

The Red Advantage

Creating a level playing field in combat sports

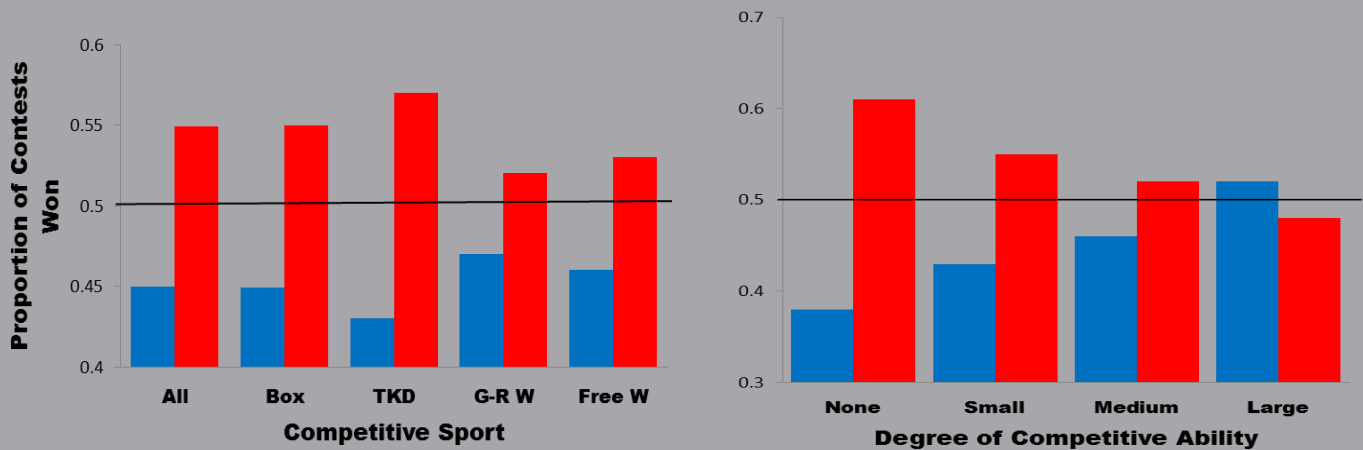


Research by Durham University reveals that the current practice of assigning competitors to wear red or blue may bias the outcome.

Here we explain why and what could be done about it.

Athletes assigned to red are more likely to win

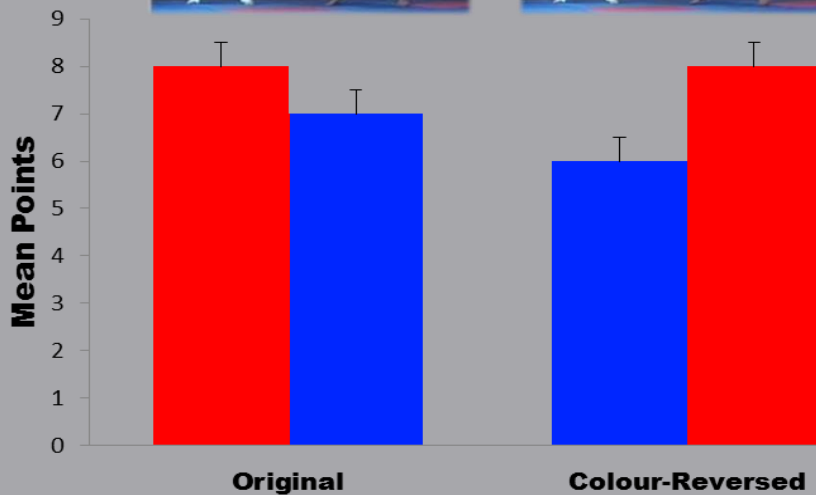
In the 2004 Olympic Games, contestants in four combat sports (Boxing, Tae Kwon Do, Greco-Roman Wrestling and Freestyle Wrestling) were randomly assigned to red or blue:



In all four combat sports, competitors assigned to red had the edge, suggesting a bias. The effect was significant when competitors were evenly matched. Hence, red can tip the balance where other factors are equal. The pattern was consistent across rounds and weight divisions within each sport.

Hill & Barton (2005) *Nature*. 435, 293-297

Judges are biased in favour of red

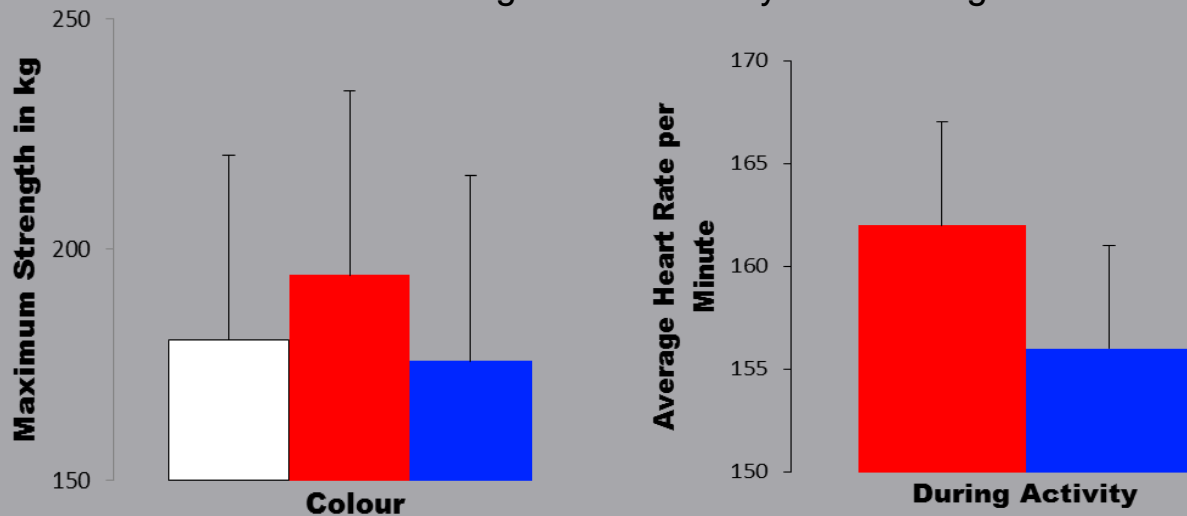


One reason for the red advantage may be that judges' perceptions are biased by colour. In this study, experienced Tae Kwon Do judges scored the outcome of bouts recorded on video. The first graph shows again the red advantage in the scoring of the original videos. Then, the colours were digitally reversed and the same clips shown in a different order. The second graph shows that the colour change caused a change in the judges' scores. Overall, referees gave 13% more points to red competitors, even when the performances were identical. Even with electronic scoring systems, this bias could still play a role. The same effect has now also been demonstrated in both European and Chinese judges.

Hagemann et al. (2008) *Psychological Science*. 19(8), 769-772
 Sorokowski et al. (2014) *Polish Psychological Bulletin*. 45(3) 318-325

Wearing red can affect psychology and improve physical performance

Heart rate and strength influenced by colour assignment



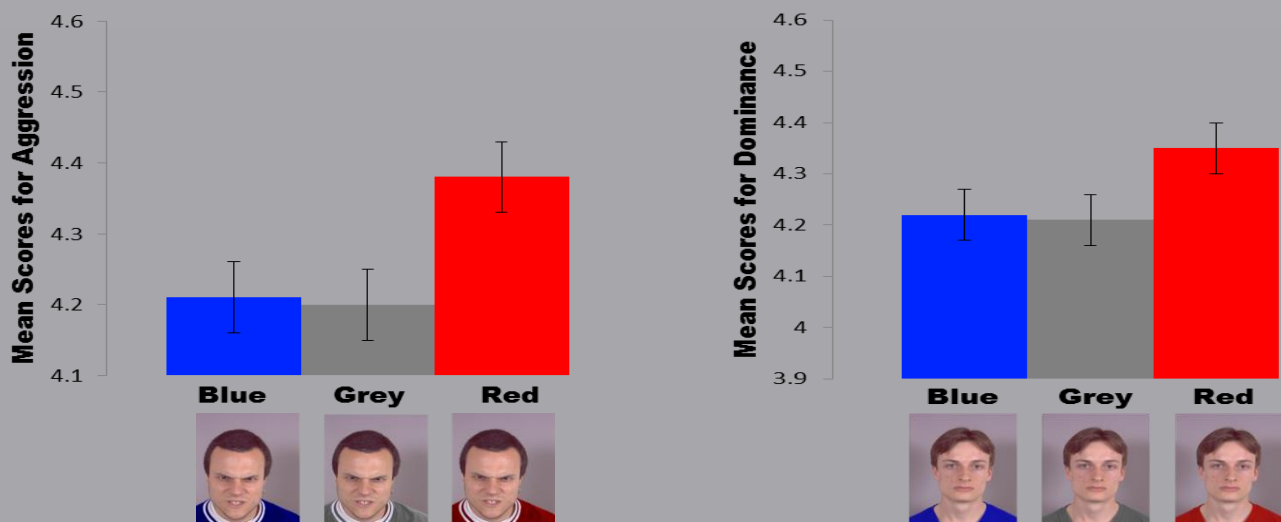
Pairs of male athletes matched for weight, height and age had to fight each other, once in a red jersey and once in blue. Those wearing red had significantly higher heart rates and higher pre-contest strength values.

Dreiskamper et al. (2013) *Journal of Sport & Exercise Psychology*. 35, 44-49

Red intimidates

Individuals in red are perceived as more aggressive and dominant.

This may help to explain the effects on both judges' scoring and individuals' performance



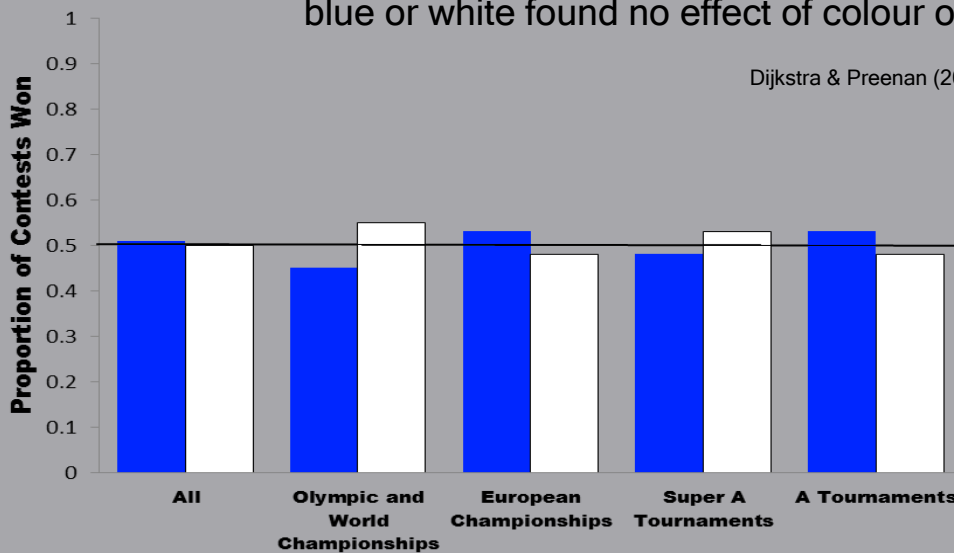
Here again, colour was digitally manipulated while keeping everything else the same. Photos were rated as significantly more aggressive, dominant and angry in the red compared to blue and grey conditions, with no difference between blue and grey.

Wiedemann, Burt, Hill & Barton (2015) *Biology Letters*. 11(5), 1-4

A possible solution: no effect of blue versus white

A large-scale study of 71 major judo tournaments, in which competitors wear either blue or white found no effect of colour on outcomes.

Dijkstra & Preenan (2008) *Proceedings of Royal Society B*. 275, 157-1162



Summary

- Colour has pervasive effects on human psychology, judges' perceptions, and competitors' physical performance.
- These effects can bias the outcome of combat sports, and compromise the 'level playing field' expected by participants and audiences worldwide.
- It is particularly the colour red that causes psychological and behavioural effects, suggesting that other colour combinations present a possible solution.
- Methods of scoring and training of judges may help also ameliorate bias, but will not deal with psychological impacts on the competitors themselves.
- Ongoing research at Durham University, and elsewhere, is examining these effects in more detail