



Blue Light Blocking Filters and Antireflective Coatings for Digital Reading: Does the Effect Differ for Low vs. High Eye Strain Symptoms

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PURPOSE

With increasing time spent on digital devices, there is rising awareness and interest in the use of blue blocking (BB) filters and antireflective (AR) coatings on lenses to reduce symptoms of digital eye strain (DES). Since these filters and coatings are available and being marketed, studies need to be done to outline what effect, if any, they have.

Because study designs, parameters, and measurements largely vary, current research is inconclusive about the effects BB and/or AR coats can have on DES. This study looks to expand on emerging data. We conducted an experiment to identify and evaluate the possible effects of BB and/or AR coatings relative to a coating-free control lens in participants with low and relatively higher DES symptoms. Outcomes assessed were pursuits, saccades, fixation, reading rate, and subjective assessment of DES symptoms.

METHODS

Twenty-eight emmetropic/contact lens corrected subjects (ages 22-31 years old; 10 male, 18 female) completed study. Participants had no previous dx of accommodative/ BV issues, congenital color deficiency, or dry eye; and denied routine use of artificial tears with digital device use. Subjects wore clear BB, AR, BB/AR, and control (coating-free) lenses in a randomized order and completed the following for each set of lenses: pursuit, saccade and fixation assessments via RightEye® testing, a 20-minute digital reading task, and a symptom questionnaire (See Table 1).

Based on total questionnaire score with control lenses, 14 subjects were grouped into low symptom score group (total score 0-8) and 14 subjects in the higher symptom group (total score 10-44).

Total and individual question symptom scores as well as saccade, pursuit, fixation, and reading rate measurements were compared for the high/low symptom groups while wearing the BB, AR/BB, AR lenses. Mixed analysis of variance tests, pairwise T test comparisons were used for statistical analysis.

FIGURE 1
Average % change in Reading Rate vs. Lenses

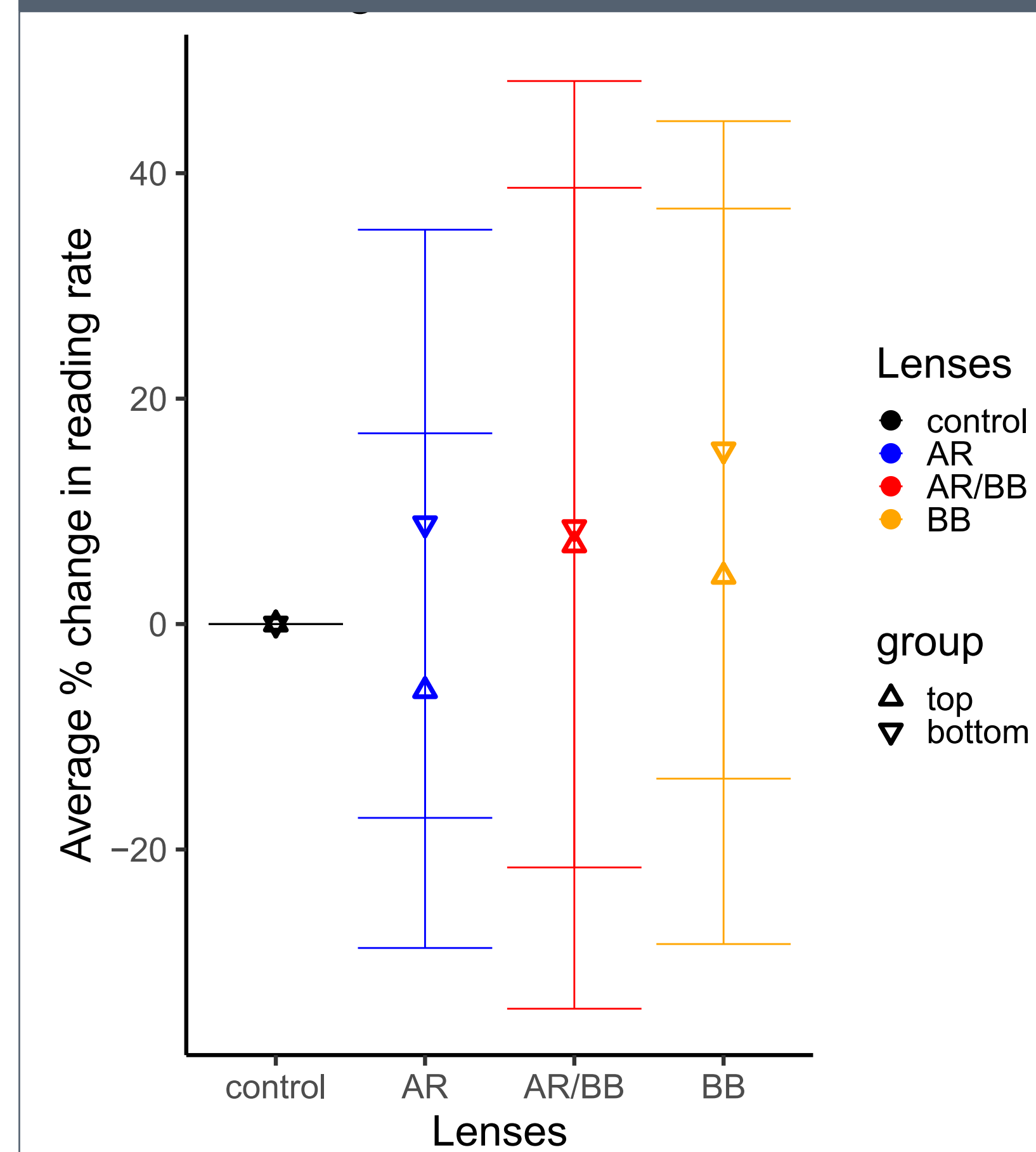


FIGURE 2
Average % change in Pursuits vs. Lenses

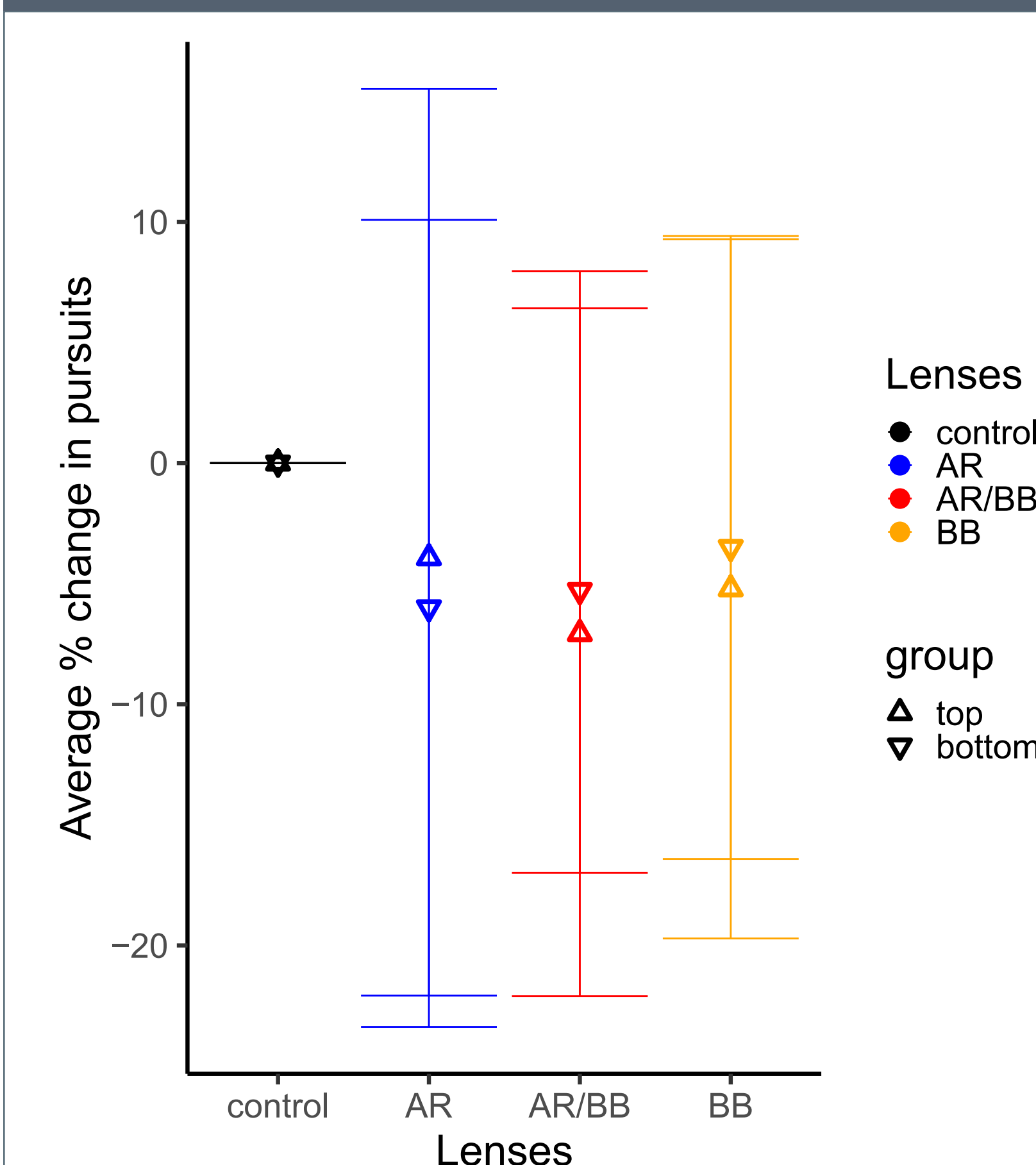


FIGURE 3
Average % change in Saccades vs. Lenses

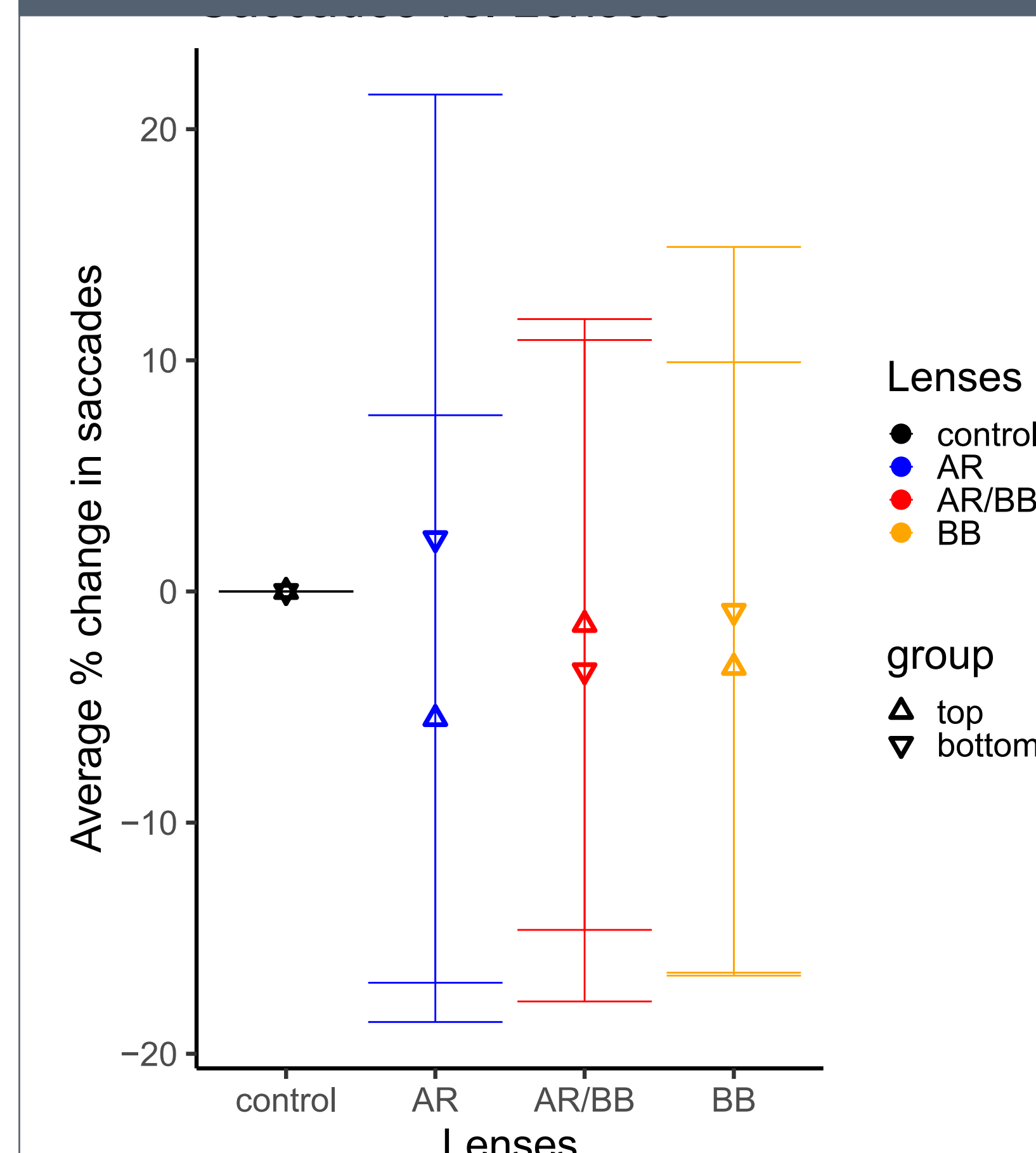


FIGURE 4
Average % change in Fixation vs. Lenses

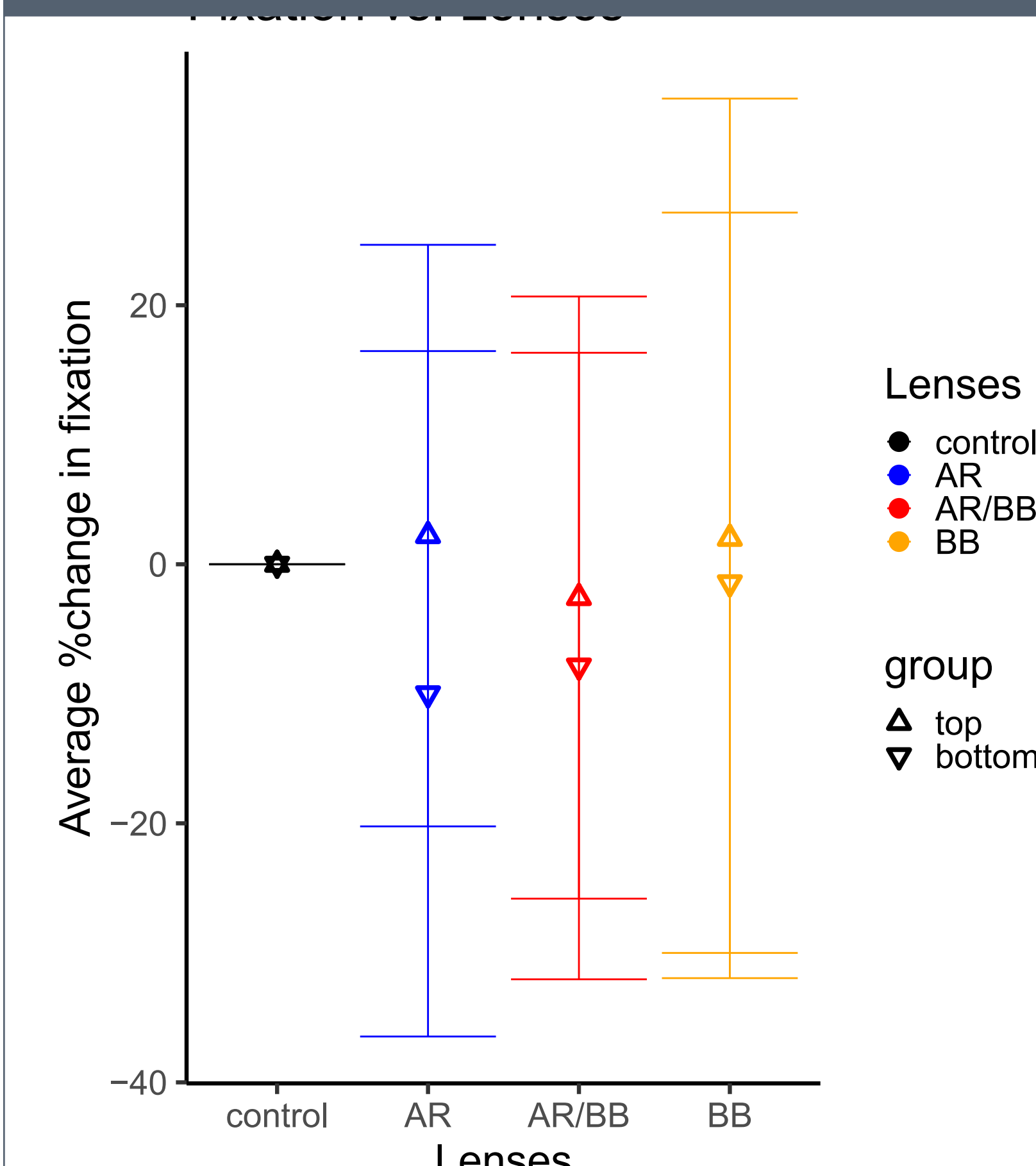


TABLE 1: p-value table

Survey Question	Group p-value	Lenses p-value	Group:Lenses p-value
Blurred vision while viewing the text	0.460	0.343	0.920
Blurred vision when looking in the distance at the end of the near task	0.272	0.376	0.017*
Difficulty or slowness in refocusing eyes from one distance to another	1.000	0.917	0.278
Irritated or burning eyes	0.359	0.517	0.070
Dry eyes	0.199	0.693	0.687
Eye strain	0.022*	0.918	0.144
Headache	0.924	0.455	0.865
Tired eyes	0.062	0.411	0.031*
Sensitivity to bright lights	0.503	0.509	0.696
Discomfort in your eyes	0.086	0.707	0.152
Total	0.075	0.896	0.259

RESULTS

No statistically significant difference between the low/high symptom groups, lenses (BB, AR, AR/BB, control), and combined group/lens interactions for reading rate, pursuits, saccades, and fixation was found. See Figures 1-4.

No statistical significance difference between the groups, lenses, and group/lens interactions for the total score or survey questions except for statistical significance with the group/lens (BB/AR) interactions for 'blurred vision when looking in the distance at the end of the near task' as well as 'tired eyes' and between the groups for 'eye strain'. See Table 1.

CONCLUSION

BB and/or AR coats have no significant impact on objective measures such as pursuits, saccades, fixation, and reading rate regardless of symptom level. More symptomatic people may experience subjective lessening of some eye strain symptoms with BB/AR coats

SAMPLE LENSES



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