

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?

Error rates were higher in studies where authors did not share their data. This was observed in reproducibility research, where replicated effects were on average smaller in magnitude (0.197) compared to the original effects (0.403), according to data from Science (2015) on reproducibility in psychology.

(b) Errors were often in favor of the original study authors, potentially reflecting a bias towards confirming their initial hypotheses.

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?

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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) The first failure is the absence of independent reproduction of results, the second is the rushed publication of unverified findings, and the last is confirmation bias among reviewers.

(b) It took the scientific community around 2 years to resolve the errors.

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) Modern professions included military engineering, architecture, and cartography, essential for infrastructure and defense projects.

(b) Most congressional leaders came from fields such as law, politics, or business.

5. José Mariano Mocino 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 expedition aimed to explore and document the flora, fauna, and geography of the region, strengthening the scientific and political interests of New Spain.

6. In Peru, we must take note of the work of Hipólito Unzué. (a) What are some of his other scientific contributions? (b) In Nueva Granada, we must take note of the work of José Celestino Mutis. What are some of his main contributions?

a) Unañue contributed to medicine and meteorology, analyzing how climate impacted health.
(b) Similarly, Mutis led the Royal Botanical Expedition, classifying hundreds of species and contributing to global botanical knowledge.

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) The wars began around 1810.

(b) For example, Francisco José de Caldas, who was a scientist and military officer, was executed for his participation in the independence struggle.

2 Unit 4

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

The germ theory was accepted approximately 20 years after Semmelweis's proposals on puerperal fever.

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

Autopsies began in ancient Greece and Rome, aiming to provide a scientific approach by exploring and understanding the human body to identify the causes of diseases and deaths.

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) I believe it was accidental, as penicillin was discovered accidentally by Alexander Fleming in 1928, though in a context of scientific preparation.
b) Louis Pasteur alluded to the idea that a "prepared mind" can recognize opportunities even in fortuitous events.
c) Quinine, a remedy for malaria derived from the cinchona tree bark, was discovered partly by accident.

4. What event catalyzed the formation of the Establecimiento de Ciencias de Médicas in 1833?

The rise of Enlightenment thinking and the need to institutionalize medical education in Latin America were the events that led to the formation of the *Establecimiento de Ciencias Médicas* in 1833.

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) Due to political and social limitations, reforms were slow, but also hindered by a lack of resources.

b) Celestino Mutis led the medical reform processes.

c) The Faculty of Medicine in Bogotá was reestablished in 1803, professionalizing medical practice.

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) Brazil only had two medical schools in the 18th century.

b) The reform in education was driven by the arrival of the Portuguese crown.

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?

Doctors returning from France established three key institutions: public libraries, scientific societies, and modernized hospitals.

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?

Using the principles of trigonometry, an observer can calculate that the distance to the mountain is approximately 11.5 km.

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?

a) A change of 0.5 degrees in latitude is approximately equivalent to 55.5 km.

b) For two cities at 45 degrees north and separated by 600 km, the change in longitude is approximately 7.58 degrees.

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 mid-19th century. Examples include Revista Médica de Bogotá and El Observador Médico.

(b) The first mining, chemistry, and physics journals in Mexico predate these and were influenced by the scientific boom of the early 19th century, such as *El Anfiteatro Anatómico Mexicano*.

(c) These journals were strongly linked to Colombian medical schools through professors and doctors who contributed articles. They served as platforms for sharing knowledge and advancements from faculties like the *Escuela de Medicina de Bogotá*.

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 *Colegio de Cirugía*, the *Hospital de San Andrés*, and the *Real Tribunal del Protomedicato* merged to lay the foundation for modern medical education in Mexico.

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?

Modern germ theory is very important for kinesiology and nutrition because, without it, they would likely be considered holistic approaches to medicine. In the history of Latin America, there were other forms of medical development beyond vaccines and medications, such as herbal remedies and traditional indigenous healing practices. These methods focused on overall well-being and preventive care.

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 event in 1808 that led to the creation of the first medical and surgical schools in Brazil was the arrival of the Portuguese Crown, fleeing Napoleon's invasion of Portugal.

(b) Brazil's independence was in 1822.

(c) Modern reforms were introduced in the medical schools of Bahia and Rio de Janeiro approximately 20 years after independence, around the 1840s.

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.

The term "Flexnerian" refers to the reforms inspired by the 1910 Flexner Report in the United States, which emphasized laboratory-based medicine, scientific rigor, and standardized curricula. Similarly, in Colombia, these reforms marked the transition to a more technological and research-oriented approach in medicine.

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?

(a) A key factor in the development of modern epidemiology in 19th-century Brazil was the need to combat tropical diseases such as yellow fever and malaria.

(b) The Tropicalist School of Medicine focused on studying and treating diseases specific to tropical climates, developing local knowledge and expertise.

(c) Brazil's response to the bubonic plague in 1900 included implementing quarantines, disinfection campaigns, and public health education programs to control its spread.