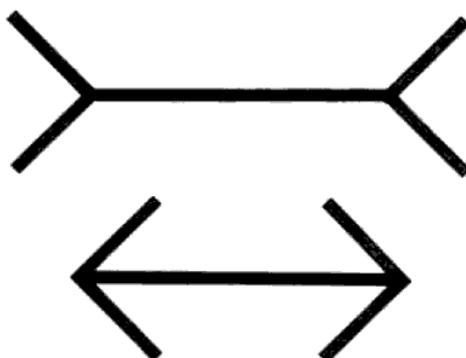


Another post from our holiday collection of oldies but goodies.

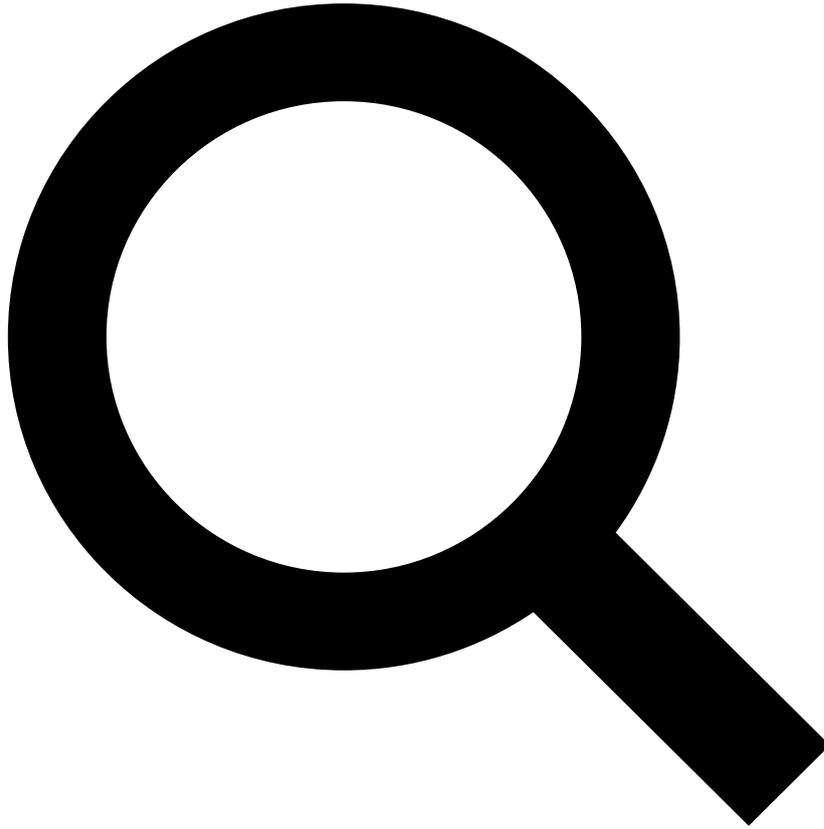
The [first post](#) in the series dealt with Nisbett's findings on different patterns of attention in Asian and Western cultures, and I talked a bit about how certain differences are more likely a priori than others. I mentioned that we cannot expect people to differ too much in being able to perceive, e.g., orientation, because it's difficult to imagine a functional visual system with orientation sensitivity. There are no visual environments without orientation. On the other hand, there is some variation between visual environments along other lines, and it would not be completely surprising to find that it causes differences in certain aspects of people's visual perception. An obvious example is in the perception of faces: in some Western environments people relatively rarely encounter Asian faces and in some Asian environments it's the opposite. There is a well-documented handicap in Europeans in the identification of Asian faces, and vice-versa (it's called the "other race" effect, holds for other populations, and is possibly the single greatest source of racist jokes). It's an interesting topic, but I won't discuss in today's post, saving it for some other time. Instead, I will deal with less obvious sources of variation: depth clues.

Most readers have probably seen the Müller-Lyer illusion. It's a Psych 101 staple that dates back to 1889. Michael Bach has a page devoted to it on his (fantastic) website, [here](#). Here the illusion is in its standard version:



I'm counting on the reader perceiving the figure with the outward-pointing arrow as longer. I probably won't kill the suspense by revealing that the two segments are actually of the same length, that's what makes it an illusion.

The classical explanation for the Müller-Lyer illusion is that the outward-pointing figure is perceived as longer because it is also perceived as further away (Gregory, 1968). The figure below attempts to explain why, in vintage Wolfenstein 3D graphics for the nostalgic:



On the left-hand side they walls appear to form a convex corner, on they right-hand side the corner appears concave. The contours outlined in black are the same figures that appear in the Muller-Lyer illusion. Just like in the Muller-Lyer illusion, the segment where the two walls meet appears longer on the right (again, they are actually the same length). The walls on the left seem to pop up towards us, while those to the right recede. Our visual system appears to conclude that the segment on the right must be longer, because it is the same size as the other on the retina, yet is further away in space.

This is the basis for the seeing-in-depth explanation for the Muller-Lyer illusion, first tested experimentally by Richard Gregory (1968), who in turns attributes the theory to Thiéry (1896). That theory explains why we are subject to the Muller-Lyer illusion, but not why we should see depth where there isn't any.

A classic study by Segall et al. (1963) deals precisely with that point. Their "carpentered world" hypothesis is that we see depth in the M-L illusion because we live in worlds full of right angles (in buildings, furniture, etc.). When right angles project on the flat surface of the retina they give rise to M-L patterns: lines and arrows. A heuristic is at work, but that heuristic only makes sense in environments with many right angles. In cultures with "non-carpentered" environments, the heuristic is pointless and the illusion should vanish.

The authors set out to test the M-L illusion on a wide variety of populations (17 groups in total), with the help of a team of anthropologists. They had people adjust the length of a M-L segment until it

matched - perceptually - the length of the other one. The so-called Point of Subjective Equality is the adjustment needed to make the two segments look of equal length, and summarises the strength of the illusion.

The data seem to support the "carpentered world" hypothesis. Europeans and Americans were the most susceptible to the illusion, and Kalahari hunter-gatherers among the least susceptible. They also point to wide variation in susceptibility to the illusion, across populations and age groups.

The data can be interpreted as proof of strong cultural influences on perception. However, the causal link is indirect: material culture influences the visual environment, which in turn impacts the visual system. The M-L illusion is no evidence for a link between visual perception and the symbolic aspects of culture, its particular contents or structures. It is strong evidence for something far less controversial - that what you see influences what you perceive.

[I glossed over a lot of problems with the seeing-in-depth explanation and the carpentered world hypothesis. More on that some other time].

## References

Gregory RL (1968) Perceptual illusions and brain models. *Proceedings Royal Society* 171:24279-296. Available [here](#).

Segall, M., Campbell, D. and Herskovits, M. J., (1966). *The Influence of Culture on Visual Perception*. New York: The Bobbs-Merrill Company.

There's a delightful article by Deregowski that discusses the Segall data and a lot of other studies:

Deregowski, J.B. Real space and represented space: Cross-cultural perspectives. *Behavioral and Brain Sciences* 1989 12 (1): 51-74.