

# STATISTICAL ANALYSIS OF PERFORMANCE OF BATSMEN IN CRICKET

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## ABSTRACT

*We investigate the origin and the validity of common beliefs regarding “the hot hand” in the game of cricket. These expressions convey a belief that a player’s performance is significantly better than his overall record. This belief is shared by players, coaches, fans and critics alike and it appears to affect the prediction of future performance of the players. In this paper an attempt is made to investigate the origin and validity of these beliefs through a two-part research study. The first part of the research uses analysis of primary data to see whether the cricketing fans believe in the existence of hot hand, also referred to as “being in form” in cricket. The second part is a work in progress and involves the application of a well known statistical method for verifying the existence of hot hand or “being in form” using secondary data.*

**Key words:** Statistical analysis, T20, hot hands, run test, random sequences

## 1. Introduction

In this article the effects of perceived momentum is discussed in relation to batting in the game of cricket. Hot hand effect, a term often used in the sporting and gambling, refers to the increased probability of the occurrence of a successful event after a run of consecutive successful events. For instance, in a bowling game, if a player knocks down all pins in two consecutive throws, the hot hand effect may imply a high perceived probability of a strike on the third throw. Although the hot hand effect was widely known in the sporting world and has influenced important selection decisions, formal research gained pace in this area subsequent to the founding study published by Gilovich et al. (1985) on the hot hand effect in basket ball. The study is often referred to as one of the first attempts to systematically investigate the topic of hot hands as a research problem and to employ statistical terms for describing hot hands. They used a three dimensional approach which included a survey of basketball fans, analysis of professional field goal data and an experiment involving controlled shooting where players predicted their performance. Gilovich’s study sparked a debate among academicians and a spate of studies followed. Siwoff (1988) analyzed four year batting performance of baseball hitters and concluded that batting averages were just about as likely to be high following cold streaks as following hot streaks. Other important studies dealing with the hot hands effect in baseball include DiMaggio’s 56-game record hitting streak (Gould, 1989) and a logistic regression study of baseball players (Albright, 1993).

One sport that has witnessed major decisions impacted by perceived momentum effect is the latest version of cricket based on “limited overs” concept. The phenomenon of perceived momentum in cricket has rarely been discussed in sporting research literature. In cricket, the term used to refer to perceived momentum is called “*being in or out of form*”. The terms “hot hands” and “being in or out of form” have been used interchangeably throughout the paper. A batsman *in form* is often believed to score higher in the tournament and the odds of selection are greater for such batsmen. The essential cricket terms are discussed in detail in Section 1.1. This paper might be the first of its kind to discuss the hot hands phenomenon in cricket. This topic assumes a great importance in cricket due to the significance of critical decisions that may be impacted by hot hands effect. Section 3 outlines the research methodology and results. Finally, the conclusions of the study are given in section 4.

### 1.1 Cricket

Cricket is a bat and ball sport played in three formats, the traditional five day test match, limited over one day international match, and the latest limited over Twenty 20. Cricket’s newest innovation, the Twenty20 format, has increased the popularity of cricket owing to the shorter duration of the game and a *win-loss* outcome instead of the frequently occurring *draws* in five day test matches. A draw is an outcome where neither of the two teams contesting in a cricket match wins the game. To those not familiar with cricket, Preston and Thomas (2000) have introduced the notion of limited over cricket in detail. Although, there are various similarities between limited over cricket and Twenty20 cricket but some important differences are pointed out in Bhattacharya, Gill, and Swartz (2011). In the Twenty 20 format, two teams consisting of eleven players in each team bat or bowl for a maximum of 20 overs. A bowler is not allowed to bowl more than four overs. In general, batting and bowling capability of cricket teams determine the success along with other capabilities including fielding performance such as wicket keeping, captaincy, home ground, etc.

## 2. Purpose of the study

In cricketing jargon, a positive or a negative streak performance is often referred to as being “*in form*” or “*out of form*”. Irrespective of whether “hot hands” effect can be scientifically explained or proved, it continued to have a significant place in important decisions in cricket. The study is planned as a two-part project. The first part focuses on a research study conducted using primary data that seeks to establish whether individuals believe in the phenomenon of being “*in form*” or “*out of form*.” The second part investigates the existence of hot hands phenomenon of “in form” using statistical analysis of secondary data and the results obtained from two parts are compared. The conclusions arrived at through this study can then be applied to the economic world and be used by various business protagonists.

## 3. Research methodology and results

### Data Collection

The first part of the research study involved collecting data through questionnaires. Of the 110 questionnaires, 93 were deemed acceptable depending on various factors such as: completeness and representativeness of the data set (number of missing questionnaires, number of missing item responses), the questionnaire acceptability to

respondents (time and difficulty to complete) etc. Based on the 93 qualified data sets, the following deductions were made.

The survey consisted of 65.6% of males and 34.4% of females. Since the majority of the respondents were male, this reflects the popularity of the cricket sport among the male population. Out of 93 respondents, majority of the respondents lie in the age group of 20 – 30. Only 5 of the respondents were above 50 years old. The remaining respondents were more or less equally distributed among the other age groups; 10 – 20, 30 – 40 and 40 – 50.

A couple of years ago, ODIs were the most preferred form of cricket; the T20 form had gained increasing popularity over a short period of time. This is evident from the data that almost 70% of the respondents chose T20 as the preferred form of cricket. ODI and Test Match received 27 and 9 votes respectively.

Respondents were asked how many matches they watched on average annually. Based on the answers, the following deductions were made:

- All the respondents watched at least 5 matches per year
- 12 respondents watch more than a 100 matches every year, going up to 400 matches per year for 2 of the respondents
- The mean of the distribution is 55.41 and standard deviation is 77.463

*Do you believe a player has a better chance of scoring a century/ half century if he has scored similarly in his previous match?*

Majority of the T20 audience believed that if a player scored a century or half century in his previous match, the player would perform similarly in the current match. This is apparent from the fact that 67 out of 93 respondents answered in the affirmative, whereas only 34.41% of the respondents felt otherwise. Accordingly, the fans believe that a century/half century will most probably be followed by a century/ half century rather than a duck or a low score.

*Do you believe that a player's performance is dependent on his previous performance?*

Out of 93 respondents, only 32 believed that a player's performance was independent of his previous performance. Conversely, the majority, which constitutes 65.59% of the respondents, believed that the performance was dependant on the previous performance. It is evident from the figures that the greater part of the T20 audience have a positive association in relation the performance of the players.

*Do you believe in the concept of 'In form' and 'Out of form' depending on a player's performance?*

Over 80% of the respondents believe in the concepts of 'In form' and 'Out of form'. Only 17 of the respondents felt that the concept did not exist. The high percentage of this belief among cricket fans is due to positive association. Fans believe that if a player scores high, he is 'In form'. If his performance is inferior, then the player is stated to be 'Out of form', which accounts for his poor performance.

The second part of the research study involves collecting secondary data and conducting statistical analysis for verifying whether the belief of cricket fans in the existence of hot hands phenomenon in cricket is true. Once all the player statistics have been compiled, we need to determine if the scores of the players are independent or if the players' performances are dependent on their previous performances. This would be accomplished using the Wald Wolfowitz run test.

In order to carry out the Wald Wolfowitz run test, we first establish the null hypothesis as follows:

*"The performance sequence of T20 players consists of independent random draws"*

The results would be evaluated using two statistics, median and mean. We can reject the alternate hypothesis which says that the players' performances are dependent on each other. Consequently, we can also prove that the beliefs of the fans are erroneous and that the hot hand in cricket does not exist. One performance is not dependent on the next and cannot be predicted.

#### **4. Conclusion**

During the course of the study, we first collected primary data from the cricket fans regarding their beliefs in the various aspects of the game. Majority of the respondents which amounted to around 70% of the sample expressed their belief in the hot hand in cricket and the dependence of one performance on the next. Next, we plan to analyze the performance of twenty T20 cricketers using the Wald Wolfowitz run tests. The results would show whether the concept of 'in form' and 'out of form' are a myth or just random events perceived by fans as a player's hot streak. This study has been carried out only on the T20 aspect, however, similar research methods can be applied to test and prove the hypothesis in other formats of the game such as One Day Internationals and Test Matches.

#### **References**

- Albright, S.C. (1993b) Rejoinder. *Journal of American Statistical Association*, 88, 1175 – 1183.
- Bhattacharya, R., Gill, P. S., & Swartz, T. B. (2011). Duckworth–Lewis and twenty20 cricket. *Journal of the Operational Research Society*, 62(11), 1951-1957.
- Gilovich T., Vallone R. & Tversky A. (1985) The hot hand in basketball : On misperceptions of random sequences. *Cognitive Psychology*, 77, 295 – 314.
- Gould S. J. (1989) The streak of streaks. *Chance* 2, 10-16.
- Preston, I., & Thomas, J. (2000). Batting strategy in limited overs cricket. *Journal of the Royal Statistical Society: Series D (The Statistician)*, 49(1), 95-106.
- Siwoff, S. Hirdt, S. & Hirdt P. (1988) *The 1988 Elias Baseball Analyst* .