ON RESEARCH METHODOLOGY

CALEB FOONG

In the study of economy, we have this old maxim: people response to incentives, and the rest is commentaries. Indeed, self-interest is the mechanism behind Adam Smith's invisible hand, the axiom of John von Neumann and Oskar Morgenstern's game theoretic approach to economy, as well as the foundation of modern behavioral finance. Should similarly there is a strand of idea that weave together all the aspects of research activity, I believe it must be : care only for the truth, and the rest is commentaries.

If all we care about is the truth, why do we commit plagiarism, why do we tint our research result, why do we produce low quality research and why the issue of trustworthiness is even brought up to the table. Is it not because we allow our personal ambition, yearning for approval, proffessional career, the pressure to publish and maybe the prospect of getting more funding to be placed in front of our care for truth. No doubt, these are all very real and pragmatic problems that not any dose of idealism can hope to solve. However, I wish to address two questions under the light of the care for truth:

(1) What are the basic process of research, study, and thinking in the broadest sense?
(2) In what sense the reinterpratation of data contains high originality?

1. Analysis and Synthesis

In signal processing, we use Fourier or wavelet analysis to break down and understand the complex signal; in programming, we break down a complicated specification into simpler modules only to assemble them into bigger programs later; in physic, we study the most basic particle in order to build the Grand Unified Theory. It is the core of scientific method to analyze a complex phenomena or system by decomposing it into simpler parts which we know more about, or at least easier to investigate, and synthesize our understanding from these parts. The synthesize process often involving gathering data from different sources, putting them together to look for patterns and finally we might gain some knowledge by incorporating them into a bigger framework or building a theory to explain them. Analysis and synthesis are the basic building block of research.

Now we turn our attention to study, take reading for a concrete example. For the first time when we read a book, we look at its title and flip around to know

whether it is about aerodynamic, baseball, cat grooming, or other topics. We then go through its table of content to get a sense of its overall organization. In other word, we analyze the book. The raw texts are the data to be interpreted and parsed into the form of information, meaning, facts, an arguments. As a reader, we have to organize them in a coherent way to form our own understanding of the book. This is the synthesis part.

It is in the sense of our parallel description of research and study that they are similar. The main difference is the product of synthesis. For research, it is a new understanding; for study, it is an existing understanding. However, this is a difference without distinction. If we really care about the truth, our first concern must be the validity of our own understanding. In another words, we must examine our own understanding. To examine our own understanding, we must break it apart and put it back together again, differently. Take the famous equation $E = mc^2$ for example, if we only rearrange the equation into $m = \frac{E}{c^2}$, we have changed our perspective from how to make an atomic bomb to the deep theory about the origin of mass. By applying analysis and synhesis to our own understanding, we might not add anything new to the human knowledge, but we have changed its shape and all are not the same again.

Thus the reinterpretation of data in the previous sense contains high originality. In fact, it is the paradigm change that might only explain the same things differently initially, but at the end, it allow us to see new things that we cannot even begin to imagine.