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Original research

### Evolution of World Cup soccer final games 1966–2010: Game structure, speed and play patterns

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#### Abstract

##### Objectives

There are relatively few performance analysis studies on field sports investigating how they evolve from a structural or tactical viewpoint. Field sports like soccer involve complex, non-linear dynamical systems yet consistent patterns of play are recognisable over time and among different sports. This study on soccer trends helps build a framework of potential causative mechanisms for these patterns.

##### Design

Retrospective correlational study.

## Methods

Broadcast footage of World Cup finals between 1966 and 2010 was used to assess patterns of play and stop periods, type and duration of game stoppages, ball speed, player density (congestion) and passing rates. This involved computer-based ball tracking and other notational analyses. These results were analysed using linear regression to track changes across time.

## Results

Almost every variable assessed changed significantly over time. Play duration decreased while stoppage duration increased, both affecting the work: recovery ratios. Ball (game) speed increased by 15% over the 44-year period. Play structure changed towards a higher player density with a 35% greater passing rate.

## Conclusions

Increases in soccer ball speed and player density show similarities with other field sports and suggest common evolutionary pressures may be driving play structures. The increased intensity of play is paralleled by longer stoppage breaks which allow greater player recovery and subsequently more intense play. Defensive strategies dominate over time as demonstrated by increased player density and congestion. The long-term pattern formations demonstrate successful coordinated states within team structures are predictable and may have universal causative mechanisms.



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## Keywords

Play speed; Game speed; Player density; Sports evolution; Association football

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