Effect of blue light on audiovisual integration

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A subset of retinal ganglion cells expresses melanopsin, a photo-pigment with absorption spectrum peaking at 480 nm (i.e., blue light). These cells can directly respond to light even without classic photoreceptor rods and cones, and are named intrinsically photosensitive retinal ganglion cells (ipRGCs). Past animal research revealed that Superior Colliculus (SC), a locus where multisensory signals are preliminarily integrated, receives inputs from ipRGCs as well. We therefore aimed to evaluate the potential influence of blue-light-elicited ipRGC signals as compared to other color lights on human multisensory perception. We examined blue light's effect using the audiovisual simultaneity judgements task that a flash and beep were presented at various SOAs, and participants were asked to judge whether the visual and auditory stimuli were presented simultaneously under blue- or red-light background. Results showed that participants' audiovisual simultaneity perception was more precise, especially in the visual-leading conditions, in the blue-light than in the red-light background. Our results suggest that ipRGCs may project to SC (or other cortical areas involving audiovisual integration) in humans as well. This is the first attempt to directly explore the impacts of blue light on multisensory perception, which sheds light on how modern technology impacts human perception.

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