

## **Turning a blind eye to bad news: Pupillary correlates of the optimism bias**

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People tend to have optimistic beliefs about themselves: whether it's regarding positive qualities, future success, or avoidance of negative life events. Previous studies in belief-updating have established that healthy individuals are more likely to integrate desirable rather than undesirable information. This effect is coined the "optimism bias." Yet, the neural basis for this bias remains largely unknown.

In the present single session study, we aimed to replicate the optimism bias behaviorally in 34 healthy participants undergoing the belief updating task. In addition, and for the first time, we collected pupillometry data to further provide neurophysiological evidence for its existence.

We replicated the optimism bias by showing that individuals updated more in response to good news than to bad news. Importantly, we provide first evidence that pupil size is influenced by the valence of the news, with good news leading to greater pupil size than bad news. Additionally, we uncovered a significant effect of confidence on both pupil size and belief-updating, with low confidence resulting in greater pupil size and greater updates.

Interestingly, confidence and news appear to play temporally distinct roles in modulating pupil size. Confidence may signal the brain to allocate more attentional resources to the upcoming news, thus modulating pupil size at an early stage. Subsequently, the valence of the effects pupil size at a later stage. Our findings lay the foundation to further investigate the intricate interplay between news and confidence, and further uncover the neural basis behind the optimism bias.