

The effect of perceptual training with anxiety on the anticipatory judgments of elite badminton players

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Introduction

Sport performance is negatively affected when performers become anxious. Researchers have shown that training during which participants are made to experience high anxiety can protect against its negative effects (e.g., Causer, Holmes, Smith, & Williams, 2011). Anticipation is a key part of expert badminton performance and necessitates that players ‘read the game’ to perceive ahead of an action occurring what their opponent is likely to do in any particular situation. Anticipatory judgments can be improved through training interventions, including those using video simulation (e.g., Williams, Ward, Knowles & Smeeton, 2002). The aim of this study was to examine the training of anticipation in badminton using video simulation under anxious conditions and the transfer of learning to high anxiety conditions and the field.

Methods

Elite adult badminton players were assigned to a high anxiety training group (HA; $n = 10$), low anxiety training group (LA; $n = 10$) or a control group (CON; $n = 10$) in a pre-acquisition-post-test design on a badminton court. In the pre- and post-tests, the groups completed a video simulation (see Figure 1) and field-based (see Figure 2) temporal occlusion test in which they anticipated serve direction under high and low anxiety conditions. The video temporal occlusion test involved life-sized footage of serves filmed from the perspective of the opponent that occluded at shuttle-racket contact, thus necessitating participants to anticipate serve direction. The field-based test involved participants responding to live serves, with the initial movement response of participants indicating their anticipatory judgment. For both tests, judgment accuracy was calculated as correct when a judgment matched the landing location of the shuttle. In the three practice sessions between tests, training groups received a video-based perceptual-cognitive training intervention detailing the “gold standard” visual search used by Olympic players with trial-by-trial video feedback on their performance. The HA group completed the training under high anxiety conditions, whereas the LA group completed the training under low anxiety conditions and the CON did not undertake any training. A mobile eye tracker was worn throughout to collect visual search behaviour. Mental effort and state anxiety were measured using validated scales (e.g., Rating Scale of Mental Effort; RSME; Krane, 1994). Anticipation judgment accuracy (RA) and visual fixations (location, number and duration) were analysed using ANOVA.



Figure 1. A video simulation session.

Figure 2. A field-testing session.

Results

Figure 3 shows RA (number of trials) for each group in the video simulation sessions. In the video simulation pre-tests, there were no differences in RA, mental effort, or visual fixations between groups. However, RA was lower, anxiety and mental effort higher, and final fixation duration was shorter in the high compared to low anxiety pre-test. In the low anxiety post-test following the practice sessions, both training groups had a significantly higher RA compared to their pre-test and the CON. In the high anxiety post-test, the HA group had significantly greater RA compared to the LA and CON. Mental effort was higher, anxiety higher and final fixation duration was shorter in the high compared to low anxiety post-test. In the field pre-test, RA was not different between groups, whereas in the post-test both training groups had greater RA compared to their pre-test and CON.

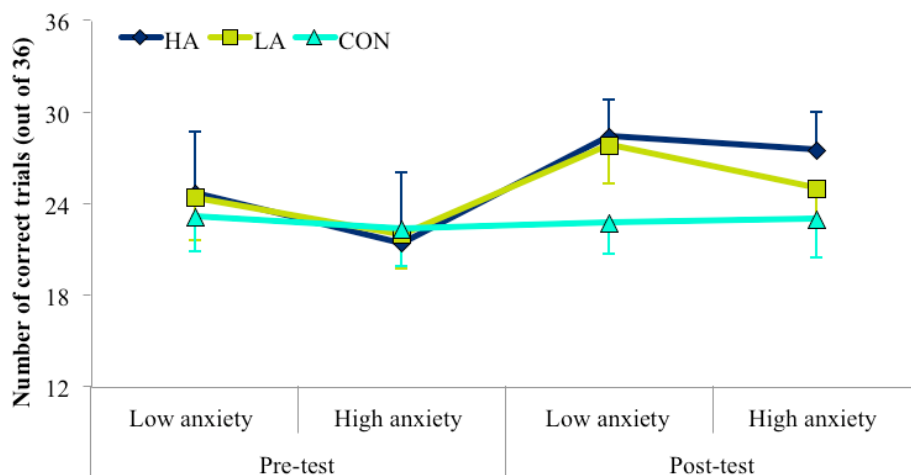


Figure 3. The anticipation judgment accuracy (RA; number of trials) of each group in the video simulation sessions.

Discussion

Video simulation training resulted in greater accuracy of anticipatory judgments on the temporal occlusion test, supporting previous research (e.g., Williams et al., 2002). The training transferred to greater accuracy of anticipatory judgments in the field. The improvements in anticipation from video simulation training with anxiety were retained in later high anxiety conditions, whereas training with low anxiety were not, supporting and extending previous research (e.g., Causer et al., 2011).

Conclusion

Video simulation training lead to improved accuracy of anticipatory judgments in the field, whilst training under anxious conditions protected against its future negative effects.

References

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