

# An examination of how fielding outcomes in international and franchise T20 and 50-over cricket are associated with bowling performances and field positions

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## ABSTRACT

In this study, 4,660 fielding outcomes from international 50-over and T20 cricket as well as multiple international franchise T20 leagues between 2016 and 2020 were examined. A generalised linear model was applied and the results revealed that infielders are less likely to drop catches than outfielders. Furthermore, outfielders in front of square are most likely to drop catches. In addition, drop catches are more likely to occur from spin bowling rather than fast bowling and interestingly, the odds of dropping a catch are lower when bowling a leg-side line. With regards to mis-fields, infielders are revealed to be less likely to mis-field than outfielders. Furthermore, mis-fields are more likely to occur from spin bowling rather than fast bowling. Run-outs were discovered to be more likely to occur in deep fielding positions on the leg-side, less likely to occur during powerplay overs and more likely to occur when bowlers bowl leg-side lines. Stumpings were revealed in this study to be significantly less likely when bowling a leg-side line. From a practical perspective, these findings can offer some assistance to team captains when positioning fielders as well as guide coaching practice.

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## 1. Introduction

Cricket is among the most popular and widely watched sports in the world with over 2 million followers globally (Bhardwaj & Dwyer, 2022). While cricket is classified into multi-day and limited over formats, in recent years, limited overs franchise tournaments have been introduced around the world, which is increasing the amount of cricket played and is bringing about development in skills and techniques used in the game (Jamil et al., 2022). Batters are increasingly playing innovative, non-traditional cricket shots (Jamil et al., 2022; Mehta et al., 2023), bowlers are frequently using a wide range of variations to fulfil their objectives of taking wickets and restricting runs scored (Jamil, Kerruish, et al., 2023; Mehta et al., 2022) and fielders are working in tandem to take incredible catches

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previously unseen (Lim et al., 2023). Despite this, and the coaching adage “catches win matches”, there remains a paucity of academic research into fielding relative to batting and bowling (MacDonald Wells et al., 2018). Likewise, while batting and bowling success is readily quantifiable by such metrics as batting and bowling averages and strike rates, no such measures exist for fielding (Perera et al., 2018), although some studies have proposed tools to do so (Saikia et al., 2012).

Fielding has gained considerable importance in the game of cricket as the saving of runs is an important factor in winning matches, particularly in the shorter formats of the game (Saikia et al., 2012). Moreover, a high level of fielding can keep the pressure on the opposition batsmen which can contribute to batting mistakes and thus enhance the chances of the bowling/fielding team taking a wicket (MacDonald Wells et al., 2018). Fielders can ultimately achieve their objectives through the execution of vital skills that involve (a) catching a batted ball in order to dismiss the batter, (b) chasing and gathering a batted ball and returning it to the wicket-keeper to prevent runs from being scored, (c) running a batter out by striking the stumps with an accurate throw and (d) preventing the ball from hitting the boundary ropes (Lim et al., 2023).

Several studies have focused on the physiological requirements of cricket fielding using GPS units and time-motion analysis (Petersen et al., 2010), which quantifies positional movement patterns and gait analysis. Lim et al. (2023), provide an extensive review of the physical requirements of fielding, where it suggested that different types of fielders require different physical skills. For example, close catching fielders require quick reflexes, inner-circle fielders require good reactive skills and strong over-arm throwing ability and outer circle fielders should be able to cover long distances (up to 40 m) at high speed and therefore possess good sprinting ability and accurate throwing ability (Lim et al., 2023).

The closed technical skill components of fielding performance, such as catching and throwing, have also been previously studied (Freeston et al., 2007; MacDonald Wells et al., 2018; D. C. MacDonald et al., 2013). Freeston et al. (2007) discovered a trade-off between throwing accuracy and velocity, while other studies attempted to quantify the fielding skills specific to position (MacDonald Wells et al., 2018; D. C. MacDonald et al., 2013). The physical and technical demands of the position of wicket-keeper, perhaps the most specialised fielding position of all have also been previously studied (D. MacDonald et al., 2018; D. Macdonald et al., 2013). However, many of these previous studies focussing on fielding have overlooked the way in which fielding outcomes could potentially be influenced by other performance or situational variables and how these factors could interact. In a recent study, interaction effects between fielding outcomes and bowling metrics were discovered to be significant and critical factors with regards to influencing the outcome of cricket matches (Sarangi & Singh, 2023). Ultimately, Sarangi and Singh (2023) concluded that on-field dismissals caused by fielding outcomes such as run-outs, catching and stumpings significantly increased a team's probability of winning matches (Sarangi & Singh, 2023).

With the level of professionalism seen in modern day cricket; professional teams and national organisations employ performance analysts to collect, code and analyse performance specific data during and post-match to facilitate coaching and performance planning. For each cricket delivery, data for numerous variables are collected (Jain et al., 2021). This includes but is not limited to; the type of bowling delivery, the ball

trajectory (bowling line and bowling length) and the shot outcome (Jamil, Harkness, et al., 2023; Mehta et al., 2022). Crucially vital data on the fielding outcome are also collated such as, where the ball travelled in the field of play, who fielded the ball, successful and unsuccessful run-out attempts, successful catches and the cost of any mis-fields or dropped catches (MacDonald Wells et al., 2018; D. MacDonald et al., 2018; D. C. MacDonald et al., 2013). The sheer volume of data available, combined with the associated video footage, provides a large data set for retrospective scientific investigation. In more recent times, this abundance of data has enabled focussed analysis of specific phases of cricket matches such as powerplay periods (Silva et al., 2015), specific innings (Connor et al., 2019) and death bowling phases (Jamil, Harkness et al., 2023; Jamil, Kerruish, et al., 2023).

This study will utilise a unique data set consisting of fielding outcome data from international and several national franchise leagues in an attempt to examine how performance variables such as fielding positions, bowler type, bowling lines, bowling lengths and powerplay periods can each be associated with positive and negative fielding outcomes such as dropped catches, mis-field, successful and unsuccessful run-out attempts and stumpings. In practical terms, the results of this study could potentially inform coaching practice, as well as impact team selection and in-game strategy and tactics. Furthermore, these findings could lay a foundation, upon which future researchers can build and investigate each of the trends discovered at a more microscopic level.

## 2. Methods

### 2.1. Design and data

In total 4,660 fielding outcome events, across 332 men's elite competitive matches were analysed in this study. All fielding outcome events analysed in this study occurred during the following international tournaments; ICC Champions Trophy 2017 (15 matches), the ICC World Cup 2019 (48 matches), the ICC T20 World Cup 2016 (35 matches) and the following franchise tournaments; Bangladesh Premier League 2019/20 (46 matches), Caribbean Premier League 2020 (33 matches), Indian Premier League 2020 (60 Matches), KFC T20 Big Bash League 2019/20 (61 matches), and the Pakistan Super League 2020 (34 matches). Data were privately acquired from Opta (Stats Perform, London) and all necessary permissions were obtained. High levels of reliability for Opta data have been previously reported (Jamil, Harkness, et al., 2023). A full definitions list provided by the data supplier of the variables analysed in this study is presented in [Table 1](#). [Figures 1 and 2](#) present the zones and the specific fielding positions within those zones that were analysed in this study respectively. Ethical approval for this study was obtained by the ethics committee of the relevant institution.

### 2.2. Statistical analysis

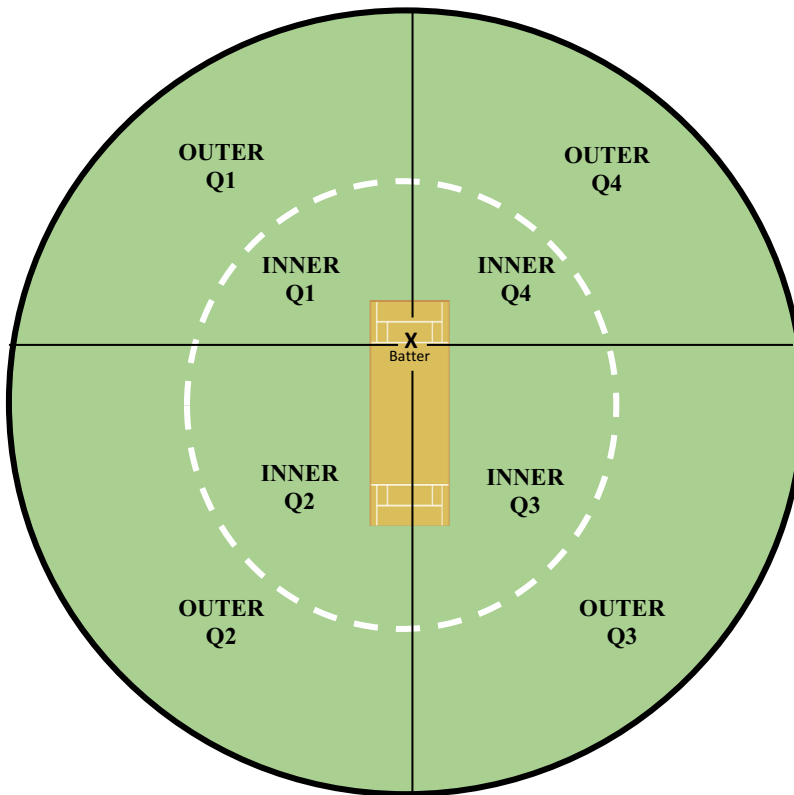
A multinomial logistic regression analysis was conducted as part of this study. Given that the data contained repeated measurements from bowlers, batters and games, we considered including random effects. However, their inclusion resulted in a poorer model fit, as determined by the Akaike Information Criterion (AIC). Model selection with

**Table 1.** Definitions list.

Sub-variable	Definition
Dropped Catch	Instances when the ball has made contact with the bat or the gloves of the batter and continued aerially. In the case of a dropped catch the ball makes contact with the fielders' hands but is then subsequently makes contact with the ground
Mis-Field	Instances when a fielder makes contact with the ball in an attempt to retrieve it for their team, but fails to do so
Run-out	Instances when a fielder receives and removes the bails before the batsman has made his ground, resulting in the dismissal of the batsman, either with a direct hit of the stumps with a throw from the field or by passing to another fielder
Missed run-out	Instances when a fielder fails to remove the stumps (either with a throw or with ball in hand), when the batter is still short of his ground and would otherwise have been dismissed
Stumped	The batsman has advanced down the pitch, missed the ball, the wicket- keeper takes the ball and removes the bails resulting in the dismissal of the batsman
Powerplay	Phases of an innings when field restrictions are placed upon the fielding team meaning only a select number of fielders can be placed in the outer circle
Leg Spin	Instances when a right arm bowler will bowl the leg-spin style of bowling, and the ball will turn from leg stump to off stump for a right-handed batter. (The opposite is true for left-handed batters).
Off Spin	Instances when a right arm bowler will bowl the off-spin style of bowling, where the ball will turn from off stump to leg stump for a right-handed batter. (The opposite is true for left-handed batters).
Orthodox	Instances when a left arm bowler will bowl the off-spin style of bowling, and the ball will turn from leg stump to off stump for a right-handed batter. (The opposite is true for left-handed batters).
Unorthodox	Instances when a left arm bowler will bowl the leg-spin style of bowling, and the ball will turn from off stump to leg stump to a right-handed batter. (The opposite is true for left-handed batters).
Seam	Instances when a right arm and or left arm bowler will bowl the seam or swing style of bowling (fast bowling), and the ball will arrive at the batter in speeds in excess of 80mph
Leg-side bowling line	Where the ball pitches (bounces) in line with the batter's leg-stump
Middle stump bowling line	Where the ball pitches (bounces) in line with the batter's middle-stump
Off-side bowling line	Where the ball pitches (bounces) in line with the batter's off-stump
Full bowling length	Where the ball pitches (bounces) approximately 0–4 metres away from the batter's stumps
Length bowling length	Where the ball pitches (bounces) approximately 4–8 metres away from the batter's stumps. Traditionally in cricket many balls that land on a "length" are considered to be "good lengths" as batters may exhibit some indecision with their foot movement and subsequent shot selection.
Short bowling length	Where the ball pitches (bounces) approximately 8+ metres away from the batter's stumps

backward elimination based on AIC (Zuur et al., 2009) excluded all interactions as well as bowling length. The final model thus retained five predictors: fielding position, bowler type, bowling line, power play and batter foot movement. To address instances of perfect separability, such as stumpings occurrences solely in the wicketkeeper position, we introduced a small decay penalty of 0.3. This penalty value was chosen based on 5-fold cross-validation accuracy after testing values from 0 to 1 in 0.1 increments.

Model validation included comparing our final model to an intercept-only model using the likelihood ratio test, which showed that the five retained predictors collectively explained the fielding outcomes significantly better than a model without predictors ( $\chi^2(76, N = 4660) = 3184.9, p < .001$ ). The proportion of deviance explained by the model relative to the intercept-only model was .241, indicating a moderate effect size. We also used 5-fold cross-validation to assess the model's predictive accuracy, finding that it correctly predicted 55.6% of fielding outcomes. Classification rates were 99.5% for stumpings, 89.9% for missed run-outs, 58.9% for mis-fields, 4.2% for dropped catches and 1.9% for run-outs.



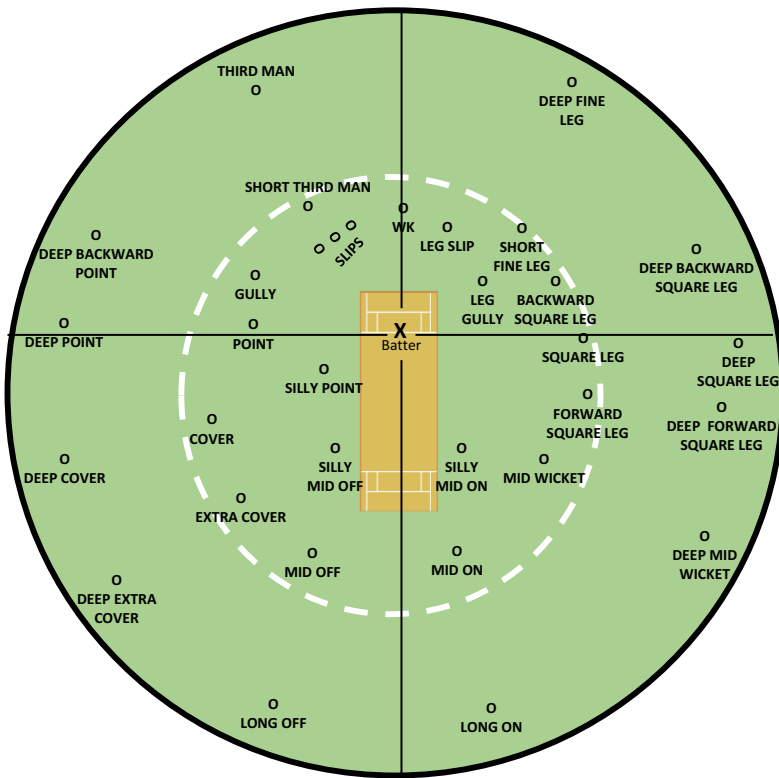
**Figure 1.** Eight fielding zones where fielding outcomes were analysed. Figure represents fielding zones relative to a right-handed batter. Fielding positions would be mirrored for a left-handed batter.

While the overall prediction accuracy was moderate, the model performed substantially better than a naïve model that always predicts the most frequent fielding outcome (missed run-out attempt; accuracy = 34.4%) and a model that predicts outcomes randomly (accuracy = 20%).

We conducted all analyses in R Statistical Software (v4.4.2; R Core Team, 2024). The logistic regression models were run using the *nnet* package (v7.3–19). Logistic regression models with random-effects were assessed using the *mclogit* package (v0.9.8). Model summary tables were generated using the *sjPlot* package (v2.8.16).

### 3. Results

To assess the statistical significance of each predictor, we conducted likelihood ratio tests comparing models with and without each predictor. All predictors were statistically significant ( $p < .001$ ) – see Table 2 for details. Next, we analysed the effect of each predictor on fielding outcome as determined by the multinomial logistic regression model. The results are summarised in Table 3.



**Figure 2.** Fielding positions where fielding outcomes were analysed. Figure represents fielding positions relative to a right-handed batter. Fielding positions would be mirrored for a left-handed batter.

**Table 2.** Outputs of the likelihood ratio test to assess the significance of the predictors.

Independent Variables	$\chi^2$	Df	P-value
Fielding position	2440.1	36	<.001
Bowler type	298.8	16	<.001
Bowling line	25.7	8	.001
Power play	13.9	1	.008
Foot movement	31.0	12	.002

### 3.1. Fielding outcome and fielding position

Figure 3 illustrates the effect of fielding position on fielding outcome. Our statistical analysis revealed that fielders in all inner-circle positions (Q1 to Q4) were significantly less likely to drop catches compared to outfielders in position Q1 out. The odds ratios (OR) for dropping catches in the inner-circle positions ranged from 0.031 to 0.060 (all  $p < .001$ ), indicating a substantially lower likelihood. Conversely, outfielders in position Q2 out and Q3 out were more likely to drop catches than those in position Q1 out (Q2 out:  $OR = 2.367, p = .048, 95\%CI[1.006, 5.569]$ ; Q3 out:  $OR = 2.396, p = .015, 95\%CI[1.189, 4.829]$ ). Both bowlers ( $OR = 0.389, p = .024, 95\%CI[0.172, 0.881]$ ) and

**Table 3.** Odds ratios, and *p*-values for predictors in the multinomial logistic regression model. Missed run-out serves as the reference category.

	Dropped Catch		Mis-Field		Run-Out		Stumped	
	Odds Ratio	<i>P</i> -value	Odds Ratio	<i>P</i> -value	Odds Ratio	<i>P</i> -value	Odds Ratio	<i>P</i> -value
Intercept	2.337	0.139	13.517	<0.001	0.718	0.536	0.004	0.010
Foot movement [Backwards]	1.293	0.626	0.800	0.527	0.710	0.367	0.147	0.062
Foot movement [Forwards]	1.389	0.532	0.776	0.470	0.717	0.379	0.992	0.993
Foot movement [Lateral]	1.548	0.426	0.664	0.282	0.651	0.296	0.681	0.720
Bowling line [Legside]	0.678	0.005*	0.838	0.098	1.255	0.045*	0.247	0.011*
Bowling line [Middle Stump]	1.089	0.645	1.079	0.621	1.056	0.767	0.888	0.822
Bowling type [Leg Spin]	2.331	<0.001*	2.693	<0.001*	1.268	0.198	69.413	<0.001*
Bowling type [Off Spin]	1.558	0.013*	2.463	<0.001*	0.984	0.933	31.968	<0.001*
Bowling type [Orthodox]	1.859	0.002*	2.266	<0.001*	1.044	0.844	77.642	<0.001*
Bowling type [Unorthodox]	0.910	0.874	1.170	0.733	0.634	0.467	25.290	<0.001*
Field position [Bowler]	0.389	0.024*	0.031	<0.001*	1.587	0.398	0.508	0.784
Field position [Quadrant 1 IN]	0.060	<0.001*	0.037	<0.001*	0.641	0.276	0.127	0.326
Field position [Quadrant 2 IN]	0.046	<0.001*	0.037	<0.001*	0.817	0.617	0.096	0.256
Field position [Quadrant 2 OUT]	2.367	0.048*	1.526	0.309	2.274	0.173	0.631	0.860
Field position [Quadrant 3 IN]	0.048	<0.001*	0.030	<0.001*	0.716	0.412	0.126	0.322
Field position [Quadrant 3 OUT]	2.396	0.015*	0.950	0.879	2.970	0.028*	0.562	0.818
Field position [Quadrant 4 IN]	0.031	<0.001*	0.037	<0.001*	0.659	0.325	0.177	0.417
Field position [Quadrant 4 OUT]	2.705	0.056	2.423	0.074	2.260	0.246	0.880	0.976
Field position [Wicketkeeper]	0.179	<0.001*	0.103	<0.001*	1.819	0.186	154.760	0.008
power play	1.064	0.584	0.953	0.598	0.700	0.001	0.957	0.916

wicketkeepers ( $OR = 0.179, p < .001, 95\%CI[0.088, 0.365]$ ) were significantly less likely to drop a catch.

Regarding mis-fields, fielders in inner-circle positions were significantly less likely to mis-field compared to outfielders in position Q1 out (ORs ranging from 0.030 to 0.037, all  $p < .001$ ). Both bowlers ( $OR = 0.031, p < .001, 95\%CI[0.011, 0.085]$ ) and wicketkeepers ( $OR = 0.103, p < .001, 95\%CI[0.056, 0.192]$ ) were also significantly less likely to mis-field.

For run-outs, only field position Q3 out showed a significant effect ( $OR = 2.970, p = .024, 95\%CI[0.172, 0.881]$ ), indicating that the odds of executing successful run-outs by a fielder in position Q3 out are nearly three times higher than for a fielder in position Q1 out.

Wicketkeepers were significantly more likely to stump a batter out compared to outfielders in position Q1 out, with 54% of fielding outcomes for wicketkeepers being

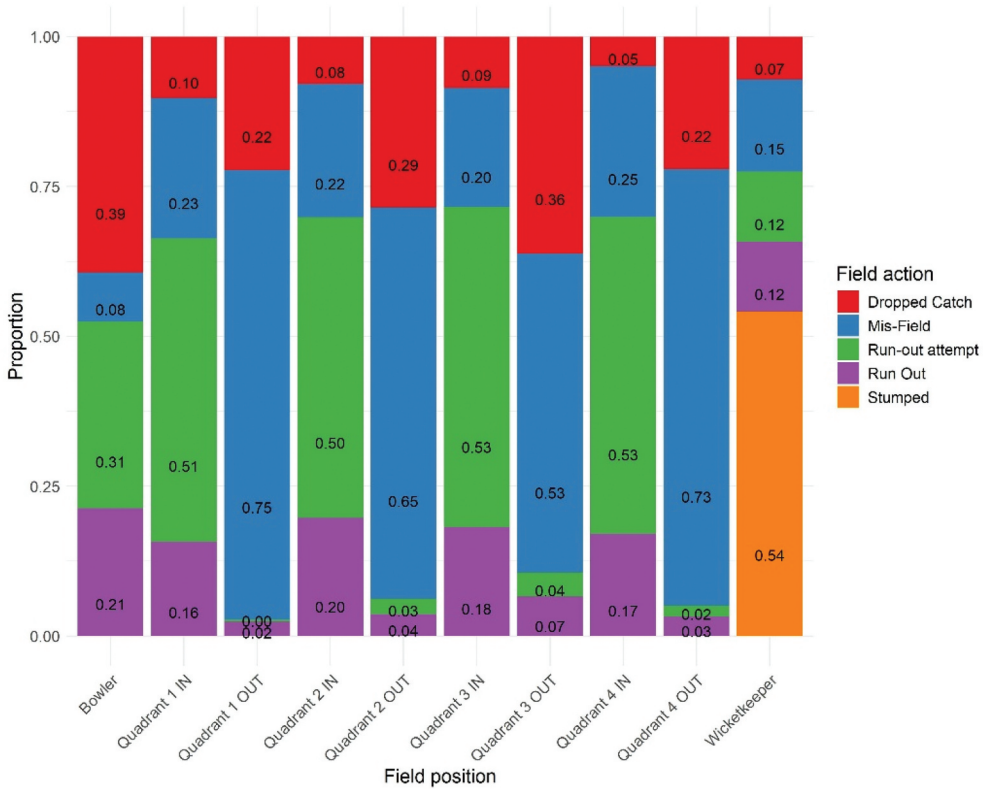


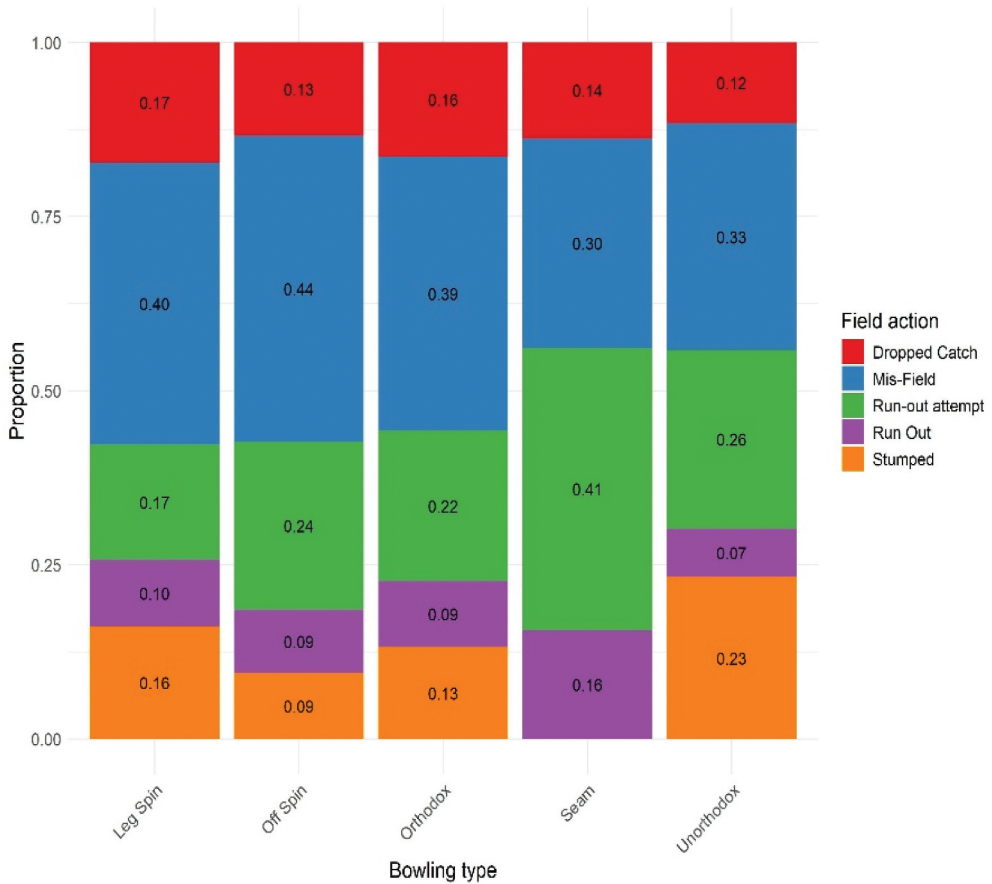
Figure 3. Distribution of fielding outcomes by field position.

stumpings, compared to no stumpings recorded for Q1 outfielders or any other field position (see Figure 3). This is to be expected as stumpings can only be exclusively performed by the wicket-keeper.

### 3.2. Fielding outcome and type of bowler

Figure 4 depicts the effect of bowler type on fielding outcomes. Our statistical analysis revealed that fielders would be more likely to drop a catch off different types of spin bowling (off-spin, leg-spin and orthodox) relative to fast bowling. The odds ratios were off spin, 1.56,  $p = 0.013$ , 95%CI[1.098 – 2.211], leg-spin, 2.33  $p < .001$ , 95%CI [1.653 – 2.388] and orthodox, 1.86,  $p = 0.002$ , 95%CI[1.248 – 2.769] respectively, indicating a substantially higher likelihood. Unorthodox bowling was revealed to be non-significant.

The results were very similar with regards to mis-fields. Specifically, our results revealed that fielders would be more likely to mis-field off the same types of spin bowling (off-spin, leg-spin and orthodox) relative to fast bowling. The odds ratios were 2.46, 2.69 and 2.26 respectively (all  $p < .001$ ), indicating a substantially higher likelihood. Unorthodox bowling was again revealed to be non-significant.



**Figure 4.** Distribution of fielding outcomes by bowler type.

With regards to stumpings, wicket-keepers would be significantly more likely to execute a successful stumping of all types of spin bowling (off-spin, leg-spin, orthodox and unorthodox), compared to fast bowling. The percentages of stumpings were 9%, 16%, 13% and 23% respectively, compared to no stumpings for fast bowling (see Figure 4).

### 3.3. Fielding outcome and powerplay

Figure 5 illustrates the effect of power plays on fielding outcomes. Powerplay had a significant effect only on run-out outcomes ( $OR = 0.700$ ,  $p < .001$ ,  $95\%CI[0.569, 0.862]$ ). This indicates that the odds of successful run-outs are 30% lower during powerplay overs relative to non-powerplay overs.

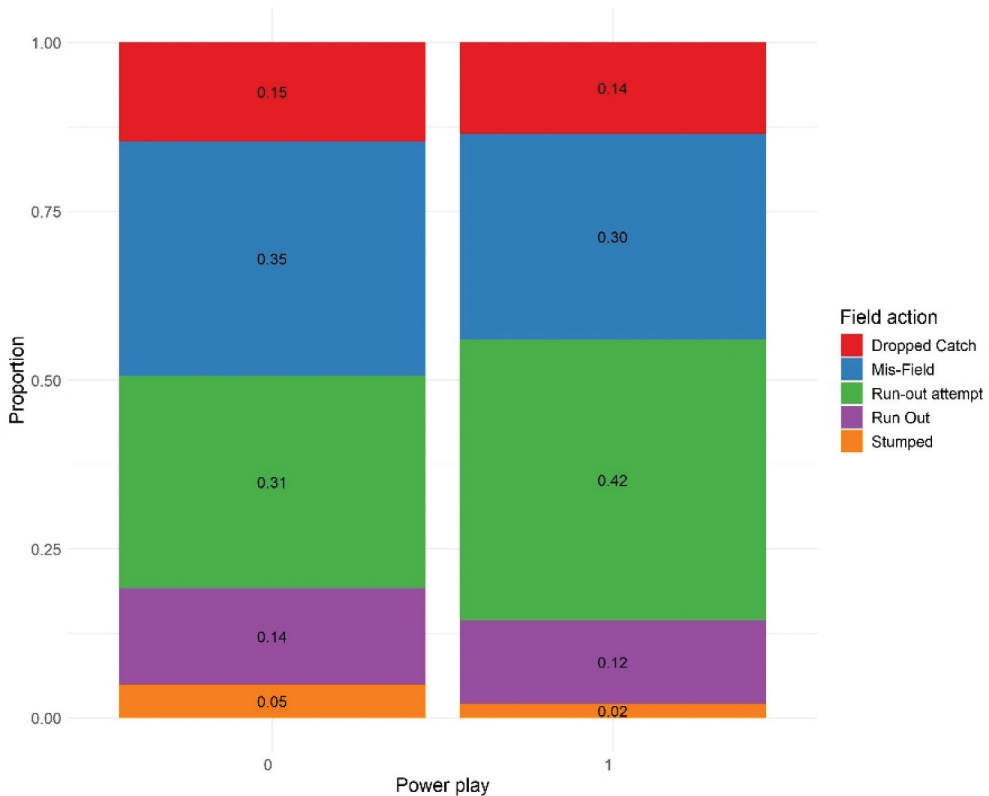


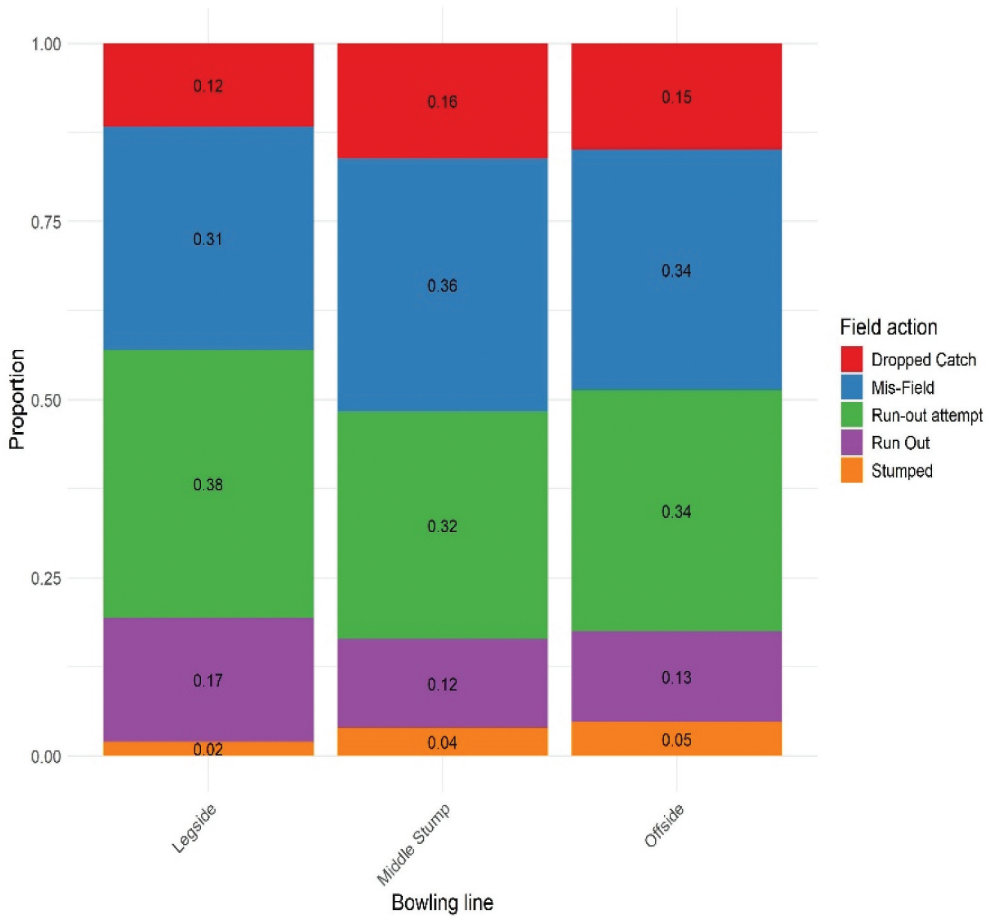
Figure 5. Distribution of fielding outcomes by powerplay.

### 3.4. Fielding outcome and bowling line

The effect of bowling line on fielding outcomes is depicted in Figure 6. Our statistical analysis revealed that the odds of a fielder dropping a catch are significantly lower when bowlers bowl a leg-side line relative to an off-side line ( $OR = 0.678, p = 0.005, 95\%CI[0.518 - 0.888]$ ). Conversely, the odds of a successful run-out are significantly higher when bowlers bowl on a leg-side line ( $OR = 1.255, p = 0.045, 95\%CI[1.006 - 1.566]$ ). The odds of successful stumping are significantly lower when bowlers bowl a leg-side line ( $OR = 0.247, p = 0.011, 95\%CI[0.153 - 0.787]$ ). Bowling line was revealed to have a non-significant relationship with mis-fields.

## 4. Discussion

This study sought to investigate the relationships between fielding outcomes and fielding positions, powerplays, bowler types, bowling lines and bowling lengths. The results revealed infielders are less likely to drop catches than outfielders. Furthermore, outfielders in front of square are more likely to drop catches. In addition, drop catches are more likely to occur from spin bowling rather than fast bowling and interestingly, the odds of dropping a catch are lower when bowling a leg-side line. With regards to mis-fields, infielders are revealed to be less likely



**Figure 6.** Distribution of fielding outcomes by bowling line.

to mis-field than outfielders. Furthermore, mis-fields more likely to occur from spin bowling rather than fast bowling. Run-outs were discovered in this study to be more likely to occur in deep fielding positions on the leg-side, less likely to occur during powerplay overs and more likely to occur when bowlers bowl leg-side lines. Stumpings were revealed in this study to be significantly less likely when bowling a leg-side line.

#### **4.1. Dropped catches**

This study discovered that infielders were less likely to drop catches than outfielders. Previous research has revealed that outfielders can be presented catching opportunities under varying conditions and pressures and catches that were dropped in the outfield were most often due to fielders misjudging distances of ball travel when positioning themselves to take the catch (MacDonald Wells et al., 2018). Other studies have also suggested that the more accomplished catchers should be placed

closer to the opposing batters in the infield positions (Lim et al., 2023). The results discovered in this study support this view, as this study revealed that the odds of infielders dropping catches are lower than that of outfielders. Interestingly, fielders in deep positions on both the off-side and leg-side in front of square (i.e. in front of the batter) were discovered to be more likely to drop catches. Specifically this finding refers to fielders in the positions of deep cover, deep extra cover, long-off, long-on, deep mid-wicket, deep forward square-leg and deep square-leg. It is possible that physical fatigue could potentially explain these results, especially considering that outfielders traditionally have more field areas to patrol and therefore cover greater distances and perform more high speed running actions relative to infielders (Lim et al., 2023). However, this particular finding requires further investigation and thus presents a direction for potential future research.

The results of this study also revealed that the odds of a fielder dropping a catch are greater from spin bowling relative to pace bowling. This finding is in line with some anecdotal evidence that has previously discovered the same (Davis, 2016) and it has been speculated that this could be due to a number of reasons such as fielders positioning themselves in much closer proximity to the batter relative to fast bowling as well as the trajectory and slower pace of the bowling; however, these require scientific validation and hence further investigation.

#### **4.2. Mis-fields**

The odds of out-fielders performing mis-fields were revealed in this study to be higher than infielders. This could be partly explained by outfielders having to regularly cover greater distances in their attempt to retrieve the ball – sometime up to 40 m in a single bout (Lim et al., 2023). Furthermore, outfielders often have to perform explosive movements such as a dive or jump immediately following a sprint in order to field the ball and they rarely have the opportunity to stop and position themselves to perform their skill (MacDonald Wells et al., 2018). Conversely, this finding could also be partly due to infielders generally having good reactive ability and strong over-arm throwing ability (Lim et al., 2023). Rather interestingly, the odds of mis-fields occurring were higher from spin bowlers as opposed to seam bowlers. This could be partly explained by seam bowlers traditionally being used by team captains as part of an attacking strategy geared towards taking wickets (thus the fielders being placed in attacking positions) and spin bowlers a defensive strategy geared towards preventing boundaries from being scored (more spread-out field positioning) (Najdan et al., 2014). This finding also presents an interesting topic for future research on fielding trends in professional cricket.

#### **4.3. Run-outs**

The odds of a successful run-out are lower during powerplay overs. This result is perhaps not too surprising as there are a greater number of fielders within the 30-yard inner circle during the powerplay overs in limited overs cricket formats (Jamil, Kerruish, et al., 2023), and it is therefore likely batters would take fewer risks running between the wickets.

#### **4.4. Stumpings**

Stumpings are a method of dismissal uniquely performed by wicket-keepers. The odds of a stumping were greater from all types of spin bowler relative to fast bowlers. This finding is likely explained by the positioning of the wicket-keeper. Generally, fast bowlers tend to open the innings for the fielding team in search of new-ball swing (Mehta et al., 2022; Nicholls et al., 2023; Scobie et al., 2013), this in turn requires the wicketkeeper to stand back near the edge of the 30-yard inner circle making stumpings impossible. Spin bowlers on the other hand enable wicket-keepers to stand up to the wickets due to their much slower bowling speeds (MacDonald Wells et al., 2018) and commonly tend to be introduced by team captains immediately after the powerplay phase of the innings (Jamil, Harkness, et al., 2023) as they do the bulk of their bowling in the middle overs of an innings (Najdan et al., 2014). On the contrary, when spinners bowl, the wicket-keepers stand up to the wickets. Stumpings can only occur when a batter advances down the pitch, vacates their crease and misses the ball with an attempted shot (D. MacDonald et al., 2018) and given wicket-keepers stand up to the wickets when spin bowlers are bowling, stumpings would naturally become easier to perform.

The odds of a stumping were lower when bowlers bowled on a leg-side line. This coincides with previous research that has discovered around 55% of all dropped catches and gathers from a wicket-keeper occurred when they had to move to their left and hence the leg side (D. MacDonald et al., 2018). Furthermore, there is some anecdotal evidence to suggest that wicket-keeping down the leg-side is the hardest skill for wicket-keepers to master as they become temporarily unsighted when the ball travels across the batter and then behind their legs. This particular finding could potentially inform coaching practice moving forward.

#### **4.5. Leg-side fielding**

This study has discovered some interesting results specifically with regards to fielding actions that occur on the leg-side of the playing field. Specifically, the odds of dropping a catch are lower when bowlers bowl on a leg-side line, run-outs more likely to occur when bowlers bowl on a leg-side line and run-outs are more likely to occur in deep fielding positions on the leg-side. Previous research has revealed that bowling teams tend to pack their offside field to cater for preferred bowling strategies of bowling just outside the off stump (Jamil, Woolston, et al., 2023). Consequently, the field on the legside is comparatively sparse. There is some anecdotal evidence that suggests that when there are fewer fielders in a catching zone, the focus on the few fielders in the zone potentially increases concentration and thus enhances performances. Similarly, other anecdotal evidence suggests that batters are more likely to misjudge run scoring opportunities on the legside due to being partially unsighted as well as misjudging how far the fewer fielders patrolling the leg-side have to travel to retrieve the ball. These particular findings however, also require scientific validation and hence further investigation.

#### **4.6. Limitations and future research**

This study was not without limitations. Firstly, some contextual data surrounding specific fielding events was absent. For example, catching opportunities are often presented to fielders in varying conditions and pressures (MacDonald Wells et al., 2018) and therefore catching opportunities in the same fielding position from match-to-match would not have been under homogenous circumstances – data on these circumstances were absent. Furthermore, only fielding outcomes in limited overs cricket were analysed. It could be possible that varying results are obtained for longer formats of the game such as Test cricket, where fielders are revealed to have exhibited increased effort levels and movement intensities (Petersen et al., 2011).

This study has also presented interesting themes and areas for future research. Future investigations could be focused on determining why outer circle fielders are more likely to drop catches and mis-field than inner circle fielders. Future research could also be conducted on the reasons why mis-fields and dropped catches are revealed to occur more frequently from spin bowling relative to fast bowling. Finally, a follow-up study focused on wicket-keeping could try to determine why stumpings appear to be less likely when bowling a leg-side line. Each of these themes could also be explored via the use of artificial intelligence and machine learning methods.

### **5. Conclusion**

In conclusion, this study has made multiple discoveries with potential practical implications with regards to general coaching practice, team selections, in-match fielder placings and team strategy. Specifically, the results revealed that infielders are less likely to drop catches than outfielders. Furthermore outfielders in front of square are more likely to drop catches. In addition, drop catches are more likely to occur from spin bowling rather than fast bowling and interestingly, the odds of dropping a catch are lower when bowling a leg-side line. With regards to mis-fields, infielders are revealed to be less likely to mis-field than outfielders. Furthermore, mis-fields more likely to occur from spin bowling rather than fast bowling. Run-outs were discovered in this study to be more likely to occur in deep fielding positions on the leg-side, less likely to occur during powerplay overs and more likely to occur when bowlers bowl leg-side lines. Stumpings were revealed in this study to be significantly less likely when bowling a leg-side line.

### **Disclosure statement**

No potential conflict of interest was reported by the author(s).

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