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Non-physical visual objects generated by color spreading are expected to cast shadows

Abstract. Purely visual objects created by color spreading are expected to behave like any other physical object, in particular they are expected to block light and to cast shadows.

Consider fig. 1.



Fig. 1. The gray logo is painted on the cords of the badminton racquet.

It looks as if the shadow of the gray shape on the net is missing. The racquet frame and the cords of the badminton racquet cast their shadows on the surface underneath. But the gray logo does not. The physical explanation is obvious: gray paint is only present on the cords, and not on the spaces between cords. However, due to color spreading (see Bressan, Mingolla, Sillman and Watanabe, 1997, for a review), the gray region appears to occupy an area which is larger than that occupied by the cords it is painted over, and which includes the holes between cords. We thus experience the whole area as filled with color, an area in the shape of the logo. The visual system confers object status to the filled shape of the logo. Given its position relative to the cords, if the filled shape of the logo was a physical object, it would bar light and thus cast a filled shadow (an area in the shape of the logo, completely darkened.) The fact that we are surprised by the absence of the shadow indicates that we consider the filled gray logo as opaque to light, thus akin to a full-fledged physical object. Purely visual objects created by color spreading are expected to behave like any other physical object, in particular they are expected to block light and to cast shadows.

Bressan, P., Mingolla, E., Spillmann, L., Watanabe, T., Neon Color Spreading: A Review. *Perception*, 1997, 26, 1353-1366.