

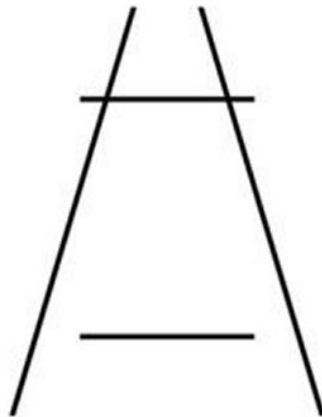


Cognitive agility realized.

Why is it so hard for people to change?

Expertise in the real world

Below is an example of a classic cognitive illusion called the “Ponzo illusion”:



In the above illustration, both horizontal lines are the same length. However, often when we first look at this image, we see “distance cues”, as though the diagonal lines were railroad tracks disappearing in the distance. If we approach the object with this mental framework, we see the top line as much larger than the bottom. However, if we view the object as a painter’s ladder, the two lines appear to be the same length.

Tricks of visual perception like this one come from the frameworks we use to interpret objects in the world. One of the primary observations made by psychologists who study perception is that even the simplest perceptual act of involves active interpretation by the brain. At any given time, we are processing only about one trillionth of the information in our immediate environment. Thus the brain uses shortcuts to decrease our cognitive load and react quickly to environmental cues. In a sense, the brain “constructs” a version of what is happening from a very limited set of inputs, drawing on its past experiences in order to put together a working “theory” about what the information means. For example, a lot of the depth and distance we “see” is actually constructed from our accumulated experiences. Thus, people who live in carpentered



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environments or those exposed to classical painting based on vanishing horizon lines are more likely to be affected by the “Ponzo illusion” than others.

In our work with experts in the workplace, we have found that many of the same principles apply, and even more so when it comes to other kinds of perceptual frameworks. Over time as we become experts in a specific job or a specific context, we develop “theories of practice” or “heuristics” – mental shortcuts that allow us to quickly evaluate familiar problem sets and develop solutions without exerting the kind of mental energy required for novel tasks. After a while, they operate as a kind of workplace-triggered “autopilot”. However, these “heuristics” can lead to cognitive distortions when the situation changes or is different than we had anticipated. Furthermore, these heuristics can actually *cause* the distortion in judgment, as we attempt to apply our expertise to arenas in which they are not relevant.

Take for example, buying a new car. Imagine you have been driving the same car for 5 years and it is the only one you have ever driven. In that time you have become an expert at driving. However, the new car has very different specifications, such as a bigger steering wheel, more sensitive break and gas pedals, and a wider turning radius. To prepare to drive your new car, you have read over all of the new specifications and are aware of the differences. Yet when you get in the car, you find that you are pushing the breaks too hard and you underestimate a u-turn. Under stressful conditions, your old framework, or “auto-pilot” is even stronger. This is a frustrating process, because you felt you had prepared for your new purchase. Your passengers start to tease you, and you begin to feel that you are not a very good driver. In time you adapt to the new specifications and feel confident again.

What has happened in this scenario is that while you felt you were an expert driver, in actuality, you were an expert at driving the specific car you had owned. Even though you were consciously aware of the differences between the old and new car (after reading the manual), the framework for your actions had not been adapted in the real world. Through trial and error (turning too wide, stopping abruptly), you are able to shift how you think about driving. You are able to take your basic existing driving expertise and adapt it to the new situation. In a sense, over time you “replace” your old auto-pilot with a new one. If you keep both cars, you develop a more differentiated auto-pilot mode that allows you to drive both cars easily and without much thought.



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In summary, in familiar domains, expertise is quite powerful, enabling people to evaluate situations and act quickly without much reflection. Occasionally, however, a dominant framework undergoes revision. When the situation, goals or the organizing principles of a domain change, thinking guided by the implicit mental model still asserts itself – automatically – even though it may no longer be relevant or appropriate. Even knowing that we need to think differently does not help us do so. In this situation “experts” must develop a new framework for looking at the same issues as before. This can be a very painful and long process and the “old ways” of looking at the problems can severely hinder the expert’s ability to acquire a new framework for quite some time.