

Red still works: a response to Fortunato & Clauset

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Fortunato & Clauset (2016) claim to have refuted “past claims of an effect of red on human competition” and shown the bias towards red winners in combat sports in the 2004 Athens Olympic Games (Hill & Barton 2005) “reflects instead a structural bias” in the tournaments. Fortunato & Clauset (2016) base these claims on their identification of a subtle potential confounding variable in analyses of combat tournaments, and they conduct simulations to show how imbalances in the proportion of red versus blue winners could arise from asymmetrical tournament structures. The idea is ingenious, but the main conclusion that they have refuted an effect of red on human competition, is unwarranted. In fact, the simulations performed by Fortunato & Clauset (2016) show clearly that their theoretical effect cannot account for the data: a significant ‘red advantage’ is present where they predict none, and where they predict a significant blue advantage this is lacking. In addition, their claims take no account of the extensive experimental evidence for effects of red that have since accumulated.

Fortunato & Clauset (2016) claim that asymmetry in tournament structure “fully accounts for” the disproportionate wins by red in the 2004 Olympics. This is untrue. The Fortunato & Clauset (2016) simulations predict no effects of tournament structure in boxing and taekwondo (i.e. $f_{\text{red}}=0.5$ is the correct null hypothesis; see their Fig S4 and accompanying text). Yet that is exactly where we saw the biggest difference between red and blue, and - contrary to Fortunato & Clauset’s claim that only the full (four sports) data set showed a significant red bias - the pooled results for boxing and taekwondo alone are significant ($p<0.023$, binomial test). This is without restricting the analysis to evenly-matched competitors, where we predicted and found the strongest red effect (Hill and Barton 2005, Fig 1b); this systematic effect of competitor symmetry on strength of the red effect is not predicted by Fortunato & Clauset’s approach.

The Fortunato & Clauset (2016) simulations also do not account for the 2008 data. Although the predicted effects of tournament asymmetry are significantly stronger in the 2008 Olympics - in this case towards blue - there is no significant blue advantage in the actual competition data. Ironically, controlling for the tournament asymmetry in the 2008 tournament structure would increase the likelihood of detecting an underlying red effect. However, without being able to parameterize the competitive symmetry of the athletes involved, or demonstrate that controlling for tournament

structure makes our published effect disappear, it isn't possible to justify the claim that the "results refute the foundational finding" of our work.

We agree on one point: any 'red advantage' effect is likely to be small, only tipping the balance where bouts are symmetrical, and disappearing under the weight of confounding variables (e.g. seeding) in many tournaments. We have always been clear about this, and advocate that experimental data are needed to properly explore the effects. In this regard Fortunato & Clauset (2016) ignore diverse experimental evidence that has accumulated since our original paper. For example, Hagemann et al. (2008) and Sorokowski et al. (2014) found that digitally manipulating colour in videos (of taekwondo and boxing bouts respectively) caused a significant shift in scoring by experienced referees towards red competitors. Dreiskemper et al. (2013) showed that wearing red improved physical performance, and several experimental studies (e.g. Wiedemann et al., 2015) demonstrate the predicted effects on perceptions of dominance and aggression. In claiming to have refuted "claims of an effect of red on human competition" and undermined "that any effect of red on human behavior is an evolved response", Fortunato & Clauset (2016) go well beyond the evidence presented and ignore the evidence from the wider literature.

References

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