

## Exercise 9.2

### 1. The Roundness versus the Flatness of the Earth.

- **Consensus Source:** NASA's website provides extensive evidence from satellite images and space missions that confirm the Earth is round (spherical). NASA is a leading authority in space exploration and Earth sciences.
- **Non-Consensus Source:** Flat Earth Society's materials and publications argue for a flat Earth, contradicting overwhelming scientific evidence. These claims are not supported by empirical scientific data and are widely discredited by the scientific community.

### 2. The Earth has/has not been visited by aliens in recorded history.

- **Consensus Source:** The SETI Institute, which searches for signs of extraterrestrial intelligence, has found no credible evidence of alien visits to Earth. Their scientific approach to the search for alien life is widely respected in the astronomical community.
- **Non-Consensus Source:** Various UFO sighting reports and conspiracy theory websites claim evidence of alien visits. However, these sources often lack verifiable evidence and do not withstand scientific scrutiny.

### 3. Some people genuinely possess psychic abilities such as precognition or the ability to communicate with the dead.

- **Consensus Source:** The Committee for Skeptical Inquiry (CSI) often publishes articles and papers that critically examine claims of psychic abilities, finding no scientific basis for such claims.
- **Non-Consensus Source:** Television shows and books by self-proclaimed psychics claim evidence of psychic abilities. These claims frequently fail to be reproducible under controlled scientific conditions.

### 4. The presence or absence of a warming trend over the last 30 years in the city, county, or state where you live.

- **Consensus Source:** Local meteorological departments or services often keep historical climate data. For example, the National Oceanic and Atmospheric Administration (NOAA) in the United States provides access to weather and climate data that show trends over time.
- The Illinois State Climatologist provides time series plots showing annual temperature, precipitation, and snowfall trends for Champaign-Urbana, IL. The plots include a simple linear trend line to indicate overall changes and highlight considerable year-to-year and decade-to-decade variations due to climate trends and variability<sup>1</sup>.

### 5. The presence or absence of a global warming trend over the last 30 years.

- **Consensus Source:** The Intergovernmental Panel on Climate Change (IPCC) reports, which synthesize the work of thousands of scientists worldwide, confirm a significant global warming trend over the last 30 years.
- **Non-Consensus Source:** Some politically motivated or non-peer-reviewed articles claim that global warming is a hoax or overblown, despite the overwhelming consensus in the peer-reviewed scientific literature.

### 6. Coffee consumption causes/does not cause pancreatic cancer.

- **Consensus Source:** The American Cancer Society provides information that is consistent with current research, which generally shows no clear causal relationship between coffee consumption and pancreatic cancer.
- **Non-Consensus Source:** Occasional health fad websites or non-scientific publications may draw sensational claims about the dangers or benefits of coffee without a comprehensive review of the scientific literature.

7. **The effects of gluten on health (for people who do not suffer from celiac disease).**

- **Consensus Source:** Major health organizations like the Mayo Clinic provide information that, for non-celiac individuals, there is little evidence that gluten poses a health risk. Some people may have non-celiac gluten sensitivity, but its prevalence and impact are not clearly understood and do not warrant a gluten-free diet for the general population.
- **Non-Consensus Source:** Some diet books and wellness blogs advocate for gluten-free diets for all, often without robust scientific evidence to back up their claims.

8. **The anesthetic effects of curare.**

- **Consensus Source:** Scholarly articles in medical journals or information from medical textbooks describe the neuromuscular blocking effects of curare used in medical anesthesia. Its mode of action is well understood and documented in the scientific literature.
- **Non-Consensus Source:** There are few non-consensus sources on such a specific scientific topic, but misinformation can sometimes arise from sources conflating traditional use with medical use or misrepresenting its effects and risks.

### Exercise 9.3.1

- Everyone in this room is wearing a hat:
  - *Provability:* This claim can be proven true by visually inspecting each person in the room and verifying that they are wearing a hat.
- All objects that are heavier than air fall when released at the earth's surface:
  - *Provability:* This claim can be tested through experimentation, although it might be subject to exceptions due to aerodynamics, magnetic fields, or other forces. However, it's impossible for us to test it for all the object in the universe.
- Every currently living human has a heart:
  - *Provability:* It's widely accepted in medical and scientific communities, although proving it conclusively for every individual is practically impossible.
- Every human who has ever lived had a heart:
  - *Provability:* This claim extends to historical and prehistoric times making it difficult to prove. However, it's reasonable to believe based on our understanding of human biology.
- Every human (past, present, and future) has/had/will have a heart:
  - *Provability:* This claim is even more expansive and speculative, especially regarding the future. It's impossible to prove. We should be cautious about the statement as it's based on assumptions that might not hold in face of biological or technological evolution.
- All currently living ravens are black:

- *Provability:* This is a broad generalization which is difficult to prove due to the vast number of ravens. However, it's a common observation that could form a reasonable belief.
7. All sodium chloride (table salt) burns with a yellow flame:
    - *Provability:* This claim can be tested and verified through controlled experiments, although proving it for all sodium chloride might be impractical.
  8. All planets are less than 100,000 miles in diameter:
    - *Provability:* This claim can be checked against astronomical data, although the definition of planets might evolve or new celestial bodies might be discovered that challenge this claim. (It's impractical to prove it true, yet it's easy to prove it false (single case))
  9. Nothing can accelerate up to the speed of light:
    - *Provability:* This claim is supported by the theory of relativity, but proving it definitively is impractical.
  10. Gold melts at 1,948°F (1,064°C):
    - *Provability:* This claim is easily verifiable through experimentation and is well-documented in scientific literature, though it's impossible to test on every gold in the universe.

### Exercise 9.3.2

1. **Grain Alcohol Boiling Point:** The evidence provided, in this case, does indeed offer strong reason to reject the hypothesis. The experimental setup seems straightforward, and the thermometer readings directly contradict the stated boiling point. It's a clear case where the hypothesis is shown to be false by empirical evidence.
2. **Car Keys Location:** The evidence provided doesn't conclusively falsify the hypothesis. It's possible that the keys are elsewhere in the bedroom, not just on the bedside table. To more thoroughly test the hypothesis, a more exhaustive search of the bedroom would be needed.
3. **Global Warming:** The evidence of increased snowfall in the U.S. over a decade doesn't provide a strong basis for rejecting the global warming hypothesis. Global warming refers to long-term warming of the planet, and its effects can result in a wide range of climatic changes, including potentially more snowfall in certain areas due to increased evaporation and moisture in the air. A more comprehensive examination of global temperature trends and other climate indicators would be needed to assess this hypothesis accurately.
4. **Flat Earth:** The evidence of seeing a ship's lower part disappear over the horizon while its mast remains visible is a classic example that supports the round Earth hypothesis and contradicts the flat Earth hypothesis. This observation aligns with the understanding of the Earth's curvature affecting how distant objects appear from a given viewpoint.
5. **Mass Measurement:** The evidence provided - a verified accurate weighing scale showing a weight of 4.8 kg - gives a good reason to reject the hypothesis that the mass is 5 kg. While there might be a slight margin of error, the direct measurement of the mass with a verified tool provides strong evidence against the hypothesis.
6. **Moon Mountains:** The telescope observation showing mountains on the moon's surface provides strong evidence against the hypothesis that there are no mountains on the moon. The verification of the telescope's accuracy with other objects enhances the reliability of this evidence.