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## It's all done with mirrors: Proof of non-existence

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**Abstract.** Mirrors can show us to be absent (with minimal cognitive damage) and also can show imaginary lines to be unreal (again with little or no effect on the adjoining percept). The processes that create the subjective lines are immune to the optic information that the lines do not exist.

Mirrors are of considerable interest to perceptual psychologists. They present problems for ecological optics—J J Gibson's basis for naive realism. Is a plane textureless surface with perfect reflectivity acceptable as part of the 'ecological' environment in Gibson's sense? Mirror surfaces lack texture. The absence of texture creates problems for Gibson's analysis in which texture provides optical information for surfaces (Gibson 1966). On a calm day the surface of a lake can approach a perfect mirror, so that one cannot simply set mirrors aside as 'unecological' in the way that Gibsonians have disposed of some other problems (Kennedy 1974). The ecological indicator of the presence of a mirror is an axis of symmetry between a sample of the optic array and a reflection of that sample.

There are many puzzles created by mirrors. Here, three puzzles of *existence* will be described.

With monocular gaze many three-dimensional surfaces reverse, for example, a cup may 'reverse' to look as though it is a dome instead of a hollow. This effect can be used to suggest one's own absence in the following way. Take a slightly convex piece of smooth reflecting material, for example, a lens from commercial sun glasses. If the glass is set at 45° to the horizontal to reflect the ceiling, and one then perceptually 'reverses' it, it appears slightly concave. *It should then reflect the viewer, were it truly concave.* But it does not do so. There is optical information that one does not exist.

Alternatively, take a trapezoidal plane mirror that resembles a square drawn in perspective, two converging sides, and two parallels. Place the larger of the parallel sides uppermost and tilt the mirror back until it projects a square image. If one looks at this mirror and perceives it as square and upright, which is fairly easy to do, one would expect to see one's reflection. However, if it is tilted back sufficiently, no trace of the viewer is seen. This is a most disquieting upshot, suggesting one is elsewhere, or a phantom that has no reflection.

Another interesting display can be arranged with a three-dimensional object in which a subjective wire appears to join the tips of rods (Ware and Kennedy 1977). A large version of this can be constructed (ours is 2 ft by 9 in). If a small mirror is placed behind the imaginary line joining the tips of the rods there will be no reflection of the imaginary line. Hence, here is optical information for the nonexistence of the subjective wire-information that the wire is at best a phantom. Similarly, the wire does not cast a shadow on a small card held behind it. The perceiver nevertheless continues to see the subjective wire. The optical information which disconfirms the hypothesis that the wire is present is not enough to destroy its perception. We may conclude that whatever part of the visual system creates the subjective wire takes no account of the absence of expected reflections. The 'cognitive' information provided by the mirror is dealt with independently of the visual processes that create the apparent visual divisions.

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The 'imaginary wire' demonstration is a neat complement of the 'absent self' demonstration. In one, the mirror shows that a wire is imaginary, but it does not disappear. In the other, the mirror shows us to be unreal, but we do not, I hope, vanish.

**References**

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