

Midterm - INTD262

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1 Unit 3

1. Recall the fascinating story about psychological research, in which the author shares that 67 percent of psychologists who were asked to share their data did not share it. (a) Were the rates of error higher or lower in the studies for which the authors did not share data? (b) In whose favor were the errors?
 - (a) The studies where authors did not share data had higher rates of error. The lack of transparency and failure to share data typically leads to unverified conclusions and may contribute to flawed or biased results.
 - (b) The errors favored the researchers or the study's authors, as they did not allow external scrutiny or verification of their findings, potentially allowing for the publication of erroneous conclusions without challenge
2. "Recent research in behavioral economics has shown that groups are often better than individuals at finding errors in reasoning." (a) Why do you think this is the case? (b) Can you give an example of the wisdom of crowds thus far in our study of Latin American science?
 - (a) Groups are often better than individuals at finding errors in reasoning because diverse perspectives, knowledge, and experiences within a group help identify mistakes that might be missed by a single person. Groups can pool collective intelligence to correct errors and improve accuracy.
 - (b) In Latin American science, an example could be the collaborative work of scientists in the 19th century, where large teams of researchers, such as those in the expeditions led by figures like José Celestino Mutis, pooled their knowledge to study and categorize plant species, ultimately correcting mistakes and advancing scientific understanding in a more accurate and comprehensive way.
3. Recall the story of cold fusion. (a) List three facets of the peer review process that went wrong in this episode. (b) How long, from start to finish, did it take for the scientific community to sort out the errors in the cold fusion research?
 - (a) Three issues with the peer review process in the cold fusion episode were:
 1. Premature publication without adequate experimental validation.
 2. Lack of replication of results by independent researchers.
 3. Bias in the review process that allowed the findings to be published despite skepticism from experts in the field.
 - (b) It took about over a decade for the scientific community to fully debunk and resolve the issues surrounding cold fusion research, which began in the late 1980s and was largely discredited by the mid-1990s.
4. Note that we encountered several examples of viceregal engineers becoming Latin American leaders. (a) What are some examples of professions that involved modern technical skill in Río de la Plata and Peru? (b) What is the primary profession of modern US leaders, for example, elected to The United States Congress?
 - (a) In Río de la Plata and Peru, professions involving modern technical skills included **engineering**, particularly **civil and military engineering**, which were crucial for infrastructure development, including roads, fortifications, and water systems. **Mining engineers** and **surveyors** also played a significant role.
 - (b) Modern U.S. leaders in Congress often come from professions such as **law**, **business**, and **public service**, with a growing trend of people from **science and technology** backgrounds entering politics.
5. José Mariano Mociño and others were ordered by the Mexican viceroy on an expedition to Nootka Island. What was the purpose of the expedition? (Take INTD255 to learn more!)

The purpose of the expedition was to **survey and document the natural history** of the Pacific Northwest, particularly its plants and animals, as part of a broader scientific interest in the flora and fauna of the Americas

during the Spanish colonial period.

6. In Per'ú, we must take note of the work of Hip'olito Un'anue. (a) What are some of his other scientific contributions? (b) In Nueva Granada, we must take note of the work of Jos'e Celestino Mutis. What are some of his main contributions?

(a) Hipólito Unánue was known for his contributions to **botany** and **pharmacology**, including his work on the medicinal properties of native plants in Peru. He also played a key role in the development of public health and the introduction of medical reforms.

(b) José Celestino Mutis is renowned for his work on the **Royal Botanical Expedition**, where he cataloged over 6,000 plant species in Nueva Granada (now Colombia). He made significant contributions to botany and was instrumental in the establishment of scientific research institutions in the region.

7. (a) When did Latin American wars of independence begin, approximately? (b) Give some examples of scientists and engineers who fought and died for their countries.

(a) Latin American wars of independence began around **1810**, starting with the **revolutionary movements in Argentina, Venezuela, and Mexico**.

(b) Several scientists and engineers participated in the independence movements, such as **Bernardo de Monteagudo**, a prominent Argentine revolutionary who was also a physician, and **José María Teclo Morelos**, a Mexican priest and revolutionary leader with scientific interests.

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2 Unit 4

1. How long after Semmelweis's solution to childbed fever was germ theory introduced?

The introduction of **germ theory** occurred roughly **20-30 years** after Semmelweis proposed his solution to childbed fever in the **1840s**. Germ theory was established in the **1860s** with the work of **Louis Pasteur** and **Robert Koch**.

2. Where did the practice of autopsies begin? In what way does performing an autopsy fit with the scientific attitude?

The practice of autopsies began in **ancient Greece** and **Rome**, with notable contributions from **Galen** and later, **Renaissance** anatomists. Autopsies are key to the scientific attitude because they represent an empirical approach to understanding disease and the human body, driven by observation, experimentation, and evidence.

3. (a) Do you think the discovery of penicillin was an accident? Why or why not? (b) Louis Pasteur is quoted as saying "chance favors the prepared mind." What did he mean by this? (c) In light of (a) and (b) do you regard the discovery of cinchona as accidental or scientific?

(a) The discovery of **penicillin** by **Alexander Fleming** is often regarded as **serendipitous**—Fleming noticed the mold's antibiotic effect while researching bacteria. However, it was his **prepared mind**, knowledge of microbiology, and ability to recognize the potential of his observations that made it a scientific discovery.

(b) "Chance favors the prepared mind" means that **unexpected discoveries** often occur when individuals are ready to recognize their significance, based on existing knowledge and experience.

(c) The discovery of **cinchona** (quinine) was not an accident but rather a **systematic exploration** of indigenous knowledge in the Americas, which led to the identification of its medicinal properties for treating malaria.

4. What event catalyzed the formation of the Establecimiento de Ciencias de M'edicas in 1833?

The **Establecimiento de Ciencias M'edicas** was formed in **1833** after the **epidemics** (such as smallpox and yellow fever) and the realization that **medical education and public health** needed reform to address growing health crises.

5. (a) List some reasons the authors give to explain why medical reforms were slow to materialize in Nueva

Granada, relative to the struggle for reform in Nueva España. (b) Who led the medical reform process in Nueva Granada in the 18th century? (c) When and where was the Facultad de Medicina reestablished in Nueva Granada, and what happened next?

(a) Reforms in **Nueva Granada** were slow due to political instability, lack of resources, and entrenched colonial structures. The **struggle for reform in Nueva España** (Mexico) was more immediate due to the **more developed** colonial medical system.

(b) The medical reform in **Nueva Granada** was led by figures like **Francisco José de Caldas** and **José María Cabal**.

(c) The **Facultad de Medicina** was re-established in **1827** in **Bogotá**. The **first modern reforms** were influenced by **European medical advances** and later, the establishment of the **School of Medicine in 1865**.

6. (a) How many medical schools were there in Brazil in the eighteenth century? (b) What happened to the Portuguese Crown in 1807? What influence did this have on medical reform?

(a) In the 18th century, there were **only two medical schools** in Brazil: one in **Bahia** (founded in 1808) and another in **Rio de Janeiro** (founded in 1826).

(b) In **1807**, the **Portuguese Crown** fled to Brazil due to the Napoleonic Wars, leading to the creation of the first medical and surgical schools as part of the broader modernization effort.

(c) After Brazil declared independence in **1822**, medical reforms in **Bahia** and **Rio de Janeiro** took place, particularly after **1850**.

7. As the generation of doctors in Columbia returned from France in the late 19th century, what three cultural institutions did they establish to enhance medical practice?

a) A major driver of **modern epidemiology** in 19th-century Brazil was the fight against **yellow fever** and **malaria**, which were widespread in Brazilian cities.

(b) The **Tropicalist School** aimed to develop **tropical medicine**, focusing on diseases unique to the region, such as **yellow fever**, **malaria**, and **dengue**.

(c) The **bubonic plague** entered Brazil in the **1890s**, and the response involved **quarantines**, public health reforms, and the work of prominent physicians like **Oswaldo Cruz**, who led campaigns to eradicate yellow fever and improve sanitation.

8. Triangulation Suppose you observe a distant mountain from a flat plain. Suppose you walk a baseline of 1 km, perpendicular to the direction towards the mountain. The difference between the compass headings to the mountain at either end of the baseline is 5 degrees. How far away is the mountain?

The mountain is **0.5 km** away.

9. Latitude and Longitude (a) Suppose two cities lie along a constant line of longitude. If we measure a change of 30 minutes (0.5 degree latitude) between them, how far apart are they, in km? (b) Suppose two cities lie along a constant latitude of 45 degrees North. If they are 600 km apart, what is the change in longitude between them?

The cities are **55.5 km** apart.

3 Unit 5

1. (a) When were the first medical journals published in Columbia? (Give a few examples). (b) Compare this time frame to the publication of the first mining, chemistry, and physics journals in Mexico. (c) How, or through

whom, were these journals connected to medical schools in Columbia?

- (a) The first medical journals in Colombia were published in the early **19th century**, including journals like the **Revista Médica de Bogotá** (founded in **1822**).
- (b) In comparison, Mexico's first scientific journals in mining, chemistry, and physics were also founded in the **19th century**, with early journals such as **El Minero** in **1810**.
- (c) These medical journals were closely connected to **medical schools** in Colombia, with professors and physicians contributing articles based on their teaching and clinical experience.

2. In 1833, two Enlightenment period institutions were merged into the beginnings of a modern medical school in Mexico. What were the three institutions?

The merger in 1833 included the **Royal and Pontifical University of Mexico**, the **Royal Botanical Expedition**, and the **Medical College** to form the **National School of Medicine**.

3. Consider our major in kinesiology and nutrition science (KNS). To what extent would we consider this medicine, in the absence of modern germ theory? That is, are there other holistic forms of medical development we encountered in Latin American history besides vaccines and drugs that fight bacteria and viruses?

In the absence of **germ theory**, fields like **kinesiology** and **nutrition science** would be considered part of holistic approaches to **health and medicine**, focusing on body mechanics, physical health, and nutrition as central aspects of wellness.

4. (a) What historical event in 1808 led to the creation of the first medical and surgical schools in Brazil (b) When did Brazil declare independence from Portugal? (c) How long after independence did the Brazilians introduce modern reforms into the medical schools in Bahia and Rio de Janeiro?

(a) The creation of the first **medical and surgical schools** in Brazil was catalyzed by the **arrival of the Portuguese court** in 1808.

(b) Brazil declared independence from **Portugal** in **1822**.

(c) Medical reforms began in the **mid-19th century**, with significant improvements in **medical education** by the 1850s.

5. In Columbia, the Escuela de Medicina was founded in 1865. It was centered on hospital-based anatomy and physiology. Consider the following quote from the text: "The second phase is notable for the slow progress of laboratory-based medicine, especially etiopathological procedures. Its final stage, starting in the 1950s, is defined by the introduction of Flexnerian reforms from North American technological medicine." What does quote mean by Flexnerian? Think back to our reading in The Scientific Attitude.

6. (a) What was a major driver of modern epidemiology in 19th Century Brazil? (b) What was the purpose of the Tropicalist School of medicine? (c) When did the bubonic plague enter Brazil, and how did the Brazilians respond?

