Cats, Rats, and Roofs: The Perils of Ignoring Relationships

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Abstract

Part of the *Cognitive Case Study Series* from Cabrera Research Lab, this case explores the importance of understanding the interrelationship of parts of complex systems by discussing the true story behind the "Borneo Cat-Drop" tale.

A "cognitive case study"—inspired by the cases used in business and policy schools that involve students in real-world problem solving—is designed to engage students in metacognition (thinking about thinking). Cognitive cases introduce the cognitive patterns underlying our mental models, and then encourage us to explore how our and others' mental models affect our emotions, behavior, action, and even our reality. These cases explore a broad range of topics, from politics to social issues to the physical sciences to everyday phenomena, with the purpose of enabling readers to see the cognitive structures at play across a variety of realms.

> *"Without reflection, we go blindly on our way, creating more unintended consequences, and failing to achieve anything useful."*
>
> Margaret J. Wheatley (2002)

Introduction

Figure 1: Solutions to complex problems can be novel.

There is a popular 1950s tale among ecologists that tells how live cats were parachuted down by the British Royal Air Force in order to save the population of a village in Borneo from rat-borne disease. The story, though rooted in actual events, has become somewhat confused and embellished over the years. [1] Nonetheless, it is a prime example of linear thinking, unintended consequences, and the importance of systemic approaches to problems. [2, 3]

Borneo is located in the Greater Sunda Islands group of the Malay Archipelago, and is the third largest island in the world next to Greenland and New Guinea. Divided into three countries, Indonesia, Malaysia, and Brunei, there are two Malaysian states at the northern tip of the island, Sarawak and Sabah. [4]

In the 1950s, this northern region of Borneo, like numerous other countries, faced a large malaria epidemic. Though malaria had been common for many

years, it came to the policy forefront in 1955 at the Eighth World Health Assembly in Mexico City, where health officials from around the world agreed that a malaria eradication program was feasible, and should be initiated by the World Health Organization (WHO). [2]p.1940 The insecticide DDT was gaining popular attention at this time for its low cost, long-lasting action, and effectiveness at killing insects such as mosquitoes. [2]p.1940

As part of the anti-malaria campaign in Sarawak, from 1952-1955 the inside surfaces of thatch homes were sprayed with DDT and BHC, another insecticide. These efforts proved to be initially successful in decreasing the mosquito population and subsequently the prevalence of malaria as well. Within 21 months, mosquitoes carrying malaria dropped from 35.6% to 1.6%. [2]p.1942

However, local residents complained that the insecticide spraying was causing damage to the thatched roofs of their buildings. This was due to the proliferation of caterpillars that ensued from the spraying. While the caterpillars were able to avoid the insecticide-sprayed areas, "their parasites, small chalcid wasps that injected their larvae into the caterpillars, were highly susceptible to DDT, causing their decline and the subsequent [50%] increase in caterpillar numbers". [2]p.1942

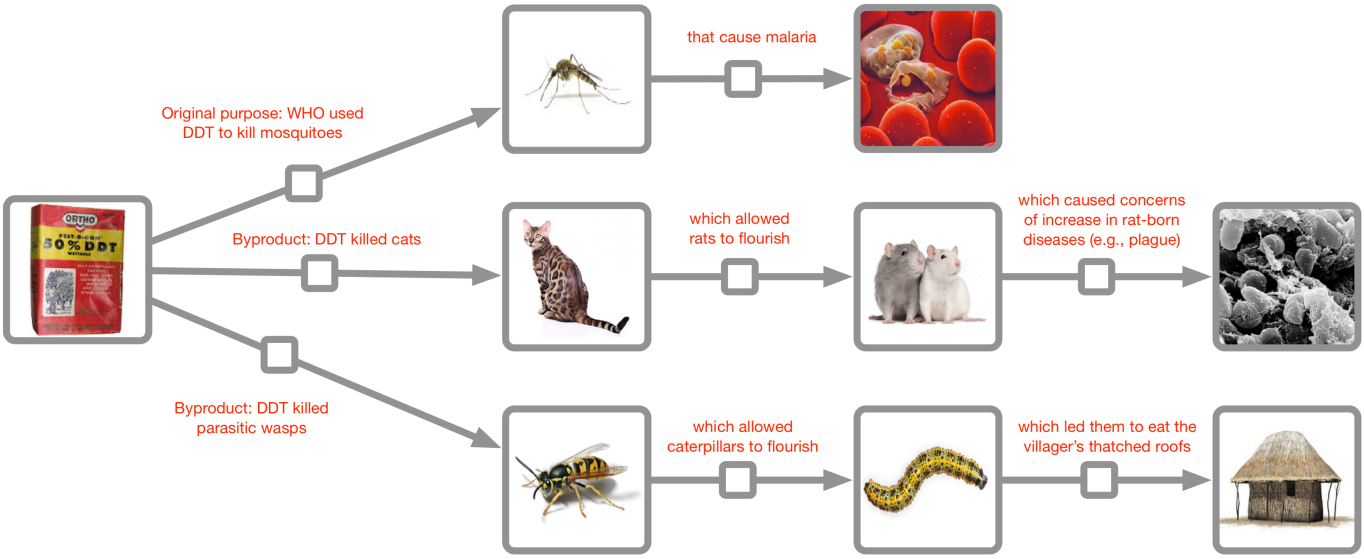

Figure 2: WHO intended to use DDT to kill mosquitoes and decrease malaria, but the unintended consequences of this simple linear causal thinking led to two additional byproducts.

Moreover, the indoor spraying of DDT also caused the deaths of cats (from licking their fur after rubbing against sprayed walls). In some villages, this led to a proliferation of rats and fears concerning a resultant spread of disease. Other instances of cat deaths from DDT have been reported. For example:

> In one case, the deaths of cats as a result of antimalarial spraying resulted in the creation of another human disease problem. An investigation conducted in 1965 by Karl Johnson determined that an outbreak of Bolivian hemorrhagic fever was "due to invasion of houses by rodents" as a consequence of cat deaths after the spraying of DDT. [2]p.1942 [5]

How is all this related to the dropping of cats? As O'Shaughnessy [1] reports: "To rectify this problem in one remote village, several dozen cats were

collected in coastal towns and parachuted by the Royal Air Force in a special container to replace those killed by the insecticides."

In *Systems Thinking Made Simple*, the Cabreras describe the four building blocks of cognition: making Distinctions and recognizing Systems, Relationships, and Perspectives. [6] These are also the rules underlying the diversity of systems thinking methods, theories, and approaches. According to the Systems rule, "Any idea or thing can be split into parts or lumped into a whole." [6]^{p45} Systems are composed of two elements, wholes and parts. The process of thinking entails organizing parts into coherent wholes, and deconstructing wholes into their constituent parts. Understanding multicausality requires recognizing the systemic nature of most phenomena. It also requires us to employ the Relationships rule: "Any thing or idea can relate to other things or ideas." [6]^{p45} Relationships are composed of two elements: action and reaction. To understand how systems operate requires deep understanding of the relationships between and among parts—how actions beget reactions in webs of causality. The better we understand the relationships between the parts of a system, the more likely we are to anticipate the multiple consequences of any given action.

Questions

- How does understanding that all relationships are composed of actions and reactions help us more accurately predict the consequences of the things we do?
- Why is it necessary to understand the Relationships rule in order to understand any system?
- Why is it important to think beyond simplistic linear-causal thinking and consider webs of causality?
- Why is it important not only to see *that there are* relationships but also to distinguish and systematize relationships?

Task

- Identify a current or historical policy that fails or failed to appreciate multicausality and the interconnectedness of many phenomena. Use DSRP to better depict the complexity of the phenomenon in question and suggest alternative actions or policies.

References

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