

# The Influence of Dietary Lutein and Zeaxanthin on Visual Performance

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## ABSTRACT

The idea that normal constituents of the diet can influence visual function is not new. As early as 1782, Buzzi identified the yellow of the macula and Schulze (1866) specifically postulated that the yellow pigments led to improvements in human vision. These pigments were later found to be derived from dietary lutein and zeaxanthin that are known to be oxygenated carotenoids (xanthophylls). Walls and Judd (1933) postulated that these yellow intraocular pigments could improve visual performance by absorbing light scattered both within (for example, glare) and outside of the eye (increasing visual range by absorbing blue light scattered in the atmosphere), and by improving spatial vision through enhancing contrast and reducing chromatic blur. In this article, evidence for these ideas is reviewed with particular emphasis towards more recent data on glare effects.

It seems clear that MP does influence visual performance through, at least, a few optical mechanisms. The most robust effects appear to be related to its actions as an optical filter. Results showing that retinal L and Z reduce glare disability and discomfort, reduce photostress recovery times, and enhance contrast are significant. MP improves glare performance through absorption of forward scattered short-wave (blue) light. There is also data (albeit preliminary) to support the idea that MP increases visual range by absorbing short-wave scattered light in the atmosphere. MP also appears to enhance contrast by improving the visibility of colored edges through differential absorption across a color border. One advantage to testing optical theories of MP function is that they can be specifically evaluated by carefully manipulating the optical characteristics of the stimuli. All of the optical effects of MP