

Physicists reveal striking similarities in sporting performance

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(Phys.org)—Finding the similarities between volleyball and snooker may seem quite tricky. However, a group of physicists have found that the spread of scores, otherwise known as distribution, across their ranking systems are almost identical.

They've also shown that this is the same for almost all sports, whether their ranking systems are based on points or the earnings of each individual or team.

Publishing their study today in the [New Journal of Physics](#), the researchers came to this conclusion by statistically analysing the ranking systems across 12 different sports: tennis, golf, table tennis, volleyball, football, snooker, badminton, basketball, baseball, hockey, handball and fencing.

Rankings are a direct measure of a player or a team's performance and come in different forms. Some sports are ranked using a points system, while others are ranked using earnings. By statistically analysing the rankings and plotting them onto graphs, the researchers found that the distributions for each sport were almost identical.

The reason why the ranking systems have a common distribution is unknown and is the latest example of a phenomenon that abides by the mysterious 'power laws' – a term used to describe phenomena where large events are rare and small events are common.

In the past, research has shown that the frequency of words in different texts, the size of cities and people's income all abide by the same power law.

Co-author of the study, Dr Wei Li, said: "Let's take human wealth. The chance of being a billionaire is small, but not zero as we see thousands of them in the world. At the same time, the chance of being poor is very high. We call this distribution a power law and, for some unknown reason, witness exactly the same distribution in other everyday phenomena.

"The sports ranking systems we analysed all follow similar power-laws."

The researchers, from Hua-Zhong Normal University, ISMANS (LUNAM Université), Université de Maine and Max-Planck Institute for Mathematics in the Sciences, also found that the sport rankings agree with a maxim known as the Pareto principle.

Also known as the 80-20 rule, this states that, for many events, roughly 80 per cent of the effects come from 20 per cent of the causes. Vilfredo Pareto noticed this in 1906 when he found that 80 per cent of Italy's land was owned by 20 per cent of the population. The rule also applied to a

variety of other countries he analysed.

In all of the sports analysed, 20 per cent of the players possessed 80 per cent of the total scores of the whole system.

"We all want to be the best or at least one of the best in some aspects. A businessman wants to be Bill Gates; a model wants to be Cindy Crawford; a tennis player wants to be Roger Federer. The idea of ranking is ubiquitous throughout our human society and we have found that for a number of [sports](#), there is a similar law which dictates how these rankings pan out," continued Dr Li.

More information: "Universal scaling in sports ranking" Deng et al. 2012 *New J. Phys.* 14 093038, iopscience.iop.org/1367-2630/14/9/093038/article

Provided by Institute of Physics

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