Stare for As Long As You Want

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I won't disappear

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A 40 years old controversy has finally been settled. Biologists argued each other for decades whether or not the rapid eye movements that occur when a person's gaze is fixated, are responsible for the fact that the image does not fade and disappear. Research conducted at Barrow Neurological Institute in Phoenix has recently resolved the debate, establishing that microsaccades are indeed responsible for driving 80 percent of our visual experience.

In order for you to see what's in front of you, the neurons in the retina have to be continuously stimulated. Light does indeed strike the retina continuously, so, what's the problem? The problem is that the neurons and the brain quickly adapt to a non-changing situation. They are interested only in detecting changes.

There is a reason for that: if they would take interest in *everything* they would simply be flooded with information. Thus, the neurons and the brain adapted in such a way that they consider potentially relevant only things that change – this **attracts our attention**.

But: we can also see things that stand still! How do we do it? One suggestion is that, even when eyes are carefully fixated on an object, they continue to make tiny movements called fixational eye movements. These movements cause nearly constant stimulation by tricking the neurons of the retina into believing something (everything) has changed.

"If our eye was perfectly still during fixation, the world would quickly fade from view due to the fact that the neurons in our eyes and brain quickly adapt to non-changing stimulation," said lead researcher Dr. Susana Martinez-Conde.

In case of other, more primitive, animals, such as the frog, this does indeed happen. A frog can literally see only what moves.

There are three types of fixational eye movements:
- Microsaccades, which are fast movements that travel in a straight line;
- Drifts, which are slow curvy motions that occur between microsaccades;
- Tremors, which are very fast, extremely small oscillations of the eye superimposed on drifts.

"It is critical that we know which of these fixational eye movements is primarily responsible for keeping the world from fading because in normal visual conditions we fixate our gaze 80 percent of the time," said Dr. Martinez-Conde. Her lab succeeded establishing the vital role of microsaccades in vision by measuring fixational eye movements in subjects whose gaze was concentrated on one object.

Other previous experiments used contact lenses having a clearly visible dot painted on them. Due to the fact that the contact lenses are placed directly on the eyeball, they move together with the eyeball experiencing all the motions of the eyeball. Such experiments proved that the dot quickly faded from view: Because the dot was indeed standing still relative to the retina, the neurons and the brains gradually stopped seeing it!

The new experiments managed to identify exactly which one of the there types of eye movement is responsible for the permanence of visibility. This not only resolves a scientific debate, it also brings new hope to patients who are blind much of the time due to fixational eye movement problems.

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