

## 1.4 How to model a complex situation

To build a model of a complex situation we need to answer three questions: What is changing? How is it changing? And why is it changing?

By asking what is changing we are putting our finger on the main issue in the situation. What is it that is increasing, decreasing or simply will not go away? What is it that intrigues or bothers you?

Let's take an example. I found this news item about the high cost of pharmaceuticals in the US. What grabbed the media and the public's attention was a 4000% increase in the cost of a prescription drug by Turing Pharmaceuticals in the US in September 2015. There was public outrage! How could a company justify such a huge price increase? The event quickly drew attention to a more fundamental trend: the rising price of prescription drugs in the US. From 2006 through 2013, average prices for the most widely used brand-name drugs in the US increased 113 percent. Candidates for the presidential primary have even made regulation of prescription drugs an issue in their campaigns.

So, what is changing? That's right, the price of prescription drugs.

Ok, so we agree on what our focus is. Now, the second question is: "How is it changing?" The objective here is to describe how the variable has changed over time. We can do this using a chart or by writing a problem statement. We will do both. After a little detective work I found some data on US prescription drug prices and plotted a chart in a spreadsheet. You can clearly see the steady increase from 2006 to 2013.

We can also write what has been changing over time as a problem statement that describes how the behavior of the key variable has evolved over a specific period of time. Here it could be, "average prices for the most widely used brand-name drugs in the US increased 113 percent from 2006 to 2013". The problem statement always contains three parts: the variable, the change and the time period. By focusing on a specific behavior over time it focuses the rest of our thinking.

Now we can look at explaining why drug prices have increased steadily these past eight years. This involves asking our third question: "Why is it changing?" We need to put our detective's trench coat back on and look for elements in the story that may have contributed to the problem. What else has been increasing or decreasing over the same time period?

We need to cast our net wide and identify and add all relevant variables to the story that may help explain what's going on. Here, I've identified eight variables from several online news articles that specialists argue have contributed to the increase in prescription drug prices. Once you have a list of variables, you are ready to connect them together. We are going to do this using a technique called the "connection circle".

Ok. Step 1: We begin by drawing a circle. Step 2: Write the elements around the circle. And step 3: Find elements that directly cause another element to increase or decrease and draw an arrow from the cause to the effect.

We can now use our connection circle to help us tell the systemic story. Let's go. "Prices allow drug companies to recoup the research and development costs of the drug and also fund new projects. Competitive and regulatory pressures can maintain price increases. However, patent protection reduces competition and lobbying activities and the market's tolerance for rising drug prices discourage regulatory controls. As drug companies make higher profits, they can invest in new projects and extend their economic influence even more."

What do you think about my finished connection circle? Do you agree? Maybe not, but that's the whole point of drawing it. Sharing our models with others helps bring our personal mental models with all their flaws and biases out into the daylight and it helps us build a richer collective understanding of a complex situation.