The Rationality Color Wheel©

Outer ring: the probability that the claim is true without the new evidence - P (H)

Second ring: the probability that you would have the new evidence if the claim was true - P (E|H)

Third ring: the probability that you would have the new evidence if the claim was NOT true - P (E|not H)

Inner ring: the probability that the claim is true given the new evidence - P (H)

Probability Scale

- Very Likely (95%)
- Likely (80%)
- Fair (50%)
- Unlikely (20%)
- Very Unlikely (5%)

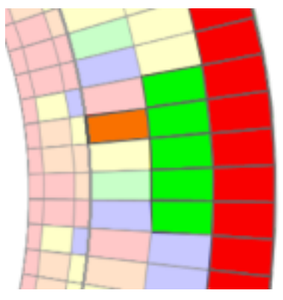
The Rationality Color Wheel is a tool for weighing evidence. When presented with evidence for a claim, simply move your finger from one color region to the next to determine how likely the claim is given the evidence. For example:

Imagine that a woman takes a medical test to determine whether or not she has a rare disease that afflicts 5% of the population. The test is highly sensitive: when a person has the disease, it returns a positive result 90% of the time. When they don't, it returns a positive result 10% of the time. The woman gets a positive test result. What is the likelihood that she has the disease?

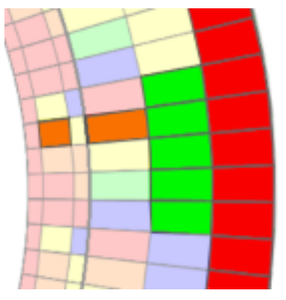
Only 5% of the population has the disease, so before the test result, the woman was "very unlikely" to have the disease. Therefore, start in the red segment of the outermost ring.

When a person has the disease, they are "likely" to get a positive test result. Therefore, move to the green region in the second ring.

When a person does not have the disease, they are "unlikely" to have a positive test result. So we move inward onto the orange region in the third ring.



Now, we simply move inward to the **middle** color in the adjacent cell. It's orange so we conclude that the woman is "unlikely" to have the disease.



When given this scenario, many people incorrectly believe that the woman has a high probability of having the disease. However, we can easily find the correct answer by using the color wheel.

The probability that a claim is true is represented by a segment with three colors. The outer color gives the maximum possible probability that the claim is true. The central color gives the probability that the claim is true when the colors values equal those in the legend. The inner color gives the smallest possible probability that the claim is true. These bounds are necessary because each color represents a range of possible values. The calculations are based on Bayesian Inference, a branch of mathematics used for statisticians in science, medicine, and research. Learn more about Bayesian Inference at https://en.wikipedia.org/wiki/Bayesian_inference.

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