

Pay attention: How we focus and concentrate

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Scientists at Newcastle University have shed new light on how the brain tunes in to relevant information.

Publishing in *Neuron*, the team reveal the interplay of brain chemicals which help us pay attention in work funded by the Wellcome Trust and BBSRC.

By changing the way [neurons](#) respond to [external stimuli](#) we improve our perceptual abilities. While these changes can affect the strength of a neuronal response, they can also affect the fidelity of that response.

Lead author Alex Thiele, Professor of Visual Neuroscience explains:
"When you communicate with others, you can make yourself better heard by speaking louder or by speaking more clearly. Neurons appear to do similar things when we're [paying attention](#). They send their message more intensely to their partners, which compares to speaking louder. But more importantly, they also increase the fidelity of their message, which compares to speaking more clearly.

"Our earlier work has shown that attention is able to affect the intensity of responses – in effect the loudness - by means of the brain chemical acetylcholine. Now we have shown that the fidelity of the response is altered by a different [brain chemical](#) system."

In the paper, the team reveal that the quality of the response is altered by means of glutamate coupling to [NMDA receptors](#) (a molecular device that mediates communication between neurons). Carried out in a primate

model, these studies for the first time isolate different attention mechanisms at the receptor level.

The research has potentially significant implications not only for our understanding of how our brains work but also give an insight into conditions such as schizophrenia, Alzheimer's disease and [attention deficit disorder](#), and may aid in the development of treatments for them.

More information: Attention induced variance and noise correlation reduction in macaque V1 is mediated by NMDA receptors. Jose L Herrero, Marc A. Gieselmann, Mehdi Sanayei & Alexander Thiele. *Neuron*.

Provided by Newcastle University

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