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In the version of the article initially published, Figs. 2, 3 and Supplementary Fig. 1 displayed results from models in which the movement of static images used to generate a naturalistic movie was mistakenly flipped along the x -axis. In the corrected analysis, the revised figures show better performance for all the models, while maintaining the main conclusion of the affected figures and the overall study.

In the third paragraph of the Results, in the sentence now reading “For an example RGC, this conventional CNN model captured 68% FEV of the recorded (Fig. 2a) response with a median FEV of $68\% \pm 12\%$ across the population ($N=57$) of recorded cells (Fig. 3a)”, 68% now replaces “59%” and $68\% \pm 12\%$ replaces “ $38\% \pm 8\%$ ”. In the sixth paragraph, in the two sentences now reading “Overall, the photoreceptor–CNN model performed with a median FEV of $81\% \pm 6\%$ (Fig. 3a). This performance gain is substantial given that the photoreceptor layer enhanced the predictive capability of conventional CNNs by approximately 19% ($p=1 \times 10^{-7}$)...”, $81\% \pm 6\%$ now replaces “ $49\% \pm 15\%$ ”, while 19% ($p=1 \times 10^{-7}$) now replaces “29% ($p=0.002$)”.

In the third paragraph of the Results “Adaptation in the photoreceptor layer drives performance gain” subsection, in the text now reading “When evaluated on the held-out segment of naturalistic movie data, this model performed very similarly to the conventional CNN model, yielding FEV of $73\% \pm 8\%$ (Fig. 3b; $p=0.12$)...”, $73\% \pm 8\%$ now replaces “ $37\% \pm 12\%$ ” and $p=0.12$ replaces “ $p=0.26$ ”. In the paragraph following, the sentence “The resultant photoreceptor–CNN model trained on the same task as above, exhibited lower performance than its fully-trainable counterpart (Fig. 2c; Fig. 3c, FEV $75\% \pm 6\%$, $p=3 \times 10^{-7}$ two-sided Wilcoxon signed-rank test, $N=57$ RGCs), but still outperformed the conventional-CNN model when evaluated on the naturalistic movie dataset” now replaces the original “The resultant photoreceptor–CNN model trained on the same task as above, exhibited performance comparable to its fully-trainable counterpart when evaluated on the naturalistic movie dataset (Fig. 2c; Fig. 3c, FEV $49\% \pm 10\%$, $p=0.07$ two-sided Wilcoxon signed-rank test, $N=57$ RGCs)”.

Figures 2, 3, Supplementary Fig. 1, and their associated source data files have been replaced in the HTML and PDF versions of the article. For comparison, the original figures are available in the Supplementary Information accompanying this amendment.

Supplementary information

Original Figs. 2, 3, Supplementary Fig. 1

Additional information

Supplementary information The online version contains supplementary material available at <https://doi.org/10.1038/s41467-025-57762-1>.

Corrections & amendments

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