

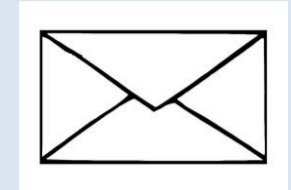
The effect of physical activity on attentional bias to emotions is modulated by age

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BACKGROUND

Physical activity has an impact in biasing attention towards positive or negative emotional stimuli. While it is known that attentional bias to emotions varies with age, evidence is lacking on the effect of physical activity on age-related attentional bias to emotions.

AIM OF THE STUDY

The current study investigated the effect of prolonged physical exercise (half-marathon) on attentional bias to emotions in younger or older amateur runners.

METHOD

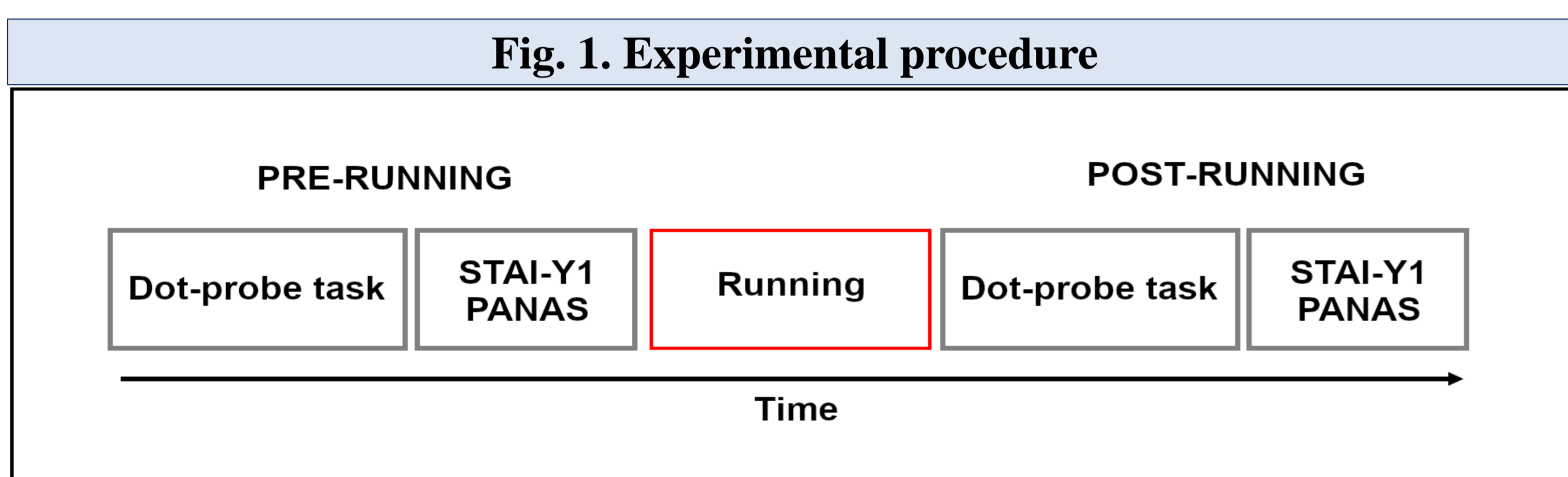
Participants

Under 45 (n=23; mean age \pm SE, 35.52 \pm 1.63 years, age range 21-44 years) and over 45 participants (n=23; mean age \pm SE, 51.78 \pm 1.26 years, age range 45-65 years) took part at the study.

Experimental Procedure

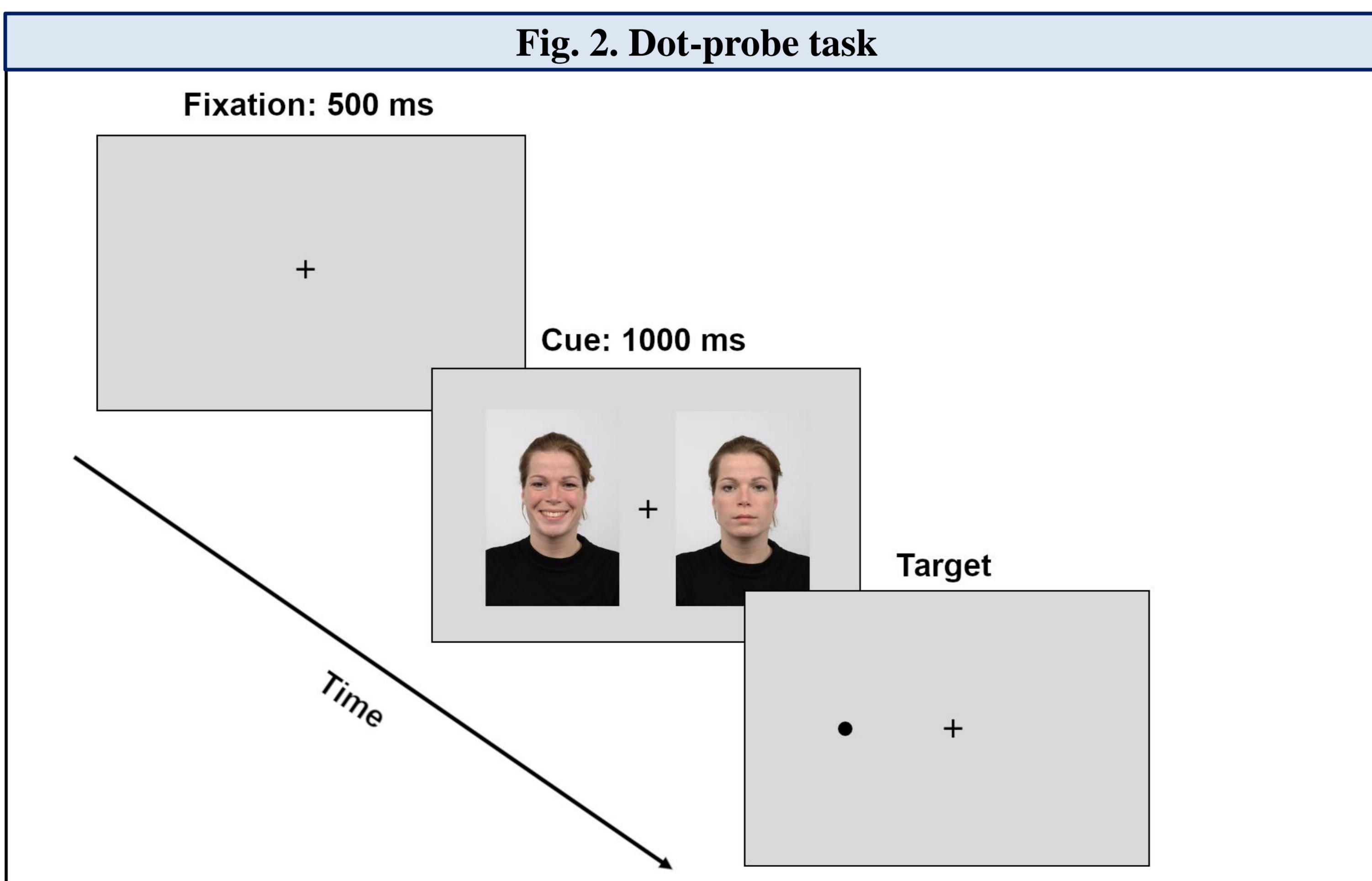
All the participants underwent the dot probe task and the questionnaires (STAI-Y1 and PANAS) before (pre-running) and after (post-running) the running race (Fig. 1).

Fig. 1. Experimental procedure



The dot-probe task was used to measure attentional bias to emotions. In each trial, a pair of faces, one neutral and the other emotional (happy, angry, sad), was displayed on a monitor to either the left or the right side of a central fixation cross; the face pair disappeared and a dot was shown in place of one of the faces. Participants were asked to indicate the location of the dot by pressing as fast as possible the corresponding key on the keyboard. In this task, attentional bias towards or away from emotions is respectively inferred by the faster or slower reaction times to the dot replacing the emotional than the neutral face (Fig. 2). The stimuli were taken from the Radboud Faces Database.

Fig. 2. Dot-probe task



RESULTS

Our main findings revealed that the attentional bias to emotions was differently modulated by the running race depending on age (Fig.3). Specifically, under 45 showed an attentional bias towards angry and away from happy and sad faces after the race (Fig.4). On the other hand, over 45 participants showed an attentional bias away from angry, but no bias for happy and sad faces after the race (Fig.4). Moreover, over 45 showed a bias away from happy and sad faces before the race (Fig. 4). Attentional bias scores did not correlate with questionnaire scores (STAI, PANAS).

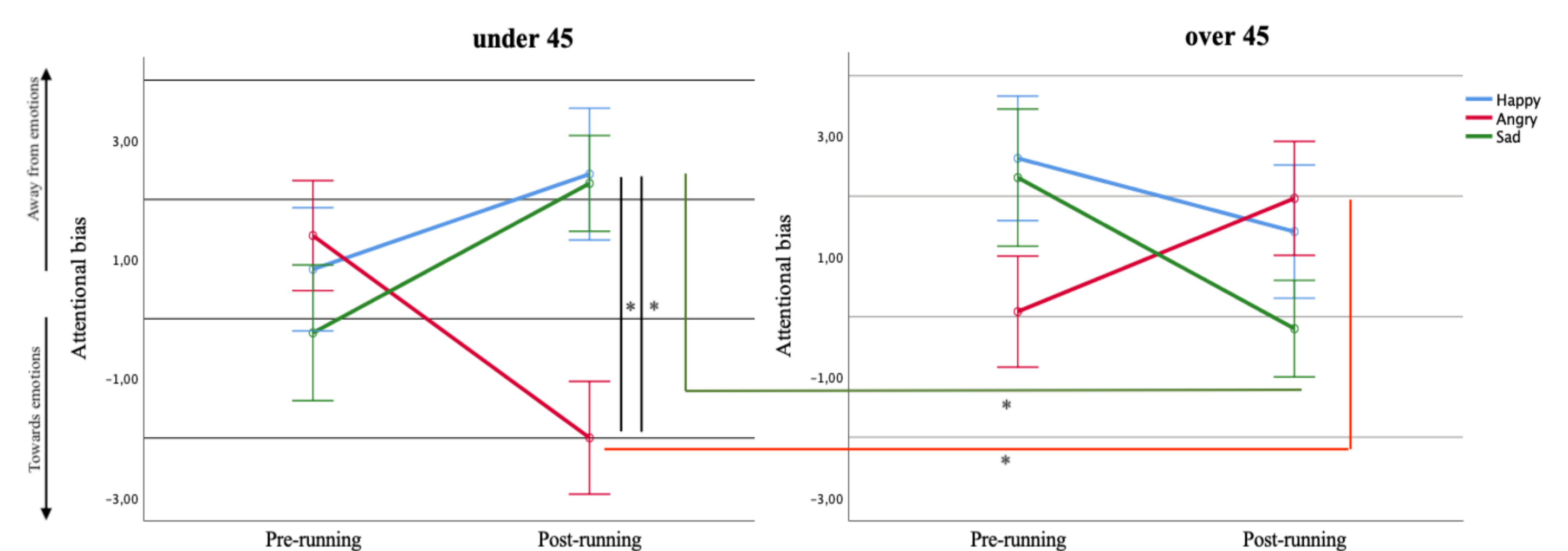


Fig. 3. Attentional bias scores for happy (red), angry (dark blue) and sad (green) faces for the under 45 (left panel) and the over 45 (right panel) group. Asterisks indicate significant differences ($p < .05$). Error bars represent standard error.

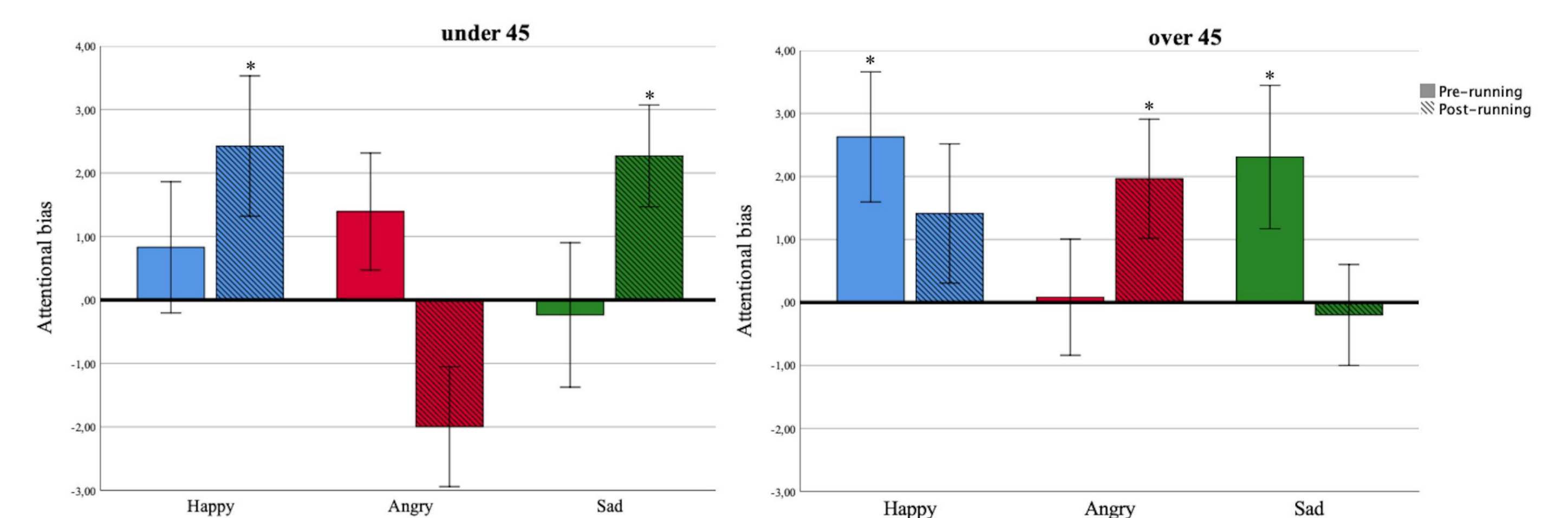


Fig. 4. Attentional bias against zero in under 45 group (left panel) and over 45 (right panel) in pre and post running sessions. Asterisks indicate that attentional bias score was significantly different from zero (with zero representing the unbiased attentional response). Error bars represent standard error.

DISCUSSION

We found a different pattern of results depending on age. In under 45 the attentional bias towards anger post-running and away from happy and sad faces pre-running could be interpreted as a response to a stressful physical situation (running race) that induces a certain level of physiological activation and stress hormones release, which enhances vigilance and reactivity to angry faces while avoiding lower arousal emotions. The different pattern of attentional bias before and after the race in over 45 participants might be due to the different ability to regulate and control emotions. We speculate that the attentional bias away from happiness and sadness pre-running as well as avoidance of anger after the race might be interpreted as the tentative to maintain an optimal emotional level. Overall, our findings suggest that the effect of physical activity on attentional bias to emotions is mediated by age-related regulatory processes.

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