



# Intro to Critical Thinking

Week 2 Class

## Week 2 – Understanding quality and biases associated with data and information

Today we will..

- look at sources of data and information and their likely quality and bias
- have discussions on Covid masking and Covid vaccines using Critical Thinking methodology.

# Week 1 Summary

- Critical Thinking is the ability to think clearly and rationally by evaluating several different sources of information objectively to make informed decisions.
- Critical Thinking helps you make the best decisions for you and others.
- It is valued by individuals, organizations and businesses likely leading to your views being accepted and your recommended action steps being executed
- We saw a Critical Thinking example where the headlines of a story, while true, was misleading as to what was likely happening statistically and the likely real story
- We saw how one can be directed to focus on a scary issue which may be very improbable compared to things we do today with similar negative outcomes.

# Sources of information – Bias and Quality

Where do you get your information?

Do you feel it is of good quality? How do you or would you know?

Do you feel it is biased? How do you or would you know?

What are your thoughts with regards to information and positions coming from politicians? Does it depend on which party? Why or why not?

What are your thoughts with regards to information and positions coming from “The Media”? Does it depend on which media source? Why or why not?

## AllSides™ Media Bias Chart

All ratings are based on online content only — not TV, print, or radio content.  
Ratings do not reflect accuracy or credibility; they reflect perspective only.



AllSides Media Bias Ratings™ are based on multi-partisan, scientific analysis.

Visit AllSides.com to view hundreds of media bias ratings.

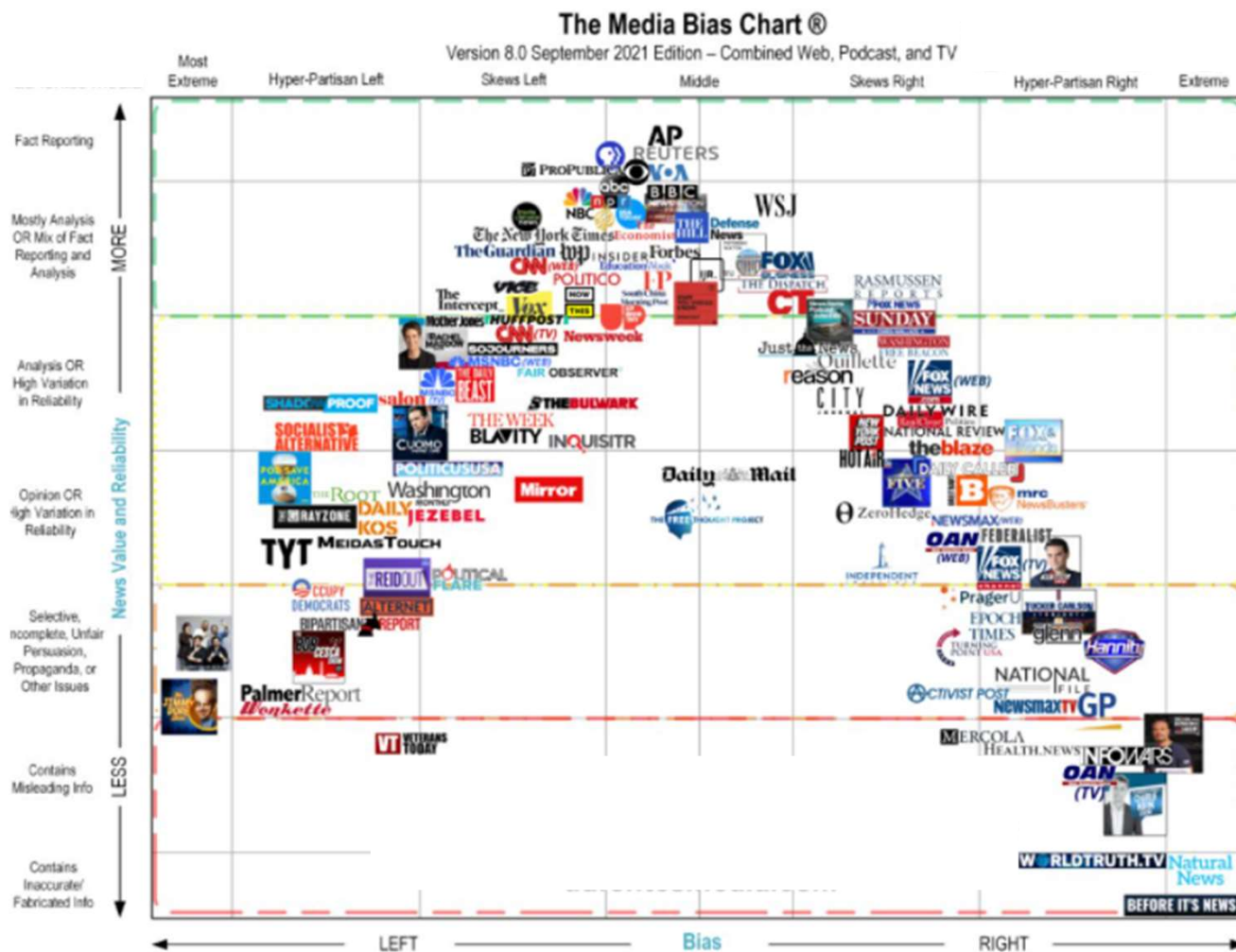
Version 5.1 | AllSides 2021

## Sources of Information and their likely bias

### Notes:

1. While the group that did this analysis of media probably has some bias themselves and clearly not all the individual articles by different writers at a particular media company fall into the same bucket, this still is a reasonable indicator of bias in media in general and what typical positions are taken at the particular sources
2. The sources with red circles are interesting in that the “news” is closer to having less bias than the “opinion” articles

*The same note from the previous slide applies here too and probably applies to the quality dimension as well, but this is still a good reference to understand the bias and quality of information coming from these sources*





# The Media Bias Chart ®

Version 8.0 September 2021 Edition – Combined Web, Podcast, and TV



Note that facts from AP, Reuters, BBC and CBS are generally viewed with high credibility and just slightly biased left. ABC, NPR (news), and NBC are also generally viewed as having good credibility and just slightly more biased left with NBC being a little farther to the left. .

Note where Fox News TV falls in this analysis of bias and reliability

# In-Class Discussions Using Critical Thinking

*Ground rules – Please engage in our discussion but keep in mind we are simply examining elements of critical thinking, not to try to convince someone that their position is wrong.*

*If a person uses critical thinking, the right “answer” will be self evident where there is a preponderance of data and information that supports one position over the other.*

*Please be aware that for some problems or opportunities, we may not have enough information to clearly know what the right answer is leading to valid differences of opinion.*

1. Covid masks - Should you wear them and if so, under what circumstances? Why or why not?
2. Should Covid masks be mandated? Under what circumstances? Why or why not?
3. Covid vaccines – Should you get them and if so under what circumstances? Why or why not?
4. Should Covid vaccines be mandated? Under what circumstances? Why or why not?



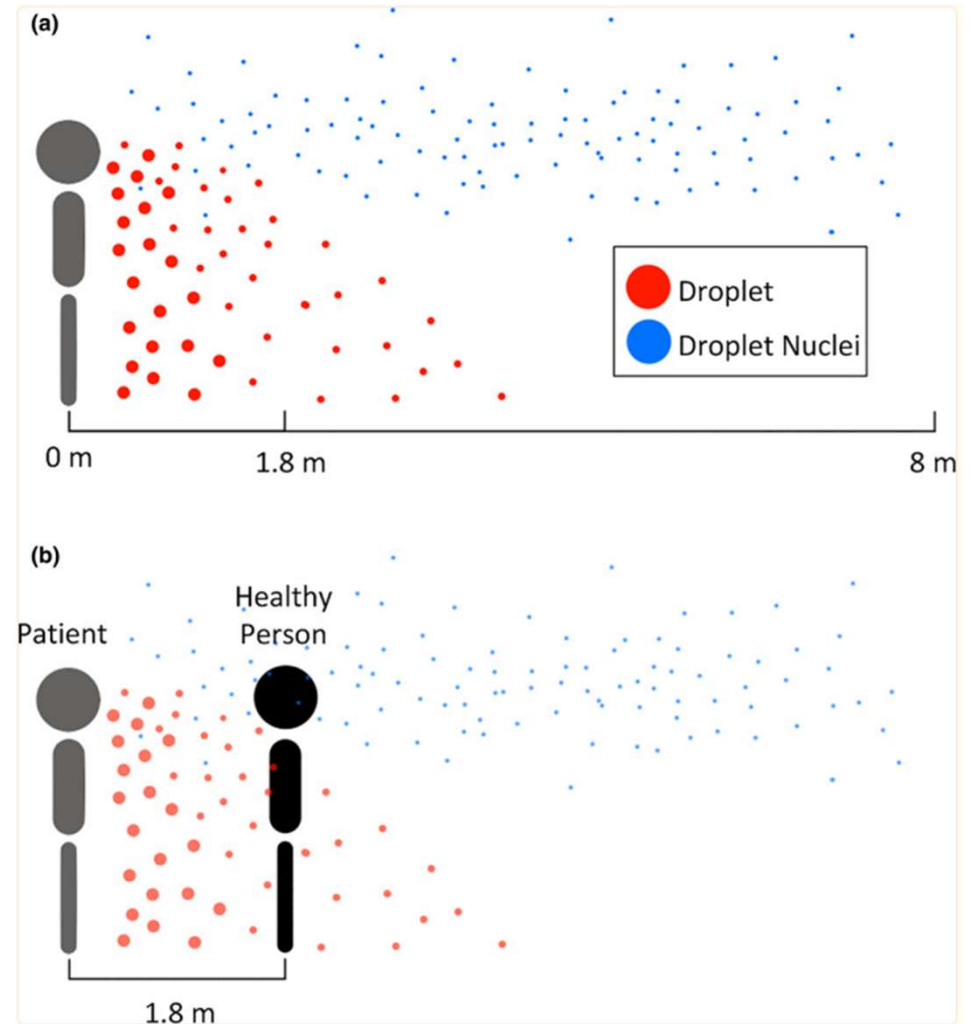
Covid masks – Should you wear or have worn them to protect yourself and others?

If so, under what circumstances?

Why or why not?

*How to you think about this critically?*

# Droplets & aerosols emitted by a person



# BTW - You will breathe much more than 34,000,000 particles of stuff during this class today!

*This isn't molecules of oxygen, nitrogen, argon, and all the gases that make up air...it's the all junk floating in air*

0.5 liters/breath x 1 m<sup>3</sup>/1000 liters x 15 breaths /minute x 45 minutes/class x 10,200,000,000 0.3 µm particles /m<sup>3</sup>= 34,425,000 particles

## ISO 14644-1 Cleanroom Standards

[www.portafab.com/cleanrooms.html](http://www.portafab.com/cleanrooms.html)

Class	maximum particles/m <sup>3</sup>						FED STD 209E equivalent
	≥0.1 µm	≥0.2 µm	≥0.3 µm	≥0.5 µm	≥1 µm	≥5 µm	
ISO 1	10	2.37	1.02	0.35	0.083	0.0029	
ISO 2	100	23.7	10.2	3.5	0.83	0.029	
ISO 3	1,000	237	102	35	8.3	0.29	Class 1
ISO 4	10,000	2,370	1,020	352	83	2.9	Class 10
ISO 5	100,000	23,700	10,200	3,520	832	29	Class 100
ISO 6	1.0×10 <sup>6</sup>	237,000	102,000	35,200	8,320	293	Class 1,000
ISO 7	1.0×10 <sup>7</sup>	2.37×10 <sup>6</sup>	1,020,000	352,000	83,200	2,930	Class 10,000
ISO 8	1.0×10 <sup>8</sup>	2.37×10 <sup>7</sup>	1.02×10 <sup>7</sup>	3,520,000	832,000	29,300	Class 100,000
ISO 9	1.0×10 <sup>9</sup>	2.37×10 <sup>8</sup>	1.02×10 <sup>8</sup>	35,200,000	8,320,000	293,000	Room air

- ← The environment required by law over an open vial or syringe of an injectable pharmaceutical during manufacturing
- ← People entering and working in this environment
- ← cannot have any exposed skin or hair!
- ← A hospital operating room (or outdoors immediately after a heavy rain)
- ← Our classroom

# Some sources of data collected

*These are some that look at it the individual level...*

- [Face Masks Against COVID-19: An Evidence Review April 2020](#)

*(Looks at effectiveness of masks in reducing transmission)*

- [Visualizing Speech-Generated Oral Fluid Droplets with Laser Light Scattering | NEJM](#)
- [Respiratory virus shedding in exhaled breath and efficacy of face masks | Nature Medicine](#)

*These are some that look at it the macro level...*

- [Arguments against mask requirements during the coronavirus \(COVID-19\) pandemic, 2020-2021 – Ballotpedia](#)
- [Community Use Of Face Masks And COVID-19: Evidence From A Natural Experiment Of State Mandates In The US | Health Affairs](#)

# Is wearing masks effective in reducing covid?

<https://www.cdc.gov/masking-science-sars-cov2> ⓘ

## Use of Masks to Control the Spread of SARS-CoV-2 - CDC

Data were added from studies published since the last update. These studies address the association of mask wearing with new infections, ...

<https://www.cdc.gov/mmwr/volumes> ⓘ

## Effectiveness of Face Mask or Respirator Use in Indoor ... - CDC

by KL Andrejko · 2022 · Cited by 4 — What is already known about this topic? Face masks or respirators (N95/KN95s) effectively filter virus-sized particles in laboratory settings.

<https://www.pnas.org/doi/pnas.2014564118> ⓘ

## An evidence review of face masks against COVID-19 | PNAS

by J Howard · 2021 · Cited by 429 — The preponderance of evidence indicates that mask wearing reduces transmissibility per contact by reducing transmission of infected respiratory ...

<https://www.ncbi.nlm.nih.gov/articles/PMC7883189> ⓘ

## How effective is a mask in preventing COVID-19 infection?

by Y Wang · Cited by 12 — For example, Hong Kong recommended mask wearing for all in order to prevent respiratory viruses, while Germany claimed no evidences that the masks...

INTRODUCTION · TRANSMISSION MODE OF... · FUNCTION OF MASKS IN...

<https://med.stanford.edu/news/all-news/2021/09> ⓘ

## Surgical masks reduce COVID-19 spread, large-scale study ...

Sep 1, 2021 — Researchers found that surgical masks impede the spread of COVID-19 and that just a few, low-cost interventions increase mask-wearing ...

<https://jamanetwork.com/journals/jama/fullarticle> ⓘ

## Effectiveness of Mask Wearing to Control Community Spread ...

by JT Brooks · 2021 · Cited by 133 — This JAMA Insights CDC review summarizes accumulating evidence that mask wearing reduces spread of SARS-CoV-2 infection and that...

<https://www.hopkinsmedicine.org/health/coronavirus> ⓘ

## Coronavirus Face Masks FAQs - Johns Hopkins Medicine

Jan 27, 2022 — The most recent recommendations related to prevention against the spread of COVID-19 include wearing cloth masks as an added measure of ...

<https://www.ucf.edu/news/face-masks-cut-distance-a...> ⓘ

## Face Masks Cut Distance Airborne Pathogens Could Travel in ...

Jan 12, 2022 — However, a new study by researchers at the University of Central Florida offers more evidence that they work. In a study appearing today in the ...

<https://www.ecdc.europa.eu/publications-data/using-...> ⓘ

## Considerations for the use of face masks in the community in ...

Feb 7, 2022 — A public health policy for wearing a face mask in public spaces should be considered in areas with community transmission when the public health ...

# How effective is wearing a mask in preventing the wearer from getting Covid?

New York Times 30 Dec 2021...

“But there is also plenty of evidence showing that masks protect the wearer even when others around them are mask-free. The amount of protection depends on the quality of the mask and how well it fits. Given that the Omicron variant is far more infectious than other variants, health experts recommend upgrading your mask to an N95, KN95 or KF94, which are all high-quality medical masks. Other variables, such as how much time you are exposed to an infected person and how well a space is ventilated also will affect your risk.”

Not finding much evidence against wearing masks in the prior search, you look to specifically see counter arguments.

*Specifically looking for studies that show that masking is ineffective against Covid*

*The first article I saw ....*

**Forbes 22 April 2021....** [Did So-Called 'Stanford, NIH Study' Really Show Face Masks Are Ineffective Against Covid-19?](#)

*was an interesting and humorous article that really is a good study in why knowing your sources and the quality of the information is important.*

*The second article I saw ....*

[Danish Study Doesn't Prove Masks Don't Work Against the Coronavirus – FactCheck.org](#)

*Again, more of a study in how some people in social media torture data and information to make it say what they want it to say.*

*After looking for articles from many different sources and perspectives it appears the overwhelming scientific opinion is that effective masking protects both others and the wearer.*



## *OK, the evidence says effective masking works. What are considerations that influence whether you should wear a mask?*

*You should look at the data and information and do your own critical thinking, but to show you what all the data and information leads me to do....*

- Like going in the Gulf with sharks, riding a bike, and being outdoors with lightning present, it comes down how important is it for me to take a risk, what are the possible consequences to myself and others, the probabilities and the costs and inconveniences of the mitigation effort (e.g. wearing a mask)
- Is there a regulatory requirement to wear a mask? If so, I will likely wear one.
- If no regulatory requirement, in situations where there are few people allowing for good social distancing, all are fully vaccinated and not immuno-compromised, located in a well-ventilated area, and in times of few Covid cases and being fully vaccinated myself, I see little reason to wear a mask.
- If in the presentence of people who are immuno-compromised or are at a higher risk of severe consequences if they get Covid, I feel a moral obligation to do what I should to protect them. I will wear a N95 mask or equivalent.
- If there is another wave of highly infectious Covid that comes, I would consider wearing an effective mask in dense population or poorly ventilated environments even being fully vaccinated.

# Should Covid masks be mandated? Under what circumstances? Why or why not?

- It is important to understand whether masks are effective to protect the wearer and others and under what circumstances before tackling these questions
- What are arguments against mandating masks if circumstances suggest they do save lives and reduce the burden on our healthcare resources?

## Week 2 Summary

- In order to Think Critically, one must collect good quality data and information.
- Use sources of information that are respected and reliable and be aware of their biases.
- Seek out information and data from multiple sources with differing perspectives (and biases) to make sure you are seeing the whole picture before drawing any conclusions