Supplement

Report of Reaction Times

Statistical Analysis

A log transform was performed to normalize a right-skewed distribution of the reaction time data. A mixed-effects multiple linear regression model was then conducted with log reaction time as the dependent variable, assessment as the main independent factor, and age and eccentricity (small/large) included as covariates (as in the analysis of detection rates). For simplicity, results are reported using reaction times rather than log reaction times.

Results

Overall blind side mean reaction time without p-prisms was 2.8 s, which improved (decreased) with p-prisms to 2.5 s (p = 0.001; Figure S1, left panel). There was no additional effect of training on reaction times with a mean of 2.5 s at the post-training assessment (p = 0.21); however, the reaction times were still faster than at baseline (p = 0.003). Mean reaction time at 3 months was 2.7 s and was no longer faster than at baseline (p = 0.207), and was slower than pre-training (p = 0.034). Reaction times were significantly faster for pedestrians appearing at small than large eccentricities (overall, 2.4 s versus 2.9 s; p < 0.0001), but unlike detection rates, there was no effect of age on reaction times (p = 0.293).

Prisms improved reaction times at the large eccentricity even before training (p = 0.008), while the effect at the small eccentricity was only marginal (p = 0.058, Figure S1, right panel). For the large eccentricity, there was no additional effect of training on reaction times (p = 0.269), but at 3 months reaction times were still faster than at baseline (p = 0.043). For the small eccentricity, there was no effect of training. Reaction times at both the post-training and 3-month visits did not differ from baseline (p = 0.378 and p = 0.998, respectively).
For the seeing side, over all 4 sessions mean reaction time was 1.2 s. There was a small, but statistically significant, improvement in seeing side reaction times over the 4 assessments, with faster reaction times post-training (1.3 s) and at three months (1.3 s) than at the first assessment (1.5 s, \( p = 0.015 \)). Although blind side reaction time with prisms was best at the post-training assessment, it was still significantly worse than seeing-side performance (\( p < 0.0001 \)).

Figure S1: Reaction times (mean and 95% CIs) by assessment for the group of 11 patients.

Plot on the left shows data for the blind side (black line) and the seeing side (grey line) collapsed across small and large eccentricities. Plot to the right shows data for the blind side only for small (blue line) and large (red line) eccentricities. Significant differences are indicated with connector and corresponding p-value. Comparisons without a connector or p-value were not-significant. NP = No p-prisms, PBT = with p-prisms before training, PAT = with p-prisms after training, P3M = with p-prisms 3 months after training.

Additional discussion

Statistical rationale for our interpretation of results of Szlyk et. al 2005\(^1\):

No statistical analyses were reported in the 2005 manuscript by Szlyk et. al, but percentages of improved tasks were provided. Improvement was defined as an increase in assessment score
with prisms greater than the mean of the difference between two baseline assessments without prisms. The 95% CI of the mean change score would have been a more traditional threshold for improvement because it accounts for the spread/variability of the data/measurements.² Using the mean change score criterion, no change in performance would be predicted to yield 50% of tasks (with prism) above and 50% below the mean of the baseline assessments, yet there were only 13-36% of tasks above the threshold (as shown in their Figure 1¹), suggesting that the round sector prism and the training procedure may have actually worsened performance.

Supplement References