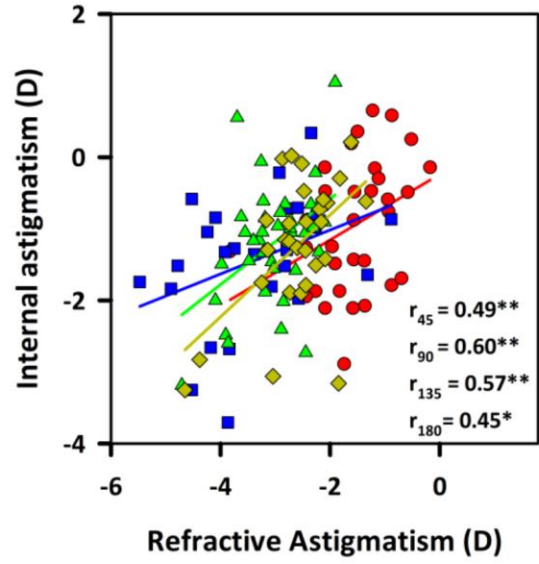
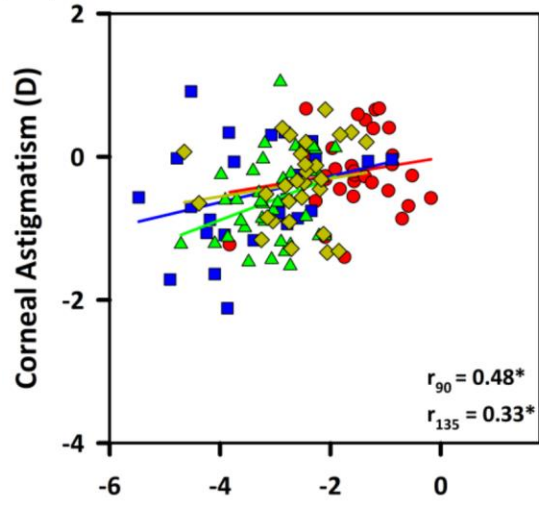
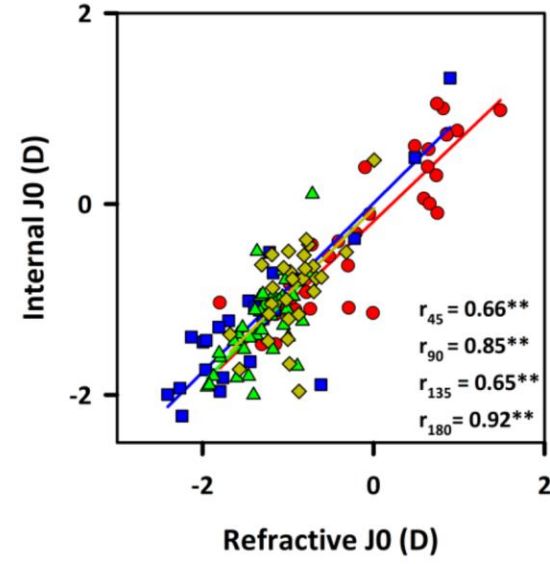
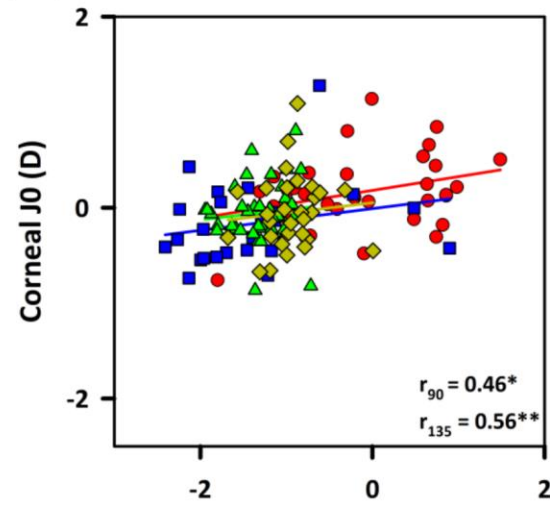
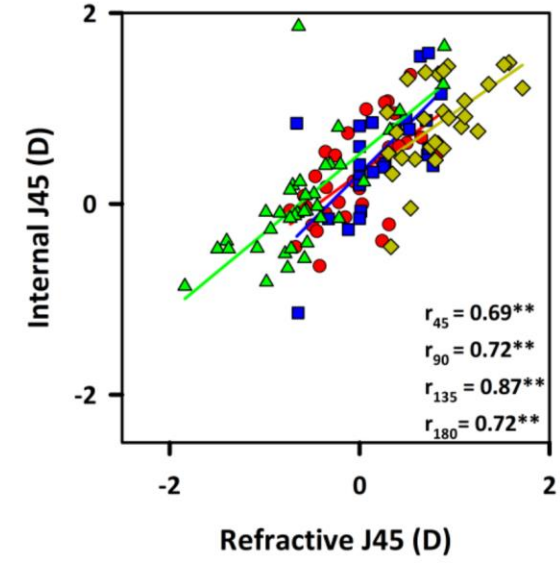
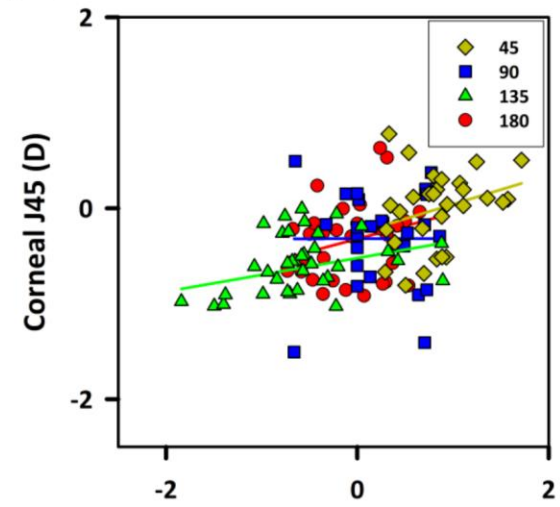


Supplementary Figure 1. Resultant astigmatism and its departure from the target end point. (A) To determine whether the resultant astigmatism is counterbalancing the astigmatism imposed (target end point) by the sphero-cylindrical lens, both resultant astigmatism and imposed astigmatism were first converted into J0 (x-axis) and J45 (y-axis) astigmatic components. Different colored symbols represent the resultant astigmatism of different groups, as shown in the legends. To illustrate how the astigmatic compensation between the resultant and target astigmatism was calculated, here we show only one example for the L90 group. In this example, the magnitude of astigmatic compensation is quantified by calculating the distance (“d”) between the resultant astigmatism (blue open square) and the target end point (blue cross hair) using Pythagorean Theorem, as represented here with a blue dash-line triangle. (B) The distances (“d”, in dioptre) obtained using Pythagorean Theorem for each group is compared across groups. Two-way ANOVA with Bonferroni’s multiple post-hoc comparisons are used for analysis. Significant difference between groups is indicated by an asterisk next to the bar plot: $p < 0.05^*$. The shortest and longest distances represent the highest and lowest astigmatic compensation. Birds treated with 90° cylindrical axes were found to show the highest astigmatic compensation when compared to the other three orientations of the same cylindrical magnitude.

A**B****C**

Supplementary Figure 2. Correlations between refractive astigmatism with corneal and internal astigmatism in birds treated with different cylindrical axes. Magnitudes of (A) astigmatism, (B) J0, and (C) J45 components of refractive astigmatism are plotted against those of corneal (Top) and internal astigmatism (Bottom). Different colored symbols represent groups treated with different cylindrical axes, as shown in the legends. The levels of significance from Pearson's correlation analyses are represented by the asterisk: $p < 0.05^*$ and $p < 0.01^{**}$. Refractive components showed stronger correlations with internal components compared with corneal components.