

The Change in Test Cricket Performance Following the Introduction of T20 Cricket: Implications for Tactical Strategy

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International cricket has evolved from predominantly Test cricket, to shorter formats of competition. With the high player overlap between formats, the introduction of Twenty20 (T20) cricket is proposed to have influenced Test cricket and therefore the tactical strategies coaches and players should attempt to implement. The aim of this study was to identify the change in specific Test cricket performance metrics following the introduction of T20 cricket across a 20-year period (2000-2020). A total of 667 matches involving the top eight International Cricket Council (ICC) Test-cricket nations were analyzed. Overall, the introduction of T20 cricket has been associated with a change in the way in which Test cricket is currently played. Results identified significantly ($p < 0.001$) more runs being scored by sixes and less by fours. A significant (17.4%; $p < 0.001$) decrease was also present in the percentage of Test matches ending in draws (23.5% in 2000 to 6.4% in 2020). Run rates increased for five teams (India, New Zealand, Pakistan, South Africa, and Sri Lanka), remained constant for one team (West Indies), and decreased for two teams (Australia, England) across the entire period studied. However, there was no change in the number of days Test matches lasted, with the average number of days continuing to last into day five (4.5 decreasing to 4.3). Findings highlight that improving the ability to strike a greater number of sixes, increase the overall run rate, and facilitate strike rotation when batting to be a focus for coaches and players alike. Future studies should ascertain whether the introduction of T20 has had an effect on One Day International (ODI) performance variables while further considering the impact of home advantage and team quality, to facilitate enhanced tactical and strategic decision-making.

Keywords: cricket, batting, performance analysis, match analysis, match strategy, coaching

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Introduction

Performance analysis is a key element of sport science support and an important component within the coaching process (Carling et al., 2005). It aims to provide coaches with a greater depth of information to inform their decision-making process more effectively, for example, match strategy, training focus, and player recruitment (Barron et al., 2018; Irvine & Kennedy, 2017; Petersen et al., 2008a). International cricket has evolved significantly over the years into three main formats (Test, One Day International [ODI] and Twenty20 [T20]), each of which has a different playing style focusing primarily on the speed of run scoring (Cannonier et al., 2015; Lohawala & Rahman, 2018). Much of the research in cricket performance analysis has focused on the performance variables associated with winning in T20 cricket (Bhattacharjee et al., 2016; Douglas & Tam, 2010; Moore et al., 2012; Najdan et al., 2014; Petersen et al., 2008a). Such research, and the indicators identified, can be used to underpin a coach's decision-making and therefore the team's tactical strategy. Facing fewer dot balls, taking more wickets specifically in the last six overs, having a higher run rate, and scoring a higher percentage of runs from boundaries have all been found to be key indicators of success across different domestic and international tournaments, including the Indian Premier League (IPL; Petersen et al., 2008a), English domestic T20 matches (Moore et al., 2012), and the T20 World Cup (Douglas & Tam, 2010; Irvine & Kennedy, 2017). Thus, considering team selections, bowlers who take more wickets should be potentially favored ahead of bowlers who bowl more economically (Petersen et al., 2008a). Additionally, batters should potentially be selected on their ability to score runs quickly and therefore increase the team's run rate, a metric that has shown a positive outcome in IPL matches (Petersen et al., 2008a).

While there may be similarities across these tournaments, the extent to which they are indicators of success do vary and often depend on the environment and context of the match. Research has shown that while there was a small effect size for taking wickets in the PowerPlay, there was a moderate effect size for lower percentage of runs from boundaries in the first six overs ($ES = 0.96 \pm 0.56$) and fewer runs conceded in the first six overs ($ES = 0.75 \pm 0.55$; Moore et al., 2012). Within the English domestic tournament, for the PowerPlay, winning teams appear to place more emphasis on minimizing the runs, and in particular the

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boundaries scored in this period rather than the more attacking nature of taking wickets. The opposite has been shown in the IPL, which places emphasis on wicket taking (Petersen et al., 2008a). While these may be explained by tournament differences, it could arguably be caused by an evolution in tactics over time; having a higher run rate in the 2008 IPL and the cricket World Cup was found to be the highest correlating variable to match success (Petersen et al., 2008a, 2008b). In addition, the percentage of runs from boundaries has tended to increase in various short forms of cricket. Such changes begin to suggest a possible evolution in batting tactics and coaching strategy over time, with batting becoming more aggressive by virtue of the increase in run scoring in general alongside the increase in runs scored via boundaries. However, it must be noted that various environmental (e.g., weather/climate) and tournament variations (e.g., number of matches played) that exist between these T20 tournaments may explain aspects of any changes identified.

Given that six of the 10 England and Wales Cricket Board (ECB) players awarded a central contract for Test cricket were also awarded one of the 12 white ball contracts in 2019 (ECB, 2019), it may well be logical to assume some playing style overlap exist between Test and the short formats of the game. Previous research has attempted to assess the influence of T20 cricket on Test cricket by analyzing several indicators of performance, such as draw percentage, run rate, match length, and runs scored in boundaries, eight years prior to and eight years subsequent to the introduction of the IPL (Ray, 2019). The study focused considerably on India and Australia identifying a decline in the percentage of draws for India and a considerable increase of 35% for Australia. Surprisingly, it was identified that there was an increase in runs per over prior to the introduction of the IPL from 3.09 in 2000 to 3.38 in 2007, but a significant decrease to 3.11 run per over post-IPL introduction (Ray, 2019). Additionally, there was no evidence that the length of Test matches decreased; however, a reduction in the number of overs bowled per Test match was identified (Ray, 2019). However, this study had a considerable focus on India and subcontinent conditions, not considering other major test playing nations, so the generalizability of the findings is limited. While there is limited research identifying any changes in Test cricket strategies after the introduction of T20, there are several studies identifying changes in draw percentage in Test cricket. Research has shown a substantial 21% decrease (Lenten, 2008) in draw percentage in Test matches; however, a decrease of 7% has also been identified (Allsopp, 2005).

Research examining the impact of T20 on Test cricket has typically grouped together several seasons before and after its introduction to determine its influence on Test performance, and though this might overcome statistical issues (e.g., anomalies and outliers), grouping many seasons together might hinder the ability

to identify a more subtle trend. It would therefore be beneficial to combine the key strengths of these studies and analyze each metric across a smaller period and for each team individually, to identify any changes and whether this is applicable to all countries. Equally, limited research has mentioned matches being excluded where considerable rain delays were present, resulting in play abandonment on one or more full days (e.g., matches ending in draws due to weather). Of the research that has looked at this, no significant effect on match outcome was reported at the international level (Forrest & Dorsey, 2008). However, Forrest and Dorsey (2008) highlighted the impact of toss and weather on English County Championship outcomes (e.g., match and league table adjustment).

Previous research has identified varying indicators of successful and unsuccessful performances across the three cricket formats (Najdan et al., 2014; Petersen et al., 2008a) with such differences arguably the result of the need to take a far more attacking approach to scoring runs within the shorter formats. However, only two studies have focused on changes in the way in which Test cricket has been played since the introduction of T20 (Lohawala & Rahman, 2018; Ray, 2019). Further, there is some contradictory evidence depending on the time period studied; therefore, more research is needed to identify any changes in key performance metrics within Test cricket following the introduction of T20 to inform future coach decision-making. A more specific analysis, using shorter periods around the introduction of the T20 format focused on individual nations, is warranted to further understand the positive or negative impact that T20 has had on Test cricket and the tactical approach required to be successful. Therefore, the aim of this study was to identify the change, if any, of specific performance variables in Test match cricket following the creation of T20 cricket.

Methods

Sample

Match statistics from 724 international Test cricket matches involving the top eight Test nations (Australia, England, India, New Zealand, Pakistan, South Africa, Sri Lanka, and the West Indies, reviewed from ICC Cricket on May 1, 2020; ICC, 2020) played between Jan. 1 2000, and March 31, 2020, were selected

for analysis. Only fixtures between the top eight Test teams were selected to ensure the highest level of competition. Higher ranked teams will often field a weaker team against those outside of the top eight, potentially resulting in data unrepresentative of typical performance (Dewart & Gillard, 2019). Of the 724 matches played, 57 were excluded, as one or more of the five days saw no play due to adverse weather. Additionally, any matches in which teams forfeited an innings or withdrew from the match were also excluded. As a result, data from 667 test matches were used for analysis. Matches were split into pre-T20 (2000-2005) and post-T20, with this post-T20 period being split into five groups each consisting of three years of competition (see Tables 1 and 2).

Table 1. Number of Matches and Innings Played by Each Country Across the Six Time Periods

Team	Type	Pre- T20		Post T20			
		2000-'05	2006-'08	2009-'11	2012-'14	2015-'17	2018-'20
Australia	Matches	68	26	33	31	27	21
	Innings	123	48	62	59	50	38
England	Matches	63	35	29	32	36	25
	Innings	121	65	49	61	69	47
India	Matches	46	34	29	26	27	18
	Innings	85	66	52	47	46	33
New Zealand	Matches	32	18	17	23	18	16
	Innings	61	36	33	45	35	28
Pakistan	Matches	43	19	25	19	21	13
	Innings	80	36	49	38	42	25
South Africa	Matches	55	31	22	23	19	20
	Innings	101	58	39	40	36	40
Sri Lanka	Matches	45	18	23	20	26	17
	Innings	85	32	45	40	51	33
West Indies	Matches	58	19	20	16	22	10
	Innings	109	37	36	32	44	20

Table 2. Number of Test Matches Played, per Year, per Country Pre- and Post-Introduction of T20

Team	Average test matches pre-T20	Average test matches post-T20	Change
Australia	11.3	9.2	-2.1
England	10.5	10.5	0.0
India	7.7	8.9	1.2
New Zealand	5.3	6.1	-0.8
Pakistan	7.2	6.5	-0.7
South Africa	9.2	7.7	-1.5
Sri Lanka	7.5	6.9	-0.6
West Indies	9.7	5.8	-3.7
Overall	8.5	7.7	-0.8

Variables and Procedure

The variables of interest included the overall match result, total number of fours and sixes scored, total number of runs scored, number of days the match lasted, and run rate of each innings played (Ray, 2019). All data were manually collected from ESPN Cricinfo (www.espncricinfo.com) and collated into a Microsoft Excel spreadsheet for further analysis.

Reliability

As the data were collected from a secondary source (ESPN Cricinfo), and despite this source being utilized within several previous research publications to date (Douglas & Tam, 2010; Petersen et al., 2008a; Ray, 2019) it was imperative the data were assessed for reliability. As such, data from approximately 10% of the matches analyzed from each year were recollected from www.howstat.com. This equated to 69 matches out of the 667 being rechecked. Agreement was assessed for each variable between the two sources using a percentage error assessment. All variables demonstrated 100% agreement and provided confidence that the collected data reliably represented actual match performance.

Data Analysis

Normality assumptions were checked using the Kolmogorov-Smirnov test. Descriptive data were presented as mean \pm *SD* where appropriate. A series

of Welch's ANOVAs (IBM SPSS Statistics, Version 25) were used to identify differences in the dependent variables between time periods. Data were then split per country and assessed for differences in the dependent variables relative to each period. Where statistical significance ($p < 0.05$) was identified, post-hoc analyses with Games-Howell multiple comparison method was performed to identify where specific differences were evident. The effect size calculation (Cohen's d) was used to characterize the magnitude of difference between each time period (Hopkins, 2004). The criteria for interpreting effect sizes were: < 0.2 trivial, $0.2-0.5$ small, $> 0.5-0.8$ medium, and > 0.8 large. Only "large" effect sizes were reported on, as these represented a considerable magnitude of experimental effect (e.g., a stronger relationship between the two variables examined).

Results

All Teams

Percentage of Runs Scored by Boundaries

A significant main effect of time on the percentage of runs scored by fours was observed ($F_{5,1328} = 5.703, p < 0.001$; see Figure 1). Post-hoc tests revealed a significant 2.8% decrease in the percentage of runs scored through fours between 2000-2005 and 2009-2011 ($p = 0.001$). There was also a significant 2.1% ($p < 0.05$) decrease between 2000-2005 and 2012-2014 and a 3.1% ($p = 0.006$) decrease between 2000-2005 and 2018-2020. There was a significant main effect of time on the percentage of runs scored by sixes ($F_{5,1328} = 4.859, p < 0.001$; see Figure 1). Post-hoc tests revealed a significant 0.8% increase in the percentage of runs scored through sixes between 2000-2005 and 2015-2017 ($p < 0.05$).

Run Rate and Number of Days Played Within Matches

There was no significant main effect of time on the average run rate (3.4) or on the average number of days a match lasted (4.4; see Figure 1). However, a steady but small decrease in the number of days played was observed from 2009-11 (4.5) through 2012-14 (4.4), 2015-17 (4.3), and 2018-20 (4.3).

Draw Percentage

There was a significant main effect of time on the percentage of matches ending in a draw ($F_{5,179} = 12.390, p < 0.001$; see Figure 1). Post-hoc tests revealed a significant 17.1% decrease in draw percentage between 2000-2005 and 2018-2020 (ES; 1.27; $p < 0.001$), as well as a 12.8% decrease between 2000-2005 and 2015-2017 (ES = 0.92; $p = 0.002$).

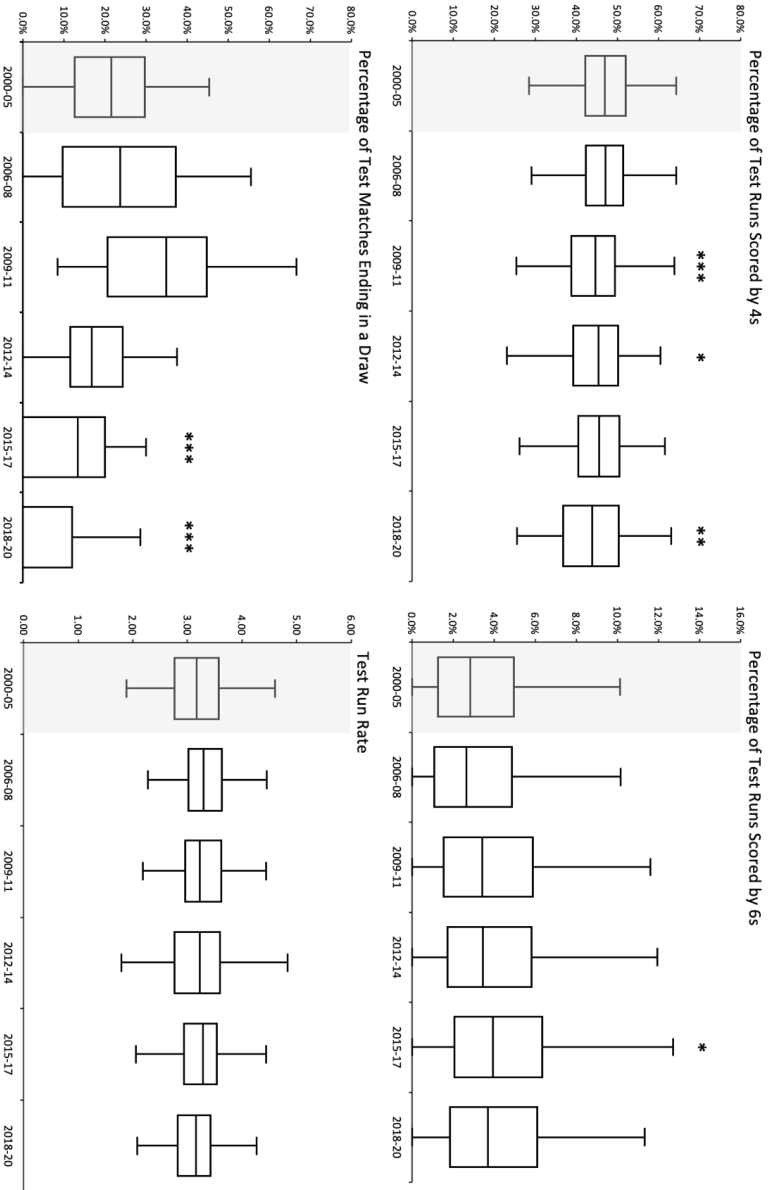


Figure 1. Box plots illustrating Four%, Six%, Run Rate, and Draw% for all teams. Shaded area represents the period prior to T20 introduction.
 Key: * = $p < 0.05$, ** = $p < 0.01$, *** = $p < 0.001$.

Analysis by Country

Percentage of Runs Scored by Boundaries

There was a significant difference in the percentage of runs scored by fours pre- and post-introduction of T20 for India, New Zealand, Pakistan, Sri Lanka, and West Indies (see Table 3). Post-hoc tests revealed a significant decrease in the percentage of runs scored by fours between 2000-2005 and 2015-2017 (7.3%) for India. A significant ($p = 0.032$) 5.8% decrease between 2000-2005 and 2018-2020 was identified within New Zealand's performance, whereas a much larger decrease was identified for Pakistan between 2000-2005 and 2012-2014 (9.5%; $p = 0.013$) and between 2000-2005 and 2015-2017 (8.7%; $p = 0.003$). There was a significant difference in the percentage of runs scored by sixes pre- and post-introduction of T20 for India and the West Indies (see Table 3). India significantly increased their percentage of runs scored via sixes by 3.6% between 2000-2005 and 2018-2020 ($p = 0.004$). West Indies saw the greatest overall increase in percentage of runs scoring by sixes of 2.6% ($p = 0.035$) between 2000-2005 and 2009-2011 and by a further 1.9% ($p = 0.007$) through 2018-2020.

Run Rate and Number of Days Played Within Matches

There was no significant difference in run rates, or the number of days played on an individual team basis. Run rates ranged between 2.9 and 3.7, with no team demonstrating a consistent increase or decrease over time. New Zealand were the only teams to score less than 3.0 runs per over, which occurred during 2000-2005. The number of days played ranged between 3.9 and 4.9, with only the West Indies in 2018-2020 falling below 4.0 days of play (see Table 3).

Draw Percentage

There was a significant difference in the percentage of matches ending in a draw for the West Indies, with post-hoc analysis identifying a significant 26.3% increase in draw percentage between 2000-2005 and 2009-2011 (see Table 3). In contrast, however, there were no differences in the percentage of matches ending in a draw for the remaining seven teams within the analysis.

Table 3. Individual Country Averages for Each Variable and Each Time Period

	2000-2005	2006-2008	2009-2011	2012-2014	2015-2017	2018-2020
<i>Percentage of Runs Scored by 4s (%)</i>						
Australia	45.8 ± 8.1	41.9 ± 6.4	45.5 ± 5.0	43.3 ± 7.0	44.9 ± 6.3	43.5 ± 8.0
England	45.8 ± 8.6	44.8 ± 7.2	44.2 ± 6.3	45.9 ± 6.5	47.2 ± 7.7	43.7 ± 8.9
India	48.7 ± 6.6	47.0 ± 7.1	46.1 ± 8.2	47.1 ± 7.3	41.4 ± 5.1***	43.3 ± 6.3
New Zealand	44.9 ± 7.1	49.5 ± 4.5**	44.0 ± 6.3	44.5 ± 7.6	48.7 ± 5.1*	39.1 ± 6.5**
Pakistan	47.0 ± 7.1	49.0 ± 4.1	43.5 ± 9.4	37.5 ± 9.8*	38.3 ± 8.3**	43.4 ± 9.4
South Africa	46.9 ± 7.7	46.8 ± 6.8	41.9 ± 7.1	45.6 ± 5.4	48.1 ± 6.3	50.8 ± 8.3
Sri Lanka	47.9 ± 7.6	46.2 ± 5.3	43.1 ± 6.2	44.3 ± 5.9	45.9 ± 6.9	40.4 ± 7.4**
West Indies	47.2 ± 7.5	48.1 ± 8.0	40.8 ± 8.7*	48.1 ± 6.4	45.9 ± 6.7	42.7 ± 6.9
Mean	46.7 ± 7.7	46.3 ± 6.9	43.9 ± 7.4*	44.6 ± 7.4*	45.0 ± 7.4	43.6 ± 8.5*
<i>Percentage of Runs Scored by 6s (%)</i>						
Australia	4.4 ± 3.2	3.6 ± 2.2	3.9 ± 2.2	4.9 ± 3.1	4.6 ± 2.5	3.0 ± 1.9
England	3.6 ± 3.2	2.5 ± 2.1	2.0 ± 1.9	3.5 ± 3.5	3.5 ± 2.6	4.9 ± 3.6
India	2.9 ± 2.3	3.5 ± 2.4	4.3 ± 3.0	3.5 ± 2.4	5.6 ± 2.5**	6.5 ± 4.9**
New Zealand	4.3 ± 3.5	5.1 ± 2.4	4.6 ± 2.5	6.0 ± 4.2	5.6 ± 3.0	4.8 ± 2.5
Pakistan	4.9 ± 4.4	3.8 ± 3.1	5.0 ± 2.7	4.2 ± 3.0	4.8 ± 3.0	3.7 ± 2.5
South Africa	3.8 ± 5.1	2.1 ± 1.9	4.3 ± 3.8	3.1 ± 2.1	3.3 ± 2.6	4.2 ± 2.8
Sri Lanka	2.4 ± 1.6	2.2 ± 2.2	2.9 ± 2.1	3.4 ± 2.5	3.8 ± 3.2	3.5 ± 2.4
West Indies	3.2 ± 2.4	5.0 ± 3.6	5.8 ± 4.0*	6.1 ± 4.4*	5.3 ± 3.9	7.7 ± 4.8**
Mean	3.7 ± 3.5	3.3 ± 2.6	3.9 ± 3.0	4.2 ± 3.3	4.5 ± 3.1*	3.2 ± 3.1
<i>Run Rate</i>						
Australia	3.7 ± 0.5	3.5 ± 0.4	3.4 ± 0.3	3.5 ± 0.7	3.6 ± 0.7	3.2 ± 0.5
England	3.2 ± 0.6	3.1 ± 0.5	3.5 ± 0.5	3.0 ± 0.6	3.3 ± 0.5	3.1 ± 0.4
India	3.1 ± 0.6	3.4 ± 0.6	3.4 ± 0.4	3.3 ± 0.5	3.4 ± 0.5	3.2 ± 0.5
New Zealand	2.9 ± 0.5	3.4 ± 0.5	3.1 ± 0.3	3.1 ± 0.6	3.6 ± 0.5	3.0 ± 0.4
Pakistan	3.1 ± 0.5	3.5 ± 0.6	2.9 ± 0.4	3.0 ± 0.6	3.1 ± 0.3	3.2 ± 0.5
South Africa	3.0 ± 0.6	3.2 ± 0.5	3.2 ± 0.6	3.2 ± 0.6	3.1 ± 0.6	3.1 ± 0.5
Sri Lanka	3.1 ± 0.4	3.3 ± 0.4	3.4 ± 1.0	3.0 ± 0.4	3.1 ± 0.3	3.1 ± 0.5
West Indies	3.0 ± 0.5	3.2 ± 0.4	3.1 ± 0.5	3.2 ± 0.3	2.9 ± 0.4	3.1 ± 0.4
Mean	3.2 ± 0.6	3.3 ± 0.5	3.3 ± 0.6	3.2 ± 0.6	3.3 ± 0.5	3.1 ± 0.5

<i>Days Lasted</i>						
Australia	4.3 ± 0.8	4.7 ± 0.6	4.5 ± 0.7	4.4 ± 0.7	4.1 ± 0.8	4.4 ± 0.6
England	4.4 ± 0.8	4.6 ± 0.6	4.5 ± 0.6	4.4 ± 0.7	4.3 ± 0.8	4.4 ± 0.6
India	4.5 ± 0.7	4.6 ± 0.6	4.6 ± 0.5	4.3 ± 0.8	4.3 ± 0.7	4.2 ± 0.7
New Zealand	4.6 ± 0.6	4.3 ± 0.7	4.6 ± 0.6	4.3 ± 0.7	4.4 ± 0.7	4.5 ± 0.6
Pakistan	4.6 ± 0.7	4.4 ± 0.8	4.4 ± 0.6	4.4 ± 0.7	4.9 ± 0.3	4.1 ± 0.6
South Africa	4.6 ± 0.7	4.3 ± 0.8	4.5 ± 0.7	4.3 ± 0.7	4.2 ± 0.8	4.2 ± 0.7
Sri Lanka	4.5 ± 0.7	4.4 ± 0.7	4.7 ± 0.6	4.6 ± 0.7	4.4 ± 0.7	4.3 ± 0.7
West Indies	4.4 ± 0.8	4.5 ± 0.7	4.5 ± 0.7	4.3 ± 0.8	4.3 ± 0.8	3.9 ± 0.7
Mean	4.5 ± 0.7	4.5 ± 0.7	4.5 ± 0.6	4.4 ± 0.7	4.3 ± 0.7	4.3 ± 0.7
<i>Percentage of Matches Ending in a Draw (%)</i>						
Australia	13.0 ± 11.5	9.5 ± 16.5	15.7 ± 7.0	13.1 ± 6.1	12.5 ± 11.4	3.3 ± 5.8
England	22.0 ± 9.1	34.5 ± 18.2	30.2 ± 13.5	19.8 ± 5.4	14.5 ± 5.5	6.1 ± 5.4
India	24.9 ± 19.6	42.9 ± 8.6	36.9 ± 11.8	18.5 ± 10.1	21.4 ± 8.0	0.0 ± 0.0
New Zealand	38.8 ± 34.5	12.2 ± 11.3	34.2 ± 8.0	22.0 ± 8.4	4.2 ± 7.2	15.1 ± 14.4
Pakistan	22.8 ± 17.9	38.8 ± 1.8	33.5 ± 12.0	20.8 ± 11.0	6.7 ± 11.5	6.3 ± 8.8
South Africa	23.9 ± 16.7	12.8 ± 4.8	24.3 ± 10.5	21.8 ± 13.9	4.8 ± 8.3	0.0 ± 0.0
Sri Lanka	23.0 ± 19.9	17.5 ± 20.5	51.5 ± 16.9	30.7 ± 16.7	11.4 ± 10.3	10.0 ± 14.1
West Indies	19.5 ± 10.2	31.9 ± 6.4	45.8 ± 7.2*	11.4 ± 10.3	10.4 ± 10.0	10.0 ± 14.1
Mean	23.5 ± 17.4	25.0 ± 11.0	34.0 ± 10.9	19.8 ± 10.2	10.7 ± 9.0*	6.4 ± 7.8*

Key: * = $p < 0.05$; ** = $p < 0.01$; *** = $p < 0.001$. Difference indicated between pre-T20 (2000-2005) and period noted.

Discussion

An important finding of this study was that significantly ($p < 0.05$) more runs have been scored by sixes and fewer by fours since the introduction of T20 cricket. From an individual team perspective, the same trend was observed for England, India, New Zealand, Sri Lanka, and West Indies. This together with the fact that fewer matches ended in draws (2015-2017, $ES = 0.92$, $p = 0.002$; 2018-2020, $ES = 1.27$, $p < 0.001$) could indicate T20 has had an effect on Test match cricket over time. Both the 2015-2017 (12.8%) and 2018-2020 (17.1%) period had a significantly lower draw percentage than pre-T20, a finding that has been alluded to in previous studies (Allsopp, 2005; Lenten, 2008). Furthermore, the fact that most significant differences were seen in the latter years (2012

onwards) could mean that T20 cricket has had a delayed yet pertinent effect on the longest format of the game, a suggestion that has been made in previous research (Lenten, 2008). Giving further credence to this is that this was the first or second analyzed period following the creation of the major domestic T20 tournaments, the Indian Premier League in 2009, the Big Bash League in 2011, and the Caribbean Premier League in 2013. This study also suggests that the overall boundary percentage has decreased since the introduction of T20. Such findings contrast with older literature that identified the importance of boundary scoring on winning (Moore et al., 2012; Petersen et al., 2008b). Nevertheless, the increase in the percentage of runs scored via sixes in Test cricket is arguably an aspect affected by the introduction of T20 cricket, whereby the use of riskier and aerial shots to score runs quickly is a key characteristic (Moore et al., 2012). Interestingly, research has suggested that six percentage in one-day cricket has a large effect on the match outcome (Petersen et al., 2008b). However, additional studies are needed to determine whether this is the case in Test matches and, if so, whether this a result of ODI matches or the emergence of T20s. Furthermore, it was theorized that the increasing importance of boundaries in the T20 format, due to the restricted number of balls that can be bowled, would have elicited a similar increase within Test cricket, especially due to the high player overlap between formats. The results do suggest that while overall boundary percentage is reduced, players are arguably becoming more expansive with their attempt at scoring runs by scoring a greater proportion of runs through sixes, so players/coaching staff ought to consider the above as part of their preparation for, and tactical decision-making during, competitive performance.

It is often argued by commentators, media, and other cricket experts that there has been an increase in the number of runs scored per over within Test cricket since the introduction of international T20. However, the results within the current study found no significant difference in the average number of runs scored per over pre- (3.2) and post-introduction of T20 (ranging between 3.1 and 3.3). Small changes (less than 0.05) were observed between the period pre-T20 and the greatest post-T20 run rate; however, the pre-T20 run rate also lies within the post-T20 run rate range. The introduction of T20 cricket has therefore clearly not affected the speed at which runs are accumulated at the elite level.

Interestingly, when the number of runs scored per over was assessed by country, all of Australia's period run rates were lower than their pre-T20 run rate, suggesting that T20 has reduced the speed in which Australia accumulates runs. However, this could be because Australia was consistently ranked number 1 in the ICC men's Test team ranking between 2001 and 2009 (ICC, 2021a) and, by virtue of their dominance, may have simply been scoring at an extraordinarily high rate during the pre-T20 period. In contrast, the run rates of New Zealand,

South Africa, India, Sri Lanka, Pakistan, and the West Indies generally increased since the introduction of T20, which mirrors previous findings that suggested a higher run rate is expected in Test cricket as T20s become more commonplace within the international cricket calendar (Lenten, 2008). This may further be justified by the comparison of the average number of test matches played per season before and after the introduction of T20 cricket (see Table 2). As a result, there appears a need to ensure players are suitably conditioned to cope with the increased higher intensity running demand. In addition, coaches need to be aware of altered run rates in particular teams to positively affect match strategy.

Although this might not necessarily be a direct cause and effect of T20 involvement, the various teams are still accumulating runs in a quicker manner, which is a characteristic associated with successful T20 cricket (Moore et al., 2012; Najdan et al., 2014). Research identified an increase in run rates for Test cricket that coincided with increasing ODI run rates, although there appeared to be an approximate 10-year delay (Lenten, 2008). If the suggested minimum 10-year delay is applicable in Test cricket, the effects of the introduction of T20 cricket on Test cricket may only be starting to become evident. To add credence to the possibility of a delayed effect, rule changes have been shown to incrementally and slowly effect how basketball (e.g., decrease in three-point accuracy by virtue of the increase in three-point arc distance to the basket; Strumbelj et al., 2013) and rugby league (e.g., 75% reduction in possessions kicked out of play due to the introduction of '40-20' rule; Eaves et al., 2008) are played tactically. This may explain why some countries are yet to demonstrate increased run rates throughout their current performances and could also explain why previous studies have found no significant increase at the point of study (Ray, 2019). Coaches, players, and support staff should be cognizant of the potential changes to performance, as evidenced within several teams herein, that might arise in years to come and embed such alterations within their coaching process.

Findings of this study contrast with previous literature suggesting that cricket matches continue to last the same length. Previous findings identified an increase in Tests finishing within four days from 19.0% to 40.8%, and the number of Tests finishing within three days rising to 15.3% (from 2.5%; Lenten, 2008). However, the difference in these findings could be due to the periods analyzed or the fact that any matches delayed by rain for greater than one day were removed from the sample. Lenten (2008) included Test matches from 1981 to 2007 while the current study incorporated matches between 2000 and 2020. Identifying that matches on average continue to day five is an important finding, as oftentimes suggestions arise for Test cricket to be reduced to four days of play (Ammon, 2019). If such a change occurred, the percentage of matches ending with no winner (i.e., a draw) would likely increase, thus negatively affecting spectator interest.

Future Recommendations

Cricket grounds are not all uniform, with many different designs, environmental considerations, and boundary lengths having a propensity to favor the batsman or bowler, among various other differences (e.g., boundary lengths must be between 65 and 90 yards; ICC, 2021b). Therefore, future studies should attempt to establish the additive effect of home advantage on the relationship between T20 and Test cricket. Additionally, establishing whether there have been any changes in the way teams are winning Test matches following the introduction of T20 in relation to team quality appears of considerable interest to coaches and players alike. Due to the observed increase in the percentage of runs scored by sixes, and the associated increased risks with attacking and aggressive batting, it appears a logical progression to investigate whether a change in bowler performance within the same time periods is similarly evident (e.g., change in strike-rate). Wider cricket research around ‘The Hundred’ (the recently introduced 100 ball format) and the strategies utilized within this new short-form tournament by virtue of the rule variations appears widely impactful toward the development and differentiation of in-game tactical strategies. Finally, future research should endeavor to monitor the impact of T20 on ODI cricket to ascertain whether ODI performance metrics have been affected in a similar manner.

Conclusion

This study has provided new and longitudinal insights into the evolution of several performance indicators within Test cricket in relation to the introduction of T20 cricket. While the direct impact of T20 upon Test cricket performance cannot be conclusively known by virtue of the observational nature of the current study, this article has highlighted interesting changes in performance post-T20 introduction. As such, the year of introduction was utilized as a ‘line in the sand’ whereby changes could be observed and attributed in some manner to the introduction of this shorter, more aggressive cricket format.

Overall, this study highlights to coaches and player alike how the introduction of T20 cricket can be associated with an impact on the way in which test cricket is currently played with a decrease in four-percentage, increase in six-percentage, altered run rates for some teams, and a decrease in draw percentage being observed. As a result, improving the ability to strike a greater number of boundaries, increasing the overall run rate, and facilitating strike rotation when batting should be a focus for coaches and players. It will be interesting to observe whether further changes arise in years to come, especially when young players coming into the Test side are potentially those who have been exposed to, and grown up watching and playing, T20 cricket.

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