensen et al. investigated the skill differences in software developers and found a significant difference in reported skill vs. actual skill.
- They found that lower programming skills related to more over-optimistic estimates of one's own performance.

→ **Social-desirability bias**



- M. Jørgensen, G. R. Bergersen and K. Liestøl, "Relations Between Effort Estimates, Skill Indicators, and Measured Programming Skill," in *IEEE Transactions on Software Engineering*, vol. 47, no. 12, pp. 2892-2906, 1 Dec. 2021, doi: 10.1109/TSE.2020.2973638.
- <https://xkcd.com/1349/>

# Literature

## Tennis/base rate fallacy

- <https://www.topendsports.com/world/lists/fittest-sport/healthiest-forbes.html>
- <https://www.nytimes.com/2018/09/05/well/move/the-best-sport-for-a-longer-life-try-tennis.html>
- <https://www.tennisct.com/increased-life-expectancy>
- <https://www.healthdigest.com/1344159/science-says-best-sport-increase-life-expectancy-tennis-pickle-ball/>
- Schnohr, et al., *Various Leisure-Time Physical Activities Associated With Widely Divergent Life Expectancies: The Copenhagen City Heart Study*, Mayo Clinic Proceedings, Volume 93, Issue 12, 2018, Pages 1775-1785, ISSN 0025-6196, <https://doi.org/10.1016/j.mayocp.2018.06.025>.

## Attractiveness Bias

- Paakki, Maija & Sandell, Mari & Hopia, Anu. (2019). Visual attractiveness depends on colorfulness and color contrasts in mixed salads. *Food Quality and Preference*. 76. 10.1016/j.foodqual.2019.04.004.
- Matsangidou, M., Otterbacher, J. (2019). What Is Beautiful Continues to Be Good. In: Lamas, D., Loizides, F., Nacke, L., Petrie, H., Winckler, M., Zaphiris, P. (eds) *Human-Computer Interaction – INTERACT 2019*. INTERACT 2019. Lecture Notes in Computer Science(), vol 11749. Springer

## Dunning-Kruger Effect

- M. Jørgensen, G. R. Bergersen and K. Liestøl, "Relations Between Effort Estimates, Skill Indicators, and Measured Programming Skill," in *IEEE Transactions on Software Engineering*, vol. 47, no. 12, pp. 2892-2906, 1 Dec. 2021, doi: 10.1109/TSE.2020.2973638.
- <https://psmag.com/social-justice/confident-idiots-92793>