Your eyes reveal whether you're truly listening or not.

New research shows that people blink less when concentrating on listening, especially in noisy environments, reflecting the level of brain effort required.

Blinking might seem like an unconscious reflex, but new scientific research suggests this action can reflect our level of concentration while listening.

Blinking occurs automatically, like breathing, and most people rarely notice it. Previously, scientific studies on blinking focused primarily on vision. However, a new study from Concordia University approaches blinking from a completely different perspective: the connection between blinking and cognitive processes, particularly the ability to filter out distractions and focus on speech in noisy environments.

This study, published in the scientific journal Trends in Hearing, presents two experiments designed to track changes in blinking behavior under different listening conditions.

The more mentally intense the listening, the less you blink.

The results showed that people blink less when they have to exert more effort to understand speech, especially in noisy environments. This reduced blinking frequency reflects the amount of 'mental capacity' the brain has to mobilize during daily listening.

Notably, the study also found that lighting conditions did not affect blinking frequency. Participants blinked at nearly the same frequency in brightly lit, moderately dark, and completely dark rooms.

' *We wanted to know whether blinking is influenced by the environment, and how it relates to executive brain function* ,' shared lead author Pénélope Coupal, honorary student at the Hearing and Cognition Lab. ' *For example, do humans unconsciously 'time' blinking so as not to miss important information being said?* '

The answer is: yes.

" *We don't blink randomly,* " Coupal said. " *In fact, we blink less and more systematically when important information comes to mind.* "

Monitor blinking while listening to speech in noisy environments.

The first experiment involved nearly 50 adults. Each person sat in a soundproof room, looking at a crosshair on a screen and listening to short sentences through headphones, while the level of background noise constantly changed – from very quiet to extremely loud.

The signal-to-noise ratio (SNR) was adjusted to various levels. Participants wore eye-tracking glasses, recording every blink and the precise timing of each blink.

Each listening session was divided into three phases: before the statement begins, during the listening session, and after the statement ends. The results showed that blinking frequency decreased significantly while participants were listening, compared to before and after.

This effect is strongest when background noise is at its highest – that is, when understanding speech becomes most difficult and requires the most effort from the brain.

Light is not the deciding factor.

In the second experiment, the researchers continued to examine blinking behavior but changed the lighting conditions in the room. Participants performed the same listening exercise at different SNR levels, in dark, medium-light, and bright environments.

The results showed that the blinking pattern remained the same under all lighting conditions. This demonstrates that the variation in blinking frequency stems from cognitive needs, rather than the amount of light entering the eye.

Although blinking frequency varies greatly among individuals – some blink only about 10 times per minute, while others may blink up to 70 times per minute – the overall trend remains clear and statistically significant.

Reconsidering blinking as an indicator of brain activity.

Previously, studies linking eye activity to mental effort focused primarily on pupillary dilation (pupilometry). In many cases, blinking was considered 'noise' and excluded from the data analysis.

Conversely, this study utilized older data to directly analyze the timing and frequency of blinking. Scientists suggest that blinking could become a simple, low-effort indicator for assessing cognitive function, both in the laboratory and in real life.

"Our research shows that blinking is associated with missing information, both visual and auditory," said co-author Mickael Deroche, Associate Professor in the Department of Psychology.

Perhaps that's why we unconsciously suppress blinking when important information is being conveyed. However, to draw more convincing conclusions, we need to pinpoint exactly when and how visual-auditory information is interrupted during blinking. This will be the next research step.