

EXPLANATION TO WHY CRIMINOLOGICAL RESEARCH IS SCIENCE

WHAT IS SCIENTIFIC RESEARCH?

It is considered “scientific research” unless:

- (1) it contributes to a body of science, and
- (2) it follows the scientific method.

Then what is scientific method? We will begin with the word science!

Etymologically, the word “science” is derived from the Latin word *scientia* meaning knowledge. **Science** refers to a systematic and organized body of knowledge in any area of inquiry that is acquired using “the scientific method”

Science can be grouped into two broad categories: natural science and social science.

Natural science is the science of naturally occurring objects or phenomena, such as light, objects, matter, earth, celestial bodies, or the human body. Natural sciences can be further classified into physical sciences, earth sciences, life sciences, and others. Physical sciences consist of disciplines such as physics (the science of physical objects), chemistry (the science of matter), and astronomy (the science of celestial objects). Earth sciences consist of disciplines such as geology (the science of the earth). Life sciences include disciplines such as biology (the science of human bodies) and botany (the science of plants).

In contrast, **social science** is the science of people or collections of people, such as groups, firms, societies, or economies, and their individual or collective behaviors. Social sciences can be classified into disciplines such as psychology (the science of human behaviors), sociology (the science of social groups), and economics (the science of firms, markets, and economies).

The **natural sciences** are different from the social sciences in several respects. The natural sciences are very precise, accurate, deterministic, and independent of the person making the scientific observations. For instance, a scientific experiment in physics, such as measuring the speed of sound through a certain media or the refractive index of water, should always yield the exact same results, irrespective of the time or place of the experiment, or the person conducting the experiment.

- If two students conducting the same physics experiment obtain two different values of these physical properties, then it generally means that one or both of those students must be in error.

However, the same cannot be said for the social sciences, which tend to be less accurate, deterministic, or unambiguous. For instance, if you measure a person’s happiness using a hypothetical instrument, you may find that the same person is more happy or less happy (or sad) on different days and sometimes, at different times on the same day. One’s happiness may vary depending on the news that person received that day or on the events that transpired earlier during that day. Furthermore, there is not a single instrument or metric that can accurately measure a person’s happiness.

- Hence, one instrument may calibrate a person as being “more happy” while a second instrument may find that the same person is “less happy” at the same instant in time.

In other words, there is a high degree of *measurement error* in the social sciences and there is considerable uncertainty and little agreement on social science policy decisions.

For instance, you will not find many disagreements among natural scientists on the speed of light or the speed of the earth around the sun, but you will find numerous disagreements among social scientists on how to solve a social problem such as reduce global terrorism or rescue an economy from a recession. Any student studying the social sciences must be cognizant of and comfortable with handling higher levels of ambiguity, uncertainty, and error that come with such sciences, which merely reflects the high variability of social objects.

Sciences can also be classified based on their purpose.

1. **Basic sciences**, also called pure sciences, are those that explain the most basic objects and forces, relationships between them, and laws governing them. Examples include physics, mathematics, and biology.
2. **Applied sciences**, also called practical sciences, are sciences that apply scientific knowledge from basic sciences in a physical environment.

For instance, engineering is an applied science that applies the (PURE SCIENCE) laws of physics and chemistry for practical applications such as building stronger bridges or fuel efficient combustion engines, while medicine is an applied science that applies the laws of biology for solving human ailments. Both basic and applied sciences are required for human development. However, applied sciences cannot stand on their own right, but instead relies on basic sciences for its progress. Of course, the industry and private enterprises tend to focus more on applied sciences given their practical value, while universities study both basic and applied sciences.

SO sa atin because we are at school base, we both study basic and applied science.

SCIENTIFIC KNOWLEDGE

The purpose of science is to create scientific knowledge. **Scientific knowledge** refers to a generalized body of laws and theories to explain a phenomenon or behavior of interest that are acquired using the scientific method. **Laws** are observed patterns of phenomena or behaviors, while **theories** are systematic explanations of the underlying phenomenon or behavior. For instance, in physics, the Newtonian Laws of Motion describe what happens when an object is in a state of rest or motion (Newton's First Law), what force is needed to move a stationary object or stop a moving object (Newton's Second Law), and what happens when two objects collide (Newton's Third Law). Collectively, the three laws constitute the basis of classical mechanics – a theory of moving objects. Likewise, the theory of optics explains the properties of light and how it behaves in different media, electromagnetic theory explains the properties of electricity and how to generate it, quantum mechanics explains the properties of subatomic particles, and thermodynamics explains the properties of energy and mechanical work.

The goal of scientific research is to discover laws and postulate theories that can explain natural or social phenomena, or in other words, build scientific knowledge. It is important to understand that this knowledge may be imperfect or even quite far from the truth.

- Sometimes, there may not be a single universal truth, (meaning absolute truth) but rather an equilibrium of “multiple truths.”
- We must understand that the theories, upon which scientific knowledge is based, are only explanations of a particular phenomenon, as suggested by a scientist.
- As such, there may be good or poor explanations, depending on the extent to which those explanations fit well with reality, and consequently, there may be good or poor theories.

The progress of science is marked by our progression over time from poorer theories to better theories, through better observations using more accurate instruments and more informed logical reasoning.

We arrive at scientific laws or theories through a process of logic and evidence. **Logic** (theory) and **evidence** (observations) are the two, and only two, pillars upon which scientific knowledge is based.

In science, theories and observations are interrelated and cannot exist without each other. **Theories provide meaning and significance to what we observe**, and **observations help validate or refine existing theory or construct new theory**. Any other means of knowledge acquisition, such as **faith or authority cannot be considered science**.

SCIENTIFIC RESEARCH

Given that theories and observations are the two pillars of science, scientific research operates at two levels:

1. A theoretical level; and
2. An empirical level.

The **theoretical level** is concerned with developing abstract concepts about a natural or social phenomenon and relationships between those concepts (i.e., build “theories”);

While the **empirical level** is concerned with testing the theoretical concepts and relationships to see how well they reflect our observations of reality, with the goal of ultimately building better theories.

Over time, a theory becomes more and more refined (i.e., fits the observed reality better), and the science gains maturity. Scientific research involves continually moving back and forth between theory and observations. Both **theory and observations are essential components of scientific research**. For instance, relying solely on observations for making inferences (pinaliwanag mo lang, wala kang napulot o naidulot na pagbabago, let say (wala kang conclusion – or may conclusion ka walang recommendation) and ignoring theory is not considered valid scientific research. Yan ang nangyayari sa mga problema ng bansa natin, base sa observation ito ang problema, di ganito gawin natin, practical solution yan ang dating is tactical decision, ang problem na yan lang ang masosolve at ang ibang kaparehas na problem hindi nya masosolve. Beside, temporary ang solution kaya ang problema will continue to persist at wala pong science dun, inference lang ang ginamit mo...marami tayong ganyan, ang example dyan mismo ay an gang desisyon ng IATF na hindi scientific derivative. (WALANG PONG SCIENCE DYAN)

Depending on a researcher’s training and interest, scientific inquiry may take one of two possible forms: inductive or deductive. In **inductive research**, the goal of a researcher is to infer

theoretical concepts and patterns from observed data. In **deductive research**, the goal of the researcher is to test concepts and patterns known from theory using new empirical data. Hence, inductive research is also called *theory-building* research, and deductive research is *theory-testing* research. Note here that the goal of theory-testing is not just to test a theory, but possibly to refine, improve, and extend it. Figure (wag na to: 1.1 depicts the complementary nature of inductive and deductive research.) Note that inductive and deductive research are two halves of the research cycle that constantly iterates between theory and observations. You cannot do inductive or deductive research if you are not familiar with both the theory and data components of research. Naturally, a complete researcher is one who can traverse the entire research cycle and can handle both inductive and deductive research.

It is important to understand that **theory-building (inductive research)** and **theory-testing (deductive research)** are both critical for the advancement of science. Elegant theories are not valuable if they do not match with reality. Likewise, mountains of data are also useless until they can contribute to the construction to meaningful theories. (**wala na ito**: Rather than viewing these two processes in a circular relationship, as shown in Figure 1.1, perhaps they can be better viewed as a helix, with each iteration between theory and data contributing to better explanations of the phenomenon of interest and better theories. (**hanggang dito**) Though both inductive and deductive research are important for the advancement of science, it appears that inductive (theory-building) research is more valuable when there are few prior theories or explanations, while deductive (theory-testing) research is more productive when there are many competing theories of the same phenomenon and researchers are interested in knowing which theory works best and under what circumstances.

Theory building and theory testing are particularly difficult in the social sciences, given the FOLLOWING factors:

1. Imprecise nature of the theoretical concepts;
2. Inadequate tools to measure them,
3. The presence of many unaccounted factors that can also influence the phenomenon of interest; and
4. It is also very difficult to refute theories that do not work.

For instance, Karl Marx's theory of communism as an effective means of economic production withstood for decades, before it was finally discredited as being inferior to capitalism in promoting economic growth and social welfare. Erstwhile communist economies like the Soviet Union and China eventually moved toward more capitalistic economies characterized by profit-maximizing private enterprises.

However, the recent collapse of the mortgage and financial industries in the United States demonstrates that capitalism also has its flaws and is not as effective in fostering economic growth and social welfare as previously presumed. (Corporate Governance)

Unlike theories in the natural sciences, social science theories are rarely perfect, which provides numerous opportunities for researchers to improve those theories or build their own alternative theories.

DITO NGAYON papasok ang talent ng CRIMINOLOGIST especially when it comes to solving social problems like crime.

Conducting scientific research, therefore, requires two sets of skills – **theoretical and methodological** – needed to operate in the theoretical and empirical levels respectively. Methodological skills ("know-how") are relatively standard, invariant across disciplines, and easily acquired through doctoral programs. However, theoretical skills ("know-what") is considerably

harder to master, requires years of observation and reflection, and are tacit skills that cannot be “taught” but rather learned through experience. All of the greatest scientists in the history of mankind, such as Galileo, Newton, Einstein, Neils Bohr, Adam Smith, Charles Darwin, and Herbert Simon, were master theoreticians, and they are remembered for the theories they postulated that transformed the course of science.

Methodological skills are needed to be an ordinary researcher, but theoretical skills are needed to be an extraordinary researcher!

Scientific Method

In the preceding sections, we described science as knowledge acquired through a scientific method. So what exactly is the “scientific method”? **Scientific method** refers to a standardized set of techniques for building scientific knowledge, such as how to make valid observations, how to interpret results, and how to generalize those results. The scientific method allows researchers to independently and impartially test preexisting theories and prior findings, and subject them to open debate, modifications, or enhancements. The scientific method must satisfy four key characteristics:

- **Logical:** Scientific inferences must be based on logical principles of reasoning. (Kaya ba itong ipaliwanag at madaling maintindihan)
- **Confirmable:** Inferences derived must match with observed evidence. (Madali ba itong i-verify – meaning evidence-based, kapag sinubukan mo na i-apply makikita mo kaagad ang resulta at may epekto kaagad bilang solution sa problema? **Read it's implications in repeatable, because if you could confirm the result, you can easily REPEAT IT!**)
- **Repeatable:** Other scientists should be able to independently replicate or repeat a scientific study and obtain similar, if not identical, results. (Pag sinubukan mo ba ito hahantong sya sa kaparehas na resulta, tulad ng mga researches sa ibang bansa na pag sinubukan mo dito sa bansa natin parehas din ang kahihinatnan. Scientifically, dyan mo masusubok yong tinatawag na generalization, tulad ng temperature ng tao na 37°C (Celsius) or (98.6°F (Fahrenheit), scientifically kahit saan ka magpunta saan mang panig ng mundo pag ginamit ang testing instrument na yan ang resulta parehas lang. That's what generalization is. Yung mga theory sa krimen, in your analysis, pag-tinest mo yan, would you think you will arrive at the result if applied in different country? in other words dyan natin makikita kung ang research na yan applicable ba locally or generally. Again, why pure research may be different from applied research? Like for example in medicine, if American doctors cured headache with paracetamol effectively, would you think, it can also effectively cured Filipinos using the same medicine? This may also applied in the case of Koban Policing of Japan, if Koban is very effective in Japan, would you think it can also be applied in the Philippines? This is the reason why there is a need to test the theory and its applicability. In the words of Dr. Salih Can, a professor of the university of Massachusetts, he uses police as an example that when they employ solution to a particular problem what they are using is APPLIED RESEARCH, and this is based on PRACTICAL SOLUTION, but in the university (just like us supposed to be), what they are prescribing as a solution is PURE RESEARCH, (he made statement that they do research for the sake of the research) because before they employ such solution THEY TRY TO TEST IT IF IT REALLY WORKS. This is the reason why **“PURE RESEARCH NEEDS TO BE SCRUTINIZED!** Tulad ng bodycam ng pulis, dahil gumagamit ng body ang mga foreign pulis, dapat ba ang Filipinong pulis gumamit din ng bodycam? In fact, maraming bansa ang gumawa kaagad ng research patungkol dito? Most of the title sound like this: Where do the State Should Invest:

Strengthening the Moral Character of the Police or Spend on Technology? In other words, paano ang maliliit na bansa na walang kakayahan mag invest sa technology? Talaga bang kinakailangang umutang sa World Bank para sumabay sa teknolohiya o may ibang paraan pa para matugunan ang problema ng hindi gaanong naapektuhan ang kanilang ekonomiya? In this situation the need for a better research is needed

- *Scrutinizable:* The procedures used and the inferences derived must withstand critical scrutiny (peer review) by other scientists. If you are scientific researcher in other words, your work must be open to the society for scrutiny. Kaya dapat magaling kang researcher, kasi sa hanay ng iyong propesyon, kinakailangan IOPEN MO ANG IYONG RESEARCH PARA TIGNAN NILA GAANO KATIBAY ANG INTEGRIDAD NITO, AT SA PAMAMAGITAN NYAN, MALALAMAN MO KUNG TATANGGAPIN BA NILA ITO BILANG ISANG TUNAY NA LIKHA NG AGHAM at nararapat na ikaw ay purihin at isulong o di kaya tangkilikin ang iyong natuklasan at matulungan ka na ibahagi ito para sa mas malawakang kaalaman (Your works needs to be evaluated by peer within your science to determine its integrity; when they find integrity and credibility out of your works, it will help you promotes and advance your works not only for the sake of your science but for the sake of the society that will be benefited by that study.

Any branch of inquiry that does not allow the scientific method to test its basic laws or theories cannot be called “**SCIENCE.**”

For instance, theology (the study of religion) is not science because theological ideas (such as the presence of God) cannot be tested by independent observers using a logical, confirmable, repeatable, and scrutinizable.

Similarly, arts, music, literature, humanities, and law are also not considered science, even though they are creative and worthwhile endeavors in their own right.

The scientific method, as applied to social sciences, includes a variety of research approaches, tools, and techniques, for collecting and analyzing qualitative or quantitative data. These methods include laboratory experiments, field surveys, case research, ethnographic research, action research, and so forth.

However, recognize that the scientific method operates primarily at the empirical level of research, i.e., how to make observations and analyze these observations.

Very little of this method is directly pertinent to the **theoretical level**, which is really the more challenging part of scientific research.

Our challenges today is that if we could not do this time to be at the theoretical level, pwede naman natin umpisahan sa methodological level muna. This is one way of sharpening our minds and thoughts through constant practice (using at least accurate observation and logical reasoning) saka na ang magpatunay na ang ganitong paniniwala ay epektibo at kayang ma solve ang existing social problem. (sa ibang bansa meron na silang bagong theory and in fact is already a science within criminology, yan yong neurocriminology, that is in Europe where a criminal with history of accidental bumping on the head prior to becoming a criminal undergo surgery in the skull. To the surprise of the court and some medical practitioner, the inclination of the man to commit crime ceased and stop after brain surgery.....yan high level ng experiment yan, that is an example of pure scientific research.

We are thinking of course of some pure research that can be applied in the line of work of the crime and policing, but such level of research is still a dream for Filipino Criminologists because our profession is still seeking its right direction even up to this very moment.