oestros №4 (2012)

Detective work

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Abstract

Reflections on solving 'crime mysteries', lessons learned about induction, and the importance of all this for the scientific paradigm.

1 Introduction

Detective work is famous for solving the 'mysteries' of legal offences: 'What happened?' 'Who did it?' 'How?' 'Why?' Enquiries aim to recreate the stories of crime and produce possible explanations — eventually a single *good* one in each case — that feed into a judicial line of action (Perdicoúlis, 2012). Good detective work relies on a substantial amount of background preparation such as procedural and cognitive protocols, and knowledge acquired through experience and research. Detective work also contributes to this body of knowledge with its own experience, either case-specific or generalised. But all this does not sound exclusive to criminal investigation: the ever popular 'detective' experience can very well be shared across scientific investigation.

2 Procedural Protocol

Being official, detective work follows formal steps towards the solution of the 'mystery', similar to those of Figure 1. As in every protocol, though, successful outcomes count on human intelligence — for instance, in selecting the appropriate techniques for each task.

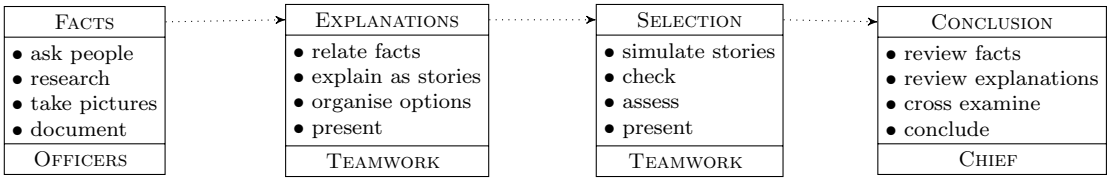

Figure 1 Generic procedural protocol

ISSN: 2182-8113

oestros №4 (2012)
Latest edition: March 24, 2019

3 Cognitive Protocol

Some of the most important and common transformations of information in the cognitive protocol of detectives are induction and deduction — Figure 2. Detectives must be careful when generalising, as well as when inferring or reaching conclusions.

FIGURE 2 Generalised cognitive operations: induction (L) and deduction (R)

4 Action Hypotheses

What appears to be a 'mystery' should have an explanation. This involves the recreation of the storyline of crime — Figure 3. Eventually, there may be a number of these explanations, which would be all alternative hypotheses. Solving the mystery is definitely the 'highlight' of the work.

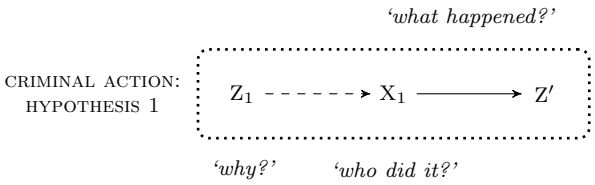

FIGURE 3 Mental model of the criminal action, representing a single explanation

5 System Hypotheses

People acquire knowledge about 'how things work' through their experience, schooling, and research. Thus, they often attempt to form their own 'world theory' through a personal induction process. In the case of detective work, police officers are likely to form their own (or perhaps shared across the profession) mental models about how crime occurs in general, or how people get tangled into vicious cycles and cannot escape easily — Figure 4. Such a process is often accompanied by research, for instance in sociology or psychology.

Generalised mental models can form the base upon which the 'action hypotheses' will be formed. In other words, facts, axioms, or assumptions will be sought in the 'great knowledge base', to be used as a base for the explanations. These mental models function in a 'read–write' mode — that is, they are both used for consultation and also as a repository of knowledge.

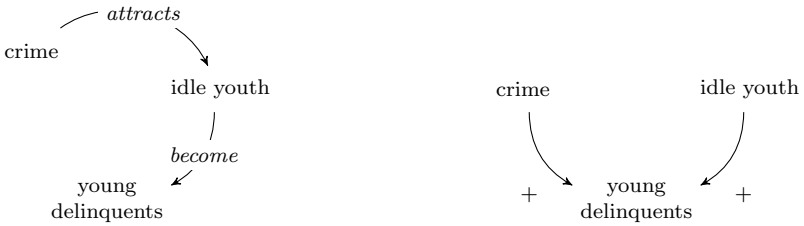

FIGURE 4 Generalised knowledge as a concept map (L) or as a reverse blueprint (R)

6 Challenges

Preparation is very important in detective work. This includes not only the procedural and cognitive protocols, but also the system hypotheses or mental models that often become the premises for case-specific reasoning. System hypotheses are the epitome of detective work in any field, but their 'GIGO'[1] liability makes them always subject to critical review.

Detective work receives significant pressure from people, the state, and the media to come up with credible explanations for crime that has been committed. Detectives are pressed to come up with valid hypotheses, and are often allocated scarce resources such as time, assistants, or money. It is interesting to compare the detective work of police to the 'detective work' in science — for instance, setting to discover the molecular structure of benzene. Kekulé, among other 'classic' scientists — that is, of the natural sciences — performed his (scientific) detective work based on knowledge, but apparently was not short of imagination. Imagination and creativity are often the main ingredient of 'serendipity' in the formulation of hypotheses, but they also carry a stigma: Kekulé, as an example, is said to have been ridiculed by his peers for having deciphered the structure of the benzene molecule in a daydream.

It is generally understood that all hypotheses are subject to proof, but turning science to be 'the great examiner' is perhaps an obsession (Kuhn, 1996; Chalmers, 1999). As marked in the detective work of police, formulating hypotheses bears much responsibility. This is a good role model for induction in science, which may enrich the current scientific paradigm — namely, to rid it of its reducing role of the examiner. It is worth noting once again that selection (or decision) is as good as the best option available (Perdicoúlis, 2011b, p.142).

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[1] 'Garbage in, garbage out'

oestros №4 (2012)
Latest edition: March 24, 2019

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