



Analysis of Crossing Opportunities at the 2018 FIFA World Cup

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Abstract

The purpose of this study was to investigate open-play crosses at the 2018 FIFA World Cup tournament, with specific reference to the mechanism and match status of the crosses. Descriptive statistics (i.e., frequency counts and percentages) and chi-square tests of association were used to analyse the data. The study observed a total of 949 crosses, resulting in 20 goals scored (2.1%). Descriptive statistics highlighted that offensive teams had more goal-scoring attempts when they used counter-attacks (18.6%) compared to organized (18.2%) and direct (10.9%) attacks. A greater number of goal-scoring attempts were observed when teams used out-swinging crosses (17.4%) as opposed to in-swinging (15%) and straight (13.5%) crosses. There was a significant ($p < 0.05$) association between the type of attack and match status. Winning teams preferred to adopt a counter-attacking style of play; losing teams used more direct attacking strategies, and drawing teams utilized more organized attacks. Losing teams took the highest number of crosses from Zones 1 (61.1%) and 2 (56.7%) compared to other zones. These findings provide practical implications for football coaches to tailor match tactics to replicate crossing scenarios at international competitions.

Keywords: cross outcome, match status, attacking, goal-scoring



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Introduction

The majority of match analysis studies in association football have centred on the key game aspects of scoring and creating scoring opportunities (Pulling et al., 2018; Wright et al., 2011). Goal scoring is a key indicator of successful performance in football, as winning a game is dependent on scoring more goals than the opposition (Araya & Larkin, 2013). From an attacking perspective, delivering crosses from the wide areas of the pitch in the attacking third is a standard tactic for creating goal-scoring opportunities

(Sarkar, 2018). In football terms, a cross is defined as the delivery of the ball from wide areas of the pitch into the opponent's 18-yard box (Hargreaves & Bate, 2010; Vecer, 2014). From open-play situations, this attacking tactical strategy has been found to contribute to 13% of goals scored at the 2006 and 2010 FIFA (Fédération Internationale de Football Association) World Cups and 28% at the 2002 FIFA World Cup (Mara et al., 2012; Smith & Lyons, 2017; Vecer, 2014). While crossing may contribute to goal-scoring opportunities, this area of performance analysis has received little

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attention among performance analysis researchers (Pulling et al., 2018).

To date, few published studies have formally investigated crossing at FIFA World Cups (Pulling et al., 2018). One seminal paper in the area investigated the mechanisms of crosses during the 1986 FIFA World Cup. Partridge and Franks (1989a; 1989b) analysed a total of 1,427 open-play crosses and concluded that crosses should be played first time, past the near post, behind defenders, without loft and hang time, and should not be delivered from around the corner flag. While this study provided key recommendations, the research was conducted over 30 years ago, and the game of football has since evolved with regards to playing style, team formations, rule changes and the use of technology (Kubayi & Larkin, 2019; Wallace & Norton, 2014). Therefore, there is a need to provide more contemporary analyses and suggestions for the use of crossing to create goal-scoring opportunities in football.

To extend the original analysis by Partridge and Franks (1989a; 1989b), Yamada and Hayashi (2015) examined 64 goal-scoring plays occurring from crosses in the 2010 FIFA World Cup and the 2012 European Football Championship tournaments. It was reported that early crosses were played between the penalty spot and the goal area; when defenders were organized, attacking players cut backcrosses around the penalty spot; and half of the crosses were delivered in front of the near post. Although the results provided some description of the types of crosses used in matches, a limitation of the research was that key performance variables, such as the time of crosses and defensive pressure, were not considered. This is an important consideration, as it will provide a more holistic description of crossing opportunities, which is lacking in the existing body of knowledge (Pulling et al., 2018).

Pulling et al. (2018) observed open-play crosses from all 64 games of the 2014 FIFA World Cup to address this gap. The results showed that a total of 1,332 crosses were played directly, resulting in 42 goals (3.2%), 56 attempts on target that did not result in a goal (4.2%), 80 attempts off-target (6.0%) and 1,154 of the crosses not leading to a goal-scoring opportunity (86.6%). Concerning the type of delivery, out-swinging crosses were the predominant type of cross (77.8%) compared to in-swinging (13.4%) and straight deliveries (8.9%). With regard to defensive pressure, the crosser was mostly under medium defensive pressure (i.e., a defender being 1.5–5 m away from the crosser) (48.0%) when de-

livering the cross. Finally, concerning the time of crosses, most were played during the last interval of the game (20.9%) (Pulling et al., 2018). While the findings indicate the type of crosses and when they occurred during a match, a shortcoming of the study is the limited acknowledgement of performance indicators such as the type of attack (i.e., direct attacks or counter-attacks) and the number of attacking and defensive players within the penalty box in relation to cross outcome.

While previous studies have provided descriptive understandings of crossing in men's football (Partridge & Franks, 1989a; 1989b; Yamada & Hayashi, 2015), more research is required to gain a holistic understanding of the mechanism of crossing for generating goal-scoring opportunities (Pulling et al., 2018). Furthermore, it is important to consider the potential relationship between crossing and match status (i.e., whether the crossing team is drawing, winning, or losing) to gain a complete perspective of the use of crossing as an attacking tactical strategy). Therefore, the purpose of the current study was to examine open-play crosses in the 2018 FIFA World Cup tournament, with specific reference to the mechanism and match status of the crosses. Football coaches can use the findings to inform coaching practice to replicate crossing scenarios relative to the game situation within the practice environment (Pulling et al., 2018).

Methods

Match Sample

All 64 matches played during the 2018 FIFA World Cup were analysed by the lead researcher using the Lince video analysis software (Gabin et al., 2012), with all crosses identified and coded. Crosses were included in the study if they were delivered into the 18-yard box and were delivered from Zones 1, 2, 3, 4 or 5 (Figures 1A and 1B). In accordance with previous crossing literature, set-piece and blocked crosses were excluded from the analysis (Pulling et al., 2018). As a result, a total of 949 open-play crosses were analysed for this study.

Observational instrument

An observational instrument adapted from previous studies (Casal et al., 2015; Kubayi & Larkin, 2019; Pulling et al., 2018; Pulling, 2013; Pulling, Robins & Rixon, 2013; Tenga et al., 2010a) was used in the current study. The instrument consists of the following 11 dimensions: 1) type of attack (i.e., organized attack, di-

Table 1. Operational Definitions of the Crossing Variables

| Category and variables | Definition |
|------------------------|--|
| Type of attack | |
| Organized attack | a) The possession starts by winning the ball in play or restarting the game. b) The progression towards the goal has a high number of non-penetrative and short passes. c) The ball tends to be moved across the width of the pitch rather than progressing deep towards the opposing goal, and the intention is to create disorder among the opposing team's players using a high number of passes and a relatively slow tempo (evaluated qualitatively). d) The defending team is in a balanced formation and has the opportunity to minimize any surprise attack. |
| Direct attack | (a) The possession starts by winning the ball in play or restarting the game. b) The progression towards the goal is based on one long pass from the defensive players to the forward players (evaluated qualitatively). c) The ball is moved deep up the pitch rather than across its width, and the intention is to move the ball directly towards the opposing goal area to have opportunities of finishing by using a reduced number of passes and a high tempo. d) The defending team is in a balanced formation and has the opportunity to minimize any surprise attack. |
| Counter-attack | a) The possession starts by winning the ball in play. b) The progression towards the goal attempts to utilize a degree of imbalance right from start to the end, with a high tempo. c) The ball is moved quickly up the pitch, and the intention is to exploit the spaces left by the opposing players when they were attacking. d) The defending team is in an unbalanced formation and does not have the opportunity to minimize a surprise attack. |
| Delivery type | |
| Out-swinging | The ball was kicked and moved in a curve away from the goal. |

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Table 1. Operational Definitions of the Crossing Variables

| Category and variables | Definition |
|--|---|
| In-swinging | The ball was kicked and moved in a curve towards the goal. |
| Straight | The ball was kicked with no curve. |
| Pitch side of delivery | |
| Right | The cross was delivered from the right side of the pitch. |
| Left | The cross was delivered from the left side of the pitch. |
| Defensive proximity to the crosser | |
| Low | There is no defensive player within 2 metres of the crosser. |
| Medium | A defender is between 1 and 2 metres away from the crosser. |
| High | A defender is less than 1 metres from the crosser. |
| Time of cross | |
| 0–15 min | The cross was taken during the 0–15-minute period of the match. |
| 16–30 min | The cross was taken during the 16–30-minute period of the match. |
| 31 min–half-time | The cross was taken between 31 minutes and half-time. |
| 46–60 min | The cross was taken during the 46–60-minute period of the match. |
| 61–75 min | The cross was taken during the 61–75-minute period of the match. |
| 76 min–full time | The cross was taken between 76 minutes and full time. |
| Extra-time | The cross was taken within the first or second period of extra time. |
| Number of attacking players in the 18-yard box | |
| Micro group | One or two attacking players located inside the 18-yard box when crosser kicks the ball. |
| Meso group | Three or four attacking players located inside the 18-yard box when crosser kicks the ball. |
| Macro group | Five or more attacking players located inside the 18-yard box when crosser kicks the ball. |
| Number of defensive players in the 18-yard box | |
| Micro group | Up to three defending players (excluding goalkeeper) located inside the 18-yard box when crosser kicks the ball. |
| Meso group | Between four and six defending players (excluding goalkeeper) located inside the 18-yard box when crosser kicks the ball. |
| Macro group | Seven or more defending players (excluding goalkeeper) located inside the 18-yard box when the crosser kicks the ball. |
| Cross outcome | |
| Goal | The ball went over the goal-line and into the net after an attacking player touched it. The referee awarded a goal. |
| Attempt on target excluding goals | Any goal attempt that was heading towards the goal but was saved by the goalkeeper or blocked by a defensive player. |
| Attempt off target | Any attempt by the attacking team that was not directed within the dimensions of the goal. An attempt that made contact with the crossbar or either of the posts was classified as an attempt off target. |
| Penalty | A player on the defending team committed a foul and the referee awarded a penalty. |
| Ball recycled out of the 18-yard box | The attacking team made contact with the ball, which led to the ball exiting the 18-yard box and possession being retained by the attacking team. |
| Unsuccessful attacking action | An attacking player contacts the ball after the cross but fails to control it, allowing the defenders an opportunity to recover it. |
| Defensive clearance – corner | A defensive outfield player made contact with the ball, and the referee awarded a corner kick. |
| Defensive clearance – throw-in | A defensive outfield player made contact with the ball, and the referee awarded a throw-in. |
| Defensive clearance | A defensive outfield player made contact with the ball, and it exited the 18-yard box. |
| No contact in the 18-yard box | The ball was not touched by any player and the ball exited the 18-yard box (includes goal kicks). |
| Goalkeeper gathers the ball | The goalkeeper comes and gathers/collects the ball (i.e., the cross bounces on the floor and then the goalkeeper collects the ball). |
| Goalkeeper catch | The goalkeeper gained possession of the ball by catching a cross. |
| Goalkeeper punch | The goalkeeper made contact with the ball by using a punching action. |
| Goalkeeper clearance | The goalkeeper made contact with the ball, and it exited the 18-yard box. |
| Match status | |
| Drawing | The score line for both teams was levelled (e.g., 0–0, 1–1). |
| Losing | The crossing team was trailing (e.g., 0–1, 1–2). |
| Winning | The crossing team was leading (e.g., 1–0, 2–1). |

rect attack and counter-attack); 2) delivery type (i.e., out-swinging, in-swinging and straight); 3) side of the pitch (i.e., right and left); 4) defensive proximity to the crosser (i.e., low, medium and high); 5) time of cross (i.e., 0–15 min, 16–30 min, 31 min–half-time, 46–60 min, 61–75 min, 76 min–full time and extra-time); 6) number of attacking players in the 18-yard box (i.e., micro, meso and macro groups); 7) number of defensive players in the 18-yard box (i.e., micro, meso and macro groups); 8) zone of the crosser (see Figures 1A and 1B); 9) zone of the outcome (see Figures 1A

and 1B); (0) the cross outcome (i.e., goal, attempt on target excluding goals, attempt off target, penalty, ball recycled out of the 18-yard box, unsuccessful attacking action, defensive clearance – corner, defensive clearance – throw-in, defensive clearance, no contact in the 18-yard box, goalkeeper gathers the ball, goalkeeper catch, goalkeeper punch and goalkeeper clearance); and 11) match status (i.e., team crossing was winning, drawing or losing). The operational definitions of these performance indicators are provided in Table 1.

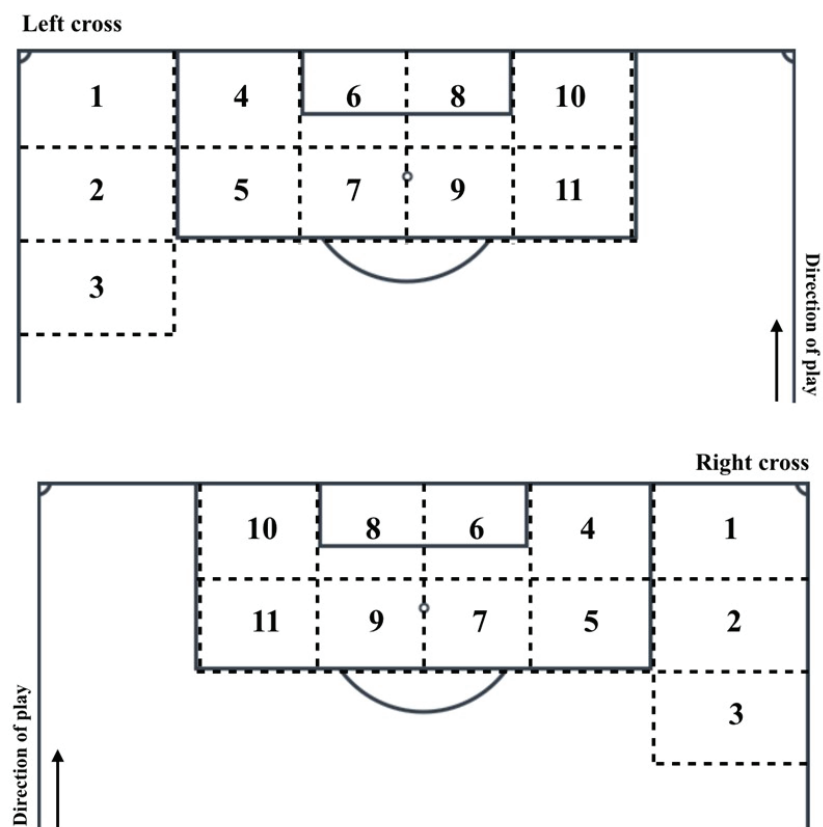


Figure 1. Zonal analysis for crosses delivered from the A) left and B) right side of the pitch

Reliability testing

Intra- and inter-observer reliability tests were examined using Cohen's kappa (κ) correlation coefficient. For intra-observer reliability, 121 crosses (i.e., 13% of total crosses) were selected and analysed on two occasions (separated by a two-week interval) by an independent football analyst. Kappa val-

ues > 0.80 were reported, showing the performance variables above the thresholds (Altman, 1991). Regarding inter-observer reliability, a second independent football analyst analysed the same number of crosses under similar conditions. Kappa values > 0.82 were observed for all performance indicators (Table 2).

Table 2. The Intra- and Inter-Rater Reliability Analysis (K) for Crossing Variables

| Variable | Intra-observer Kappa value | Inter-observer Kappa value |
|--|----------------------------|----------------------------|
| Type of attack | 0.91 | 0.84 |
| Delivery type | 0.90 | 0.88 |
| Pitchside of delivery | 1.00 | 1.00 |
| Defensive proximity to the crosser | 0.87 | 0.85 |
| Time of cross | 1.00 | 1.00 |
| Number of attacking players in the 18-yard box | 0.88 | 0.85 |
| Number of defensive players in the 18-yard box | 0.80 | 0.82 |
| Zone of the crosser | 0.84 | 0.87 |
| Zone of the outcome | 0.88 | 0.85 |
| Cross outcome | 0.86 | 0.84 |

Statistical analysis

Frequency counts and percentages were used to analyse the crossing variables. Because some cells had expected counts of less than five, which undermined the assumption of a chi-square test (Thomas et al., 2015), the cross outcome variable was collapsed into four distinct categories: 1) goal-scoring attempts (i.e., goals, attempts on target excluding goals and attempts off-target); 2) attacking outcomes (i.e., ball recycled out of the 18-yard box, defensive clearance – corner, defensive clearance – throw-in and penalty); 3) defensive outcomes (i.e., defensive clearance, no contact in the 18-yard box and unsuccessful attacking action); and 4) goalkeeper actions (i.e., goalkeeper catch, goalkeeper gathers the ball and goalkeeper punch) (Pulling et al., 2018). Effect sizes were computed using Cramer's V (V) and interpreted as small ($V = 0.10$), medium ($V = 0.30$) or large ($V \geq 0.50$) (Gravetter & Wallnau, 2007). A level of significance was set at 0.05. All statistical analyses were computed using SPSS version 26 (SPSS Inc., Chicago, IL, USA).

Results

Table 3 shows frequency counts and percentages of all crossing performance indicators. A total of 949 crosses were observed, resulting in 20 goals scored (2.1%). There were 51 attempts on target, excluding goals (5.4%) and 85 attempts off-target (9.0%). The most common cross outcome was a defensive clearance (40.5%). An organized attack was the main offensive strategy for crossing the ball (66.7%), followed by a direct attack (24.2%) and counter-attack (9.1%). The preferred delivery type was an out-swinging (69.1%) cross. When a cross was performed, defenders were positioned in a low (47.1%) or medium (40.6%) proximity to the crosser of the ball. The period in the match with the highest number of crosses was between the 76th minute and full time (17.4%). Most crosses were performed when a micro-number of attacking players (60.8%) or a meso-number of defensive players (60.5%) was in the 18-yard box. A greater number of crosses were taken from Zones 2 (31.6%) and 3 (36.2%), with the majority of crosses delivered to Zones 6 (26.8%) and 7 (21.4%).

Table 3. Frequency Counts and Percentage for Crossing Variables

| Category and variable | Frequency (%) |
|--|---------------|
| Type of attack | |
| Organized attack | 633 (66.7) |
| Direct attack | 230 (24.2) |
| Counterattack | 86 (9.1) |
| Delivery type | |
| Out-swinging | 656 (69.1) |
| In-swinging | 160 (16.9) |
| Straight | 133 (14.0) |
| Pitchside of delivery | |
| Right | 536 (56.5) |
| Left | 413 (43.5) |
| Defensive proximity to the crosser | |
| Low | 447 (47.1) |
| Medium | 385 (40.6) |
| High | 117 (12.3) |
| Time of cross | |
| 0–15 min | 140 (14.8) |
| 16–30 min | 128 (13.5) |
| 31 min–half-time | 144 (15.2) |
| 46–60 min | 160 (16.9) |
| 61–75 min | 153 (16.1) |
| 76 min–full time | 165 (17.4) |
| Extra-time | 59 (6.2) |
| Number of attacking players in the 18-yard box | |
| Micro-group | 577 (60.8) |
| Meso-group | 342 (36.0) |
| Macro-group | 30 (3.2) |
| Number of defensive players in the 18-yard box | |
| Micro-group | 276 (29.1) |
| Meso-group | 574 (60.5) |
| Macro-group | 99 (10.4) |
| Zone of the crosser | |
| Zone 1 | 193 (20.3) |

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Table 3. Frequency Counts and Percentage for Crossing Variables

| Category and variable | Frequency (%) |
|--------------------------------------|---------------|
| Zone 2 | 300 (31.6) |
| Zone 3 | 344 (36.2) |
| Zone 4 | 72 (7.6) |
| Zone 5 | 40 (4.2) |
| Zone of the outcome | |
| Zone 4 | 16 (1.7) |
| Zone 5 | 30 (3.2) |
| Zone 6 | 254 (26.8) |
| Zone 7 | 203 (21.4) |
| Zone 8 | 178 (18.8) |
| Zone 9 | 90 (9.5) |
| Zone 10 | 29 (3.1) |
| Zone 11 | 13 (1.4) |
| No zone | 136 (14.3) |
| Cross outcome | |
| Goal | 20 (2.1) |
| Attempt on target excluding goals | 51 (5.4) |
| Attempt off target | 85 (9.0) |
| Penalty | 2 (0.2) |
| Ball recycled out of the 18-yard box | 20 (2.1) |
| Unsuccessful attacking action | 27 (2.8) |
| Defensive clearance – corner | 69 (7.3) |
| Defensive clearance – throw in | 48 (5.1) |
| Defensive clearance | 384 (40.5) |
| No contact in the 18-yard box | 136 (14.3) |
| Goalkeeper gathers the ball | 25 (2.6) |
| Goalkeeper catch | 65 (6.8) |
| Goalkeeper punch | 9 (0.9) |
| Goalkeeper clearance | 8 (0.8) |

Table 4 shows the crossing variables in relation to goal-scoring attempts, attacking and defensive outcomes, and goalkeeper actions. There was no significant association between the type of attack and cross outcomes ($\chi^2 = 10.62$, $p = 0.09$, $V = 0.07$). However, the descriptive statistics indicated that teams had more goal-scoring attempts when they used counter-attacks (18.6%) compared to organized (18.2%) and direct (10.9%) attacks. In addition, there was no significant association between the type of delivery and cross outcome ($\chi^2 = 7.15$, $p = 0.31$, $V = 0.08$), although the findings highlight-

ed that there were a higher number of goal-scoring attempts when the teams used out-swinging crosses (17.4%) compared to in-swinging (15%) and straight (13.5%) crosses. In-swinging crosses resulted in more goalkeeper actions, while out-swinging crosses led to fewer goalkeeper actions. Crosses taken from Zone 5 (27.5%) produced the highest number of goal-scoring attempts, while those from Zone 3 (14%) yielded the lowest number of goal-scoring opportunities. Crosses delivered to Zone 5 (66.6%), Zone 7 (67%), Zone 9 (57.8%) and Zone 11 (61.5%) had higher defensive outcomes than other zones.

Table 4. Crossing Variables in Relation to Goal-Scoring Attempts, Attacking and Defensive Outcomes, and Goalkeeper Actions

| Category and variable | Goal scoring attempts | Attacking outcomes | Defensive outcomes | Goalkeeper actions | X ² | Sig. | Cramer's v |
|-----------------------|-----------------------|--------------------|--------------------|--------------------|----------------|------|------------|
| Type of attack | | | | | | | |
| Organized attack | 115 (18.2) | 84 (13.3) | 366 (57.8) | 68 (10.7) | 10.62 | 0.09 | 0.07 |
| Direct attack | 25 (10.9) | 38 (16.5) | 139 (60.4) | 28 (12.2) | | | |
| Counterattack | 16 (18.6) | 17 (19.8) | 42 (48.8) | 11 (12.8) | | | |
| Delivery type | | | | | | | |
| Out-swinging | 114 (17.4) | 97 (14.8) | 377 (57.5) | 68 (10.3) | 7.15 | 0.31 | 0.08 |

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Table 4. Crossing Variables in Relation to Goal-Scoring Attempts, Attacking and Defensive Outcomes, and Goalkeeper Actions

| Category and variable | Goal scoring attempts | Attacking outcomes | Defensive outcomes | Goalkeeper actions | X ² | Sig. | Cramer's v |
|--|-----------------------|--------------------|--------------------|--------------------|----------------|------|------------|
| In-swinging | 24 (15.0) | 17 (10.6) | 95 (59.4) | 24 (15.0) | 4.89 | 0.18 | 0.07 |
| Straight | 18 (13.5) | 25 (18.8) | 75 (56.4) | 15 (11.3) | | | |
| Pitchside of delivery | | | | | | | |
| Right | 85 (15.9) | 68 (12.7) | 318 (59.3) | 65 (12.1) | | | |
| Left | 71 (17.2) | 71 (17.2) | 229 (55.4) | 42 (10.2) | 5.52 | 0.48 | 0.06 |
| Defensive proximity to the crosser | | | | | | | |
| Low | 73 (16.3) | 67 (15.0) | 260 (58.2) | 47 (10.5) | | | |
| Medium | 69 (17.9) | 49 (12.7) | 220 (57.1) | 47 (12.2) | | | |
| High | 14 (12) | 23 (19.7) | 67 (57.3) | 13 (11.1) | 18.43 | 0.42 | 0.08 |
| Time of cross | | | | | | | |
| 0–15 min | 24 (17.1) | 21 (15.0) | 79 (56.4) | 16 (11.4) | | | |
| 16–30 min | 16 (12.5) | 26 (20.3) | 67 (52.3) | 19 (14.8) | | | |
| 31 min–half-time | 20 (13.9) | 14 (9.7) | 94 (65.3) | 16 (11.1) | | | |
| 46–60 min | 28 (17.5) | 23 (14.4) | 93 (58.1) | 16 (10.0) | | | |
| 61–75 min | 25 (16.3) | 28 (18.3) | 80 (52.3) | 20 (13.1) | | | |
| 76 min–full time | 32 (19.4) | 17 (10.3) | 101 (61.2) | 15 (9.1) | | | |
| Extra-time | 11 (18.6) | 10 (16.9) | 33 (55.9) | 5 (8.5) | - | - | - |
| Number of attacking players in the 18-yard box | | | | | | | |
| Micro-group | 81 (14.0) | 86 (14.9) | 339 (58.8) | 71 (12.3) | | | |
| Meso-group | 66 (19.3) | 48 (14.0) | 196 (57.3) | 32 (9.4) | | | |
| Macro-group | 9 (30.0) | 5 (16.7) | 12 (40.0) | 4 (13.3) | 5.88 | 0.45 | 0.06 |
| Number of defensive players in the 18-yard box | | | | | | | |
| Micro-group | 41 (14.9) | 39 (14.1) | 156 (56.5) | 40 (14.5) | | | |
| Meso-group | 96 (16.7) | 84 (14.6) | 339 (59.1) | 55 (9.6) | | | |
| Macro-group | 19 (19.2) | 16 (16.2) | 52 (52.5) | 12 (12.1) | - | - | - |
| Zone of the crosser | | | | | | | |
| Zone 1 | 28 (14.5) | 34 (17.6) | 113 (58.5) | 18 (9.3) | | | |
| Zone 2 | 51 (17.0) | 40 (13.3) | 176 (58.7) | 33 (11.0) | | | |
| Zone 3 | 48 (14.0) | 50 (14.5) | 197 (57.3) | 49 (14.2) | | | |
| Zone 4 | 18 (25.0) | 11 (15.3) | 37 (51.4) | 6 (8.3) | | | |
| Zone 5 | 11 (27.5) | 4 (10.0) | 24 (60.0) | 1 (2.5) | - | - | - |
| Zone of the outcome | | | | | | | |
| Zone 4 | 2 (12.5) | 6 (37.5) | 8 (50.0) | 0 (0) | | | |
| Zone 5 | 2 (6.7) | 6 (20.0) | 20 (66.6) | 2 (6.7) | | | |
| Zone 6 | 42 (16.5) | 41 (16.1) | 115 (45.3) | 56 (22.1) | | | |
| Zone 7 | 33 (16.3) | 32 (15.8) | 136 (67.0) | 2 (1.0) | | | |
| Zone 8 | 41 (23.0) | 31 (17.4) | 63 (35.4) | 43 (24.2) | | | |
| Zone 9 | 25 (27.8) | 12 (13.3) | 52 (57.8) | 1 (1.1) | | | |
| Zone 10 | 6 (20.7) | 11 (37.9) | 9 (31.0) | 3 (10.4) | | | |
| Zone 11 | 5 (38.5) | 0 (0) | 8 (61.5) | 0 (0) | | | |
| No zone | 0 (0) | 0 (0) | 136 (100) | 0 (0) | | | |

There was a significant association between the type of attack and match status ($\chi^2 = 31.72$, $p = 0.001$, $V = 0.13$). Winning teams preferred to adopt a counter-attacking style of play; losing teams used more direct attacking strategies; drawing teams adopted more organized attacks. A significant association was noted between the time of a cross and match status ($\chi^2 = 135.95$, $p = 0.001$, $V = 0.27$). Losing teams delivered a greater number of crosses during the 0–15 min (85.7%) and 16–30 min (73.4%) periods of

the game. There was a significant association between the number of defensive players in the 18-yard box and match status ($\chi^2 = 15.90$, $p = 0.001$, $V = 0.09$). Teams had the highest number of defensive players in the 18-yard box when losing (65.6%). A significant association was found between the zone of the crosser and match status ($\chi^2 = 37.20$, $p = 0.001$, $V = 0.14$), with losing teams delivering a greater number of crosses from Zones 1 (61.1%) and 2 (56.7%) compared to Zones 4 (47.2%) and 5 (45%) (Table 5).

Table 5. Crossing Variables in Relation to Match Status

| Category and variable | Winning | Losing | Drawing | X ² | Sig. | Cramer's v |
|--|-----------|------------|------------|----------------|------|------------|
| Type of attack | | | | 31.72 | 0.00 | 0.13 |
| Organized attack | 63 (9.9) | 331 (52.3) | 239 (37.8) | | | |
| Direct attack | 34 (14.8) | 137 (59.6) | 59 (25.6) | | | |
| Counterattack | 24 (27.9) | 36 (41.9) | 26 (30.2) | | | |
| Delivery type | | | | 4.80 | 0.30 | 0.05 |
| Out-swinging | 87 (13.3) | 355 (54.1) | 214 (32.6) | | | |
| In-swinging | 16 (10.0) | 88 (55.0) | 56 (35.0) | | | |
| Straight | 18 (13.5) | 61 (45.9) | 54 (40.6) | | | |
| Pitch side of delivery | | | | 0.22 | 0.90 | 0.01 |
| Right | 70 (13.1) | 286 (53.3) | 180 (33.6) | | | |
| Left | 51 (12.3) | 218 (52.8) | 144 (34.9) | | | |
| Defensive proximity to the crosser | | | | 0.50 | 0.97 | 0.02 |
| Low | 56 (12.5) | 234 (52.4) | 157 (35.1) | | | |
| Medium | 51 (13.2) | 206 (53.5) | 128 (33.3) | | | |
| High | 14 (12.0) | 64 (54.7) | 39 (33.3) | | | |
| Time of cross | | | | 135.95 | 0.00 | 0.27 |
| 0–15 min | 6 (4.3) | 120 (85.7) | 14 (10.0) | | | |
| 16–30 min | 11 (8.6) | 94 (73.4) | 23 (18.0) | | | |
| 31 min–half-time | 23 (16.0) | 76 (52.8) | 45 (31.2) | | | |
| 46–60 min | 23 (14.4) | 82 (51.2) | 55 (34.4) | | | |
| 61–75 min | 24 (15.7) | 49 (32.0) | 80 (52.3) | | | |
| 76 min–full time | 25 (15.1) | 61 (37.0) | 79 (47.9) | | | |
| Extra-time | 9 (15.2) | 22 (37.3) | 28 (47.5) | | | |
| Number of attacking players in the 18-yard box | | | | - | - | - |
| Micro-group | 98 (17.0) | 290 (50.3) | 189 (32.7) | | | |
| Meso-group | 21 (6.1) | 199 (58.2) | 122 (35.7) | | | |
| Macro-group | 2 (6.7) | 15 (50.0) | 13 (43.3) | | | |
| Number of defensive players in the 18-yard box | | | | 15.90 | 0.00 | 0.09 |
| Micro-group | 49 (17.8) | 129 (46.7) | 98 (35.5) | | | |
| Meso-group | 66 (11.5) | 310 (54.0) | 198 (34.5) | | | |
| Macro-group | 6 (6.1) | 65 (65.6) | 28 (28.3) | | | |
| Zone of the crosser | | | | 37.20 | 0.00 | 0.14 |
| Zone 1 | 22 (11.4) | 118 (61.1) | 53 (27.5) | | | |
| Zone 2 | 37 (12.3) | 170 (56.7) | 93 (31.0) | | | |
| Zone 3 | 34 (9.9) | 164 (47.7) | 146 (42.4) | | | |
| Zone 4 | 21 (21.2) | 34 (47.2) | 17 (23.6) | | | |
| Zone 5 | 7 (17.5) | 18 (45.0) | 15 (37.5) | | | |
| Zone of the outcome | | | | - | - | - |
| Zone 4 | 9 (56.2) | 1 (6.2) | 6 (37.5) | | | |
| Zone 5 | 7 (23.3) | 9 (30.0) | 14 (46.7) | | | |
| Zone 6 | 93 (36.6) | 46 (18.1) | 115 (45.3) | | | |
| Zone 7 | 65 (32.0) | 51 (25.1) | 87 (42.9) | | | |
| Zone 8 | 70 (39.3) | 39 (21.9) | 69 (38.8) | | | |
| Zone 9 | 28 (31.1) | 24 (26.7) | 38 (42.2) | | | |
| Zone 10 | 8 (27.6) | 7 (24.1) | 14 (48.3) | | | |
| Zone 11 | 7 (53.8) | 2 (15.4) | 4 (30.8) | | | |
| No zone | 40 (29.4) | 37 (27.2) | 59 (43.4) | | | |

Discussion

The current study investigated crossing opportunities at the 2018 FIFA World Cup. A total of 949 crosses were ob-

served, resulting in 20 goals (2.1%) scored. This statistic is lower than those in previously reported studies, in which 1,427 (2.7% goals) and 1,332 (3.2% goals) crosses were observed at

the 1986 and 2018 FIFA World Cup tournaments, respectively (Pulling et al., 2018; Partridge & Franks, 1989a; 1989b). In addition, 5.4% of attempts on target did not result in a goal, and 9% of crosses led to off-target attempts. Surprisingly, despite the higher percentage of attempts at goal compared to the 2014 World Cup (Pulling et al., 2018), there was a low scoring rate at the 2018 World Cup. This result may suggest that football coaches are developing and implementing better defensive strategies to deal with crosses, or teams are implementing more of a possession-based and central attacking strategy. However, as it was not an aim of this paper to determine the reasons for the differences in crossing statistics between tournaments, this may be something for future research to consider.

The current study showed that more crosses were performed using an organized attack rather than direct attacks and counter-attacks. This finding suggests that teams may prefer to hold onto the ball rather than consistently play long balls into the box (Kubayi & Toriola, 2018). In relation to the type of delivery, the highest proportion of crosses were out-swinging deliveries as opposed to in-swinging and straight crosses. This result is expected, considering that players on the left side of the pitch would mainly use their left foot to cross the ball and vice versa (Pulling et al., 2018). Most crosses were performed while low or medium pressure was being applied to the player delivering the cross. Therefore, a practical recommendation for football coaches would be to develop training sessions that promote increased defensive pressure on the player crossing the ball. Doing so may channel the attacking player towards the corner flag or force them to play the ball backwards, thus reducing the number of crosses into the 18-yard area. Finally, a greater number of crosses were delivered into the box during the last interval of the game (i.e., 76th minute – full-time). This finding suggests that during the final period of the game, teams aim to play the ball into the box in an attempt to create a goal-scoring opportunity in order to obtain a positive result from the match (Kubayi, 2020).

While the findings indicated that more crosses were performed using an organized attack, in relation to creating goal-scoring opportunities, a higher percentage of goal-scoring attempts were achieved when teams adopted a counter-attacking strategy. This finding is consistent with previous literature, which reported that teams in the Norwegian professional league that used a counter-attacking strategy scored more goals than those that adopted more elaborate attacking strategies (Tenga et al., 2010b). An advantage of a counter-attacking style of play is that it quickly moves the ball to offensive zones and prevents defending teams from reorganizing (Kim et al., 2019). As a result, it may lead to more goal-scoring opportunities for the attacking team. Therefore, if coaches want to increase the goal-scoring opportunities for their team, they may want to consider adopting a more counter-attacking style of play.

When considering the type of delivery, out-swinging crosses produced more goal-scoring attempts than other types of crosses did. This result supports the findings of Casal et al. (2015), who identified that teams using out-swinging crosses had a higher number of shots on target than those using in-swinging crosses. Furthermore, in-swinging crosses resulted in more goalkeeper actions compared to out-swinging crosses. The current study also corroborates the findings of Pulling et al. (2018), who reported that in-swinging crosses promote more goalkeeper interventions, presumably due

to the ball angling towards the goalkeeper during its flight, which may influence the goalkeeper's decision-making process in terms of coming out and claiming the ball. Conversely, out-swinging crosses may reduce the ability of the goalkeeper to intercept a ball or leave the goal line to claim it (Kubayi & Larkin, 2020; Link et al., 2016; Pulling et al., 2018), thereby giving the attacking players more time and space to direct the ball towards the goal (Casal et al., 2015).

In relation to the area on the pitch from which a cross was delivered, crosses from Zone 3 had the lowest number of goal-scoring attempts. A possible explanation for this finding could be that as this zone is the furthest from the goal; once the ball has been crossed, it is likely to travel a greater distance and for a greater duration of time, thus giving the defensive team a greater opportunity to position themselves to intercept the ball (Pulling et al., 2018). Interestingly, Zones 5, 7, 9 and 11 had a greater number of defensive outcomes than all other zones, which could be because it is easier for defenders to clear the ball out of the 18-yard box without conceding a throw-in or corner kick if the cross is delivered from within the 18-yard box, as the defenders may be positioned closer to the crosser and the intended target (i.e., they are in Zones 5, 7, 9 and 11) (Pulling et al., 2018).

A key aim of the current study was to understand the influence of match status in relation to crossing variables. Overall, the findings demonstrate that losing teams played more crosses than winning and drawing teams, which is clearly an attempt to create more goal-scoring opportunities and get back into the game. In addition, losing teams delivered a greater number of crosses during the 0–15 min and 16–30 min periods. This finding may indicate that when a team is losing early in a match, there may be a sense of urgency during these first two intervals of the game in order to avoid chasing the game towards the end.

Further, losing teams also delivered a greater number of crosses from Zones 1 and 2 compared to Zones 4 and 5, which may indicate that when teams are losing, they tend to get the ball into wider positions on the field to create goal-scoring opportunities. It should also be noted that when teams were losing, they adopted a more organized crossing attacking strategy. This finding further supports those of Bradley et al. (2014), who reported that when teams were behind, they increased their possession, suggesting that they preferred to control the game by dictating the play. Conversely, the current findings indicated that when teams were winning, they used a counter-attacking style of play in relation to the crosses they delivered. This result substantiates those of previous studies, showing that when teams are winning, they do not retain ball possession but seem to adopt more counter-attacking strategies (Lago, 2009; Lago & Martin, 2007).

The present study aimed to analyse open-play crosses at the 2018 FIFA World Cup competition, with reference to the cross mechanism and match status. Of the 949 crosses observed, a total of 20 goals (2.1%) were scored. The findings showed that teams had more goal-scoring attempts when they adopted a counter-attacking strategy in contrast to direct and organized attacks. Out-swinging crosses produced a greater number of goal-scoring attempts as opposed to in-swinging and straight crosses. Winning teams were found to use a more counter-attacking style of play, while losing teams attempted more crosses and adopted more organized attacking strategies. Overall, the current study explains how teams implemented

crossing strategies at the 2018 FIFA World Cup. The results provide football coaches with recommendations to develop successful crossing strategies at international competitions.

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