PRINCIPLES OF EMPIRICAL SCIENCE: A REMINDER

D. Gile

daniel.gile@yahoo.com
www.cirinandgile.com
Speaker’s bias

- Initial training in mathematics
- Also training in sociology
  (empirical studies orientation)
- No training in humanities
- Observation of research practice as an interpreter in scientific conferences
- Teaching research methods in mixed environments
  (students of Japanese, T&I and terminology students)
- Analysis of research in humanities through contact with translation research
Main points of presentation

• Reminder about the *Scientific Approach*, its rationale and norms → ESP

• *The Scientific Approach/ESP* is not necessarily the best way to explore the world

• Sophisticated methods are not necessarily the best in all circumstances

• Compliance with ‘scientific’ norms is not correlated with the degree of sophistication of the methods used

• When doing a PhD, need to choose paradigm and comply with the relevant norms
Science: a reminder (1)

Our knowledge about the World/representation of the World comes from:

- **Experiential knowledge**
  
  *(direct experience through sensory experience and its analysis)*

- **Inherited knowledge**
  
  *(what we learn from others)*

- **What our brain does** with the information
Science: a reminder (2)

Data acquisition and its processing by the brain are constrained by:

- **Sensory** limitations
- **Cognitive** limitations
- **Emotional** interference

*(which tends inter alia to make us see what we want to/expect to see and disregard what we would not like to see/do not expect)*
Science: a reminder (3)

Recognizing these limitations, philosophers and scientists have been developing for centuries the ‘Scientific Approach’ (SA), in order to push them back.
Science: a reminder (4)

SA was first used in natural sciences,

*it was also imported into social sciences*

Henceforth ‘**ESP**’ – Empirical Science Paradigm

Some of its norms (in particular writing norms) are found in the humanities as well

On the whole, it is found in empirical disciplines more than in theoretical disciplines
Norms and methods

SA/ESP can be represented through:

- **Conceptual Norms**
- **Social norms and institutions** to enforce their implementation (academic hierarchy, peer reviewing…)
  
  *Social norms and institutions are very similar in ESP and in non-ESP academic disciplines*

- **Technical research methods**
- **Writing norms**
Conceptual norms (1)

‘Science’ (ESP) is *supposed* to be

‘**Rigorous’**
- **Systematic**
- **Cautious**
- **Objective**

**Logical**

‘**Collective’**
- **Communicative**
  - **Critical**
  - **Explicit**
Conceptual norms (2)

In concrete terms, ESP scholars:

- Systematically conduct *empirical testing* of their ideas and theories
- Systematically *provide evidence* to back up claims
- Are *explicit* about their materials, methods and factual and/or logical grounds for their claims
- Make a *clear distinction* between documented facts and speculative thoughts
THE ESP CYCLE (Popperian model)

OBSERVATION

\[ \downarrow \]

THEORY

\[ \downarrow \]

(EMPirical) TESTING

\[ \downarrow \]

NEW/IMPROVED THEORY

\[ \downarrow \]

(EMPirical) TESTING

\[ \downarrow \]

\[ \ldots \]
THE ESP CYCLE (More realistic)

OBSERVATION
\[ \downarrow \]
THEORY
\[ \downarrow \]
(EMPIRICAL) TESTING + SOCIAL FORCES
\[ \downarrow \]
NEW/IMPROVED THEORY
\[ \downarrow \]
(EMPIRICAL) TESTING + SOCIAL FORCES
\[ \downarrow \]
\[ \ldots \]

[ Inter alia: Kuhn’s theories of scientific (r)evolution ]

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THEORIES AND TESTING

NEW THEORIES ARE CONSIDERED \textit{PROVISIONAL MODELS/EXPLANATIONS OF REALITY}

THEY ARE \textit{TESTED SYSTEMATICALLY},
WITH THE EXPECTATION (\textit{IN PRINCIPLE!}) THAT

\ldots TESTS WILL INDUCE CHANGES IN THE THEORY AND IMPROVE IT
THE LIBERAL ARTS PARADIGM (LAP)

Very common approach in TS due to scholars’ background

- Mostly conceptual analysis – Essays

- Can be empirical - in a very wide sense
  (with examples, not representative samples in the statistical sense of the word, i.e. samples designed to represent the same features as the population)

- Personal interpretation of phenomena, statements, actions without necessarily considering alternatives
THE LAP CYCLE

OBSERVATION or IDEAS/THEORIES

DISCUSSION

NEW/IMPROVED THEORIES

NO EMPIRICAL TESTING

BUT EMPIRICAL FINDINGS FROM OTHER SCHOLARS’ STUDIES CAN BE TAKEN ON BOARD IN THE DISCUSSION
**LAP vs. ESP**

- **LAP Less cautious**  
  *(No strong requirement that samples be representative  
  No testing requirement before claims)*

- **Less stringent objectivity requirements**
- **Less stringent explicitness requirement**

Authors can make claims without explicating their tentative nature, without testing them, without providing evidence systematically.

So not fully compliant with SA norms
“LAP INFERIOR TO ESP”? 

Perhaps loss in reliability  
but 
- Faster 
- Some theories cannot be tested or tested well  
  *(difficult to find valid measurable indicators, variability…)*

LAP does provide a way of exploring phenomena collectively and critically. 

Cannot say it is “inferior” in absolute terms
ESP vs. the liberal arts and other types of exploration of reality

- No claim that SA is better than LAP
- No claim that SA is better than direct experience, intuition and other ways of exploring the world
- Non-scientific exploration often leads to faster and more extensive knowledge acquisition
  - No special value to “Science”
- But ESP corresponds to a specific approach and behavior, partly different from the liberal arts
Typical objectives of ESP vs. LAP studies

**ESP**
- Explore/Find out about something
- Test a theory
- Develop a method to explore stng/test stng, a theory
  ...

**LAP**
- Think about a phenomenon (its meaning, relation w/ other phenomena, …)
- Analyze a theory
- Compare theories
  ...

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WHY DIFFERENTIATE ESP FROM LAP? (1)

Criticized in ESP, acceptable in LAP:

- “Unsubstantiated claims”
- “Hasty personal, subjective conclusions”
- “Interpretation of phenomena without considering alternative explanations”
- “Theories without intent to test them”
- “Pointless classifications”
- “Prescriptive & judgmental attitudes”
- “Not quite accurate representation of facts”
- “Randomly (or) biased selection of examples”
WHY DIFFERENTIATE ESP FROM LAP? (2)

Criticize in LAP, acceptable in ESP:

- “Concepts defined operationally are not defined well enough conceptually”
- “Focus too narrow (failure to address more relevant aspects for practical or methodological reasons), so exploration incomplete”
- “Focus too narrow, focuses on one theory only whereas there are many…”
- “Pointless accumulation of data”
- “Research with no social relevance”
WHY DIFFERENTIATE ESP FROM LAP? (3)

Many texts in TS are extra-paradigmatic
- *Didactic texts*,
- *Prescriptive texts with little theory*,
- *Analyses with little theory*,
- *Descriptions with no research context…*

But *doctoral work* is generally required
to contribute to “research”
and will be judged paradigmatically

So need to know which set of norms to follow
PEOPLE

SCIENCE (ESP and LAP) IS PERFORMED BY PEOPLE

IN TERMS OF RESEARCH, SCIENTISTS ARE ESSENTIALLY SUPPOSED TO:

1. COMPLY WITH SCIENTIFIC NORMS

2. INNOVATE SO THAT SCIENCE CAN ADVANCE

3. PERFORM EXTRA-PARADIGMATIC FUNCTIONS
   (SOCIAL, ECONOMIC, TEACHING, ORGANIZATIONAL AND OTHER)
Requirements from PhD Work

1. COMPLY WITH ‘SCIENTIFIC’ (ESP or LAP) NORMS

2. INNOVATE
   With
   - FACTS
     *(NOT YET KNOWN, WHICH REQUIRE RESEARCH TO BE UNCOVERED) → ESP*
   and/or
   - IDEAS → LAP, ESP
     *(HYPOTHESES, MODELS, NEW ANALYSES, NEW CONCEPTS)*
   and/or
   - RESEARCH METHODS → ESP if development & testing included
LOCAL CONDITIONS

NORMS VARY
(LAP versus SA, length of thesis, theoretical exploration, empirical versus theoretical, citations, writing style, …)

FOR PhD STUDENTS:
THE ‘RIGHT’ NORMS ARE THE SUPERVISOR’S NORMS

THE AMOUNT OF REQUIRED INNOVATION VARIES:
ENOUGH IS WHEN THE SUPERVISOR SAYS IT IS
WARNING/REASSURANCE

- MOST CONTRIBUTIONS OF SCIENTISTS ARE SMALL

- MOST MAJOR CONTRIBUTIONS ARE THE RESULT OF MAJOR, LENGTHY, COLLECTIVE EFFORTS

  - DON’T BE OVERAMBITIOUS
    (RISK OF FAILURE, RISK OF BURN-OUT)

- DON’T TRY TO CONTRIBUTE A MAJOR INNOVATION IN YOUR PhD

  - READ OTHER PHD THESES AND IDENTIFY THEIR CONTRIBUTION

  - SEEK TO MAKE A SIMILAR CONTRIBUTION
NATURALISTIC RESEARCH...

(Exploring Reality in its ‘Natural’ Environment)

Is perfectly acceptable in “Science”!
   In Astronomy
   In Biology, Zoology
      In History
      In Sociology
      In Linguistics
   In Psychology
   In Medical science
   …
EXPERIMENTAL RESEARCH

(Experimental research: research under conditions created specifically for scientific investigation of the phenomenon at hand)

- Contrary to a myth, Experimental research can be exploratory
  - Best known for hypothesis-testing
    but
  - Hypothesis-testing is also possible in naturalistic research)
Experimental hypothesis-testing

• Simple fictitious case for illustration:
• Hypothesis derived from Theory: A glass of (French) wine improves translation
• Experimental group of translators: drink glass of French wine, translate
• Control group of translators: no wine, translate
• Compare translations. If wine translations better, the evidence supports the theory
  (but does not prove it! → later)
Theoretical advantage of experimental research

• Can isolate the factor one focuses on (wine) by controlling other factors. So, if output quality is different, this is probably due to wine

• Note: it is also possible to isolate factors in naturalistic studies after the fact (ex. epidemiology), but this requires much more data collection (collect info about many translators’ output, check who drinks glass of wine before translating, compare outputs)
Experiments and variability

• Why use groups rather than single individuals?

• Because of potential variability: it is not possible to control all relevant variables, and some phenomena are intrinsically variable.

  (Not all translators are equally ‘good’, irrespective of the wine – and their extra-wine qualities may confuse the issue)

• Using groups allows smoothing out some variability
FIGHTING VARIABILITY

• By tightening the experimental setup
• By tightening implementation procedures
• By increasing sample size
• Through replications – Very important in ESP, because every experiment is a ‘case study’

How feasible is it in translation and interpreting research to increase sample size and conduct many replications?
WHY DOES AN EXPERIMENT IN TS NOT ‘PROVE’ THAT A HYPOTHESIS IS CORRECT?

• Because only a small number of relevant variables can be controlled and others may well tip the scales.

So experiments are always case studies with respect to one or several variables.

• Because inferential statistics only assess error probabilities - they do not provide certainties.

These two points apply no matter how sophisticated the design.
DOES EXPERIMENTAL RESEARCH EVER ‘PROVE’ THAT A HYPOTHESIS IS CORRECT?

• When many replications reach similar conclusions, the scientific community gradually gains more confidence in the hypothesis.

  But does one ever get a ‘proof’ in the mathematical sense of the word?
EXPERIMENTS VS NATURALISTIC CASE STUDIES

Which is more convincing:
- An experimental study with 10 subjects?
- Or 50 converging naturalistic case studies?
- Or 3 converging experimental studies (2 replications) with 10 subjects each?

Risks in experimental T&I research

The highest risk resides in attitudes
Unjustified sense of security because the procedure is ‘scientific’ and ‘rigorous’ (if it is!):

- Neglect of potential existence of other relevant variables, especially if findings support hypothesis

- Loss of awareness of subjective factors when using quantitative procedures (ex. fidelity strategies)

- Neglect of other procedures (observe people, ask people, use less stringent experimental designs) with which triangulation helpful
Summary and conclusions

- Empirical science is primarily an *approach*
- Techniques and paradigms are customised and evolving manifestations of an approach
- They are submitted to social pressures and therefore do not necessarily evolve as fast as ‘objective’ reality calls for
- Sophisticated techniques and paradigms are not necessarily the best
- Experimental research is not necessarily the best or ‘most scientific’ – ‘most scientific’ is what complies best with the relevant scientific norms
- ESP and LAP comply with partially different norms, Choose one for your doctoral work