

Grand Slam Point Outcomes – WTA Tour

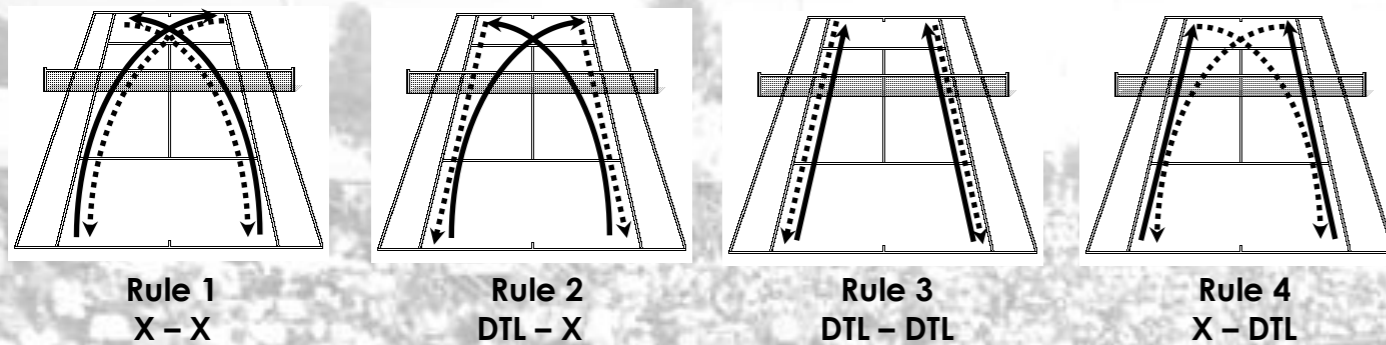
A Study into the 4 Shot Combinations™ in Tennis

Peter D. McCraw & Andrew Burgess (2007)

Introduction & Background

The study investigated the connection between outcome type, percentage of point outcomes and court surface. The intended use of the study is to assist in the tactical development of junior tennis players.

There are essentially two shot directions you can hit in tennis – Cross-Court (X) and Down-the-Line (DTL). These two choices result in four possible shot combinations.



The first shot (first symbol) is considered player A's shot (dotted line) and the subsequent shot is considered the point ending shot (solid line) by player B. E.g. Rule 2: Player A, hits Down-the-Line (DTL) then player B responds with a Cross-Court (X) shot.

Methodology

- The study was conducted at the 2007 Australian Open (Hard Court – Rebound Ace), Roland Garros (Clay Court) and Wimbledon (Grass Court) Championships.
- Women's Singles Main Draw matches were charted over the duration of each tournament. Matches were selected at random. Table 1.1 illustrates the sample size collected at each event.
- The last two shots of each point were recorded to identify the point outcome rule.
- Each point outcome rule was classified by outcome type. The three categories were: Winner (W), Unforced Error (UF) and Forced Error (F).

Conclusions

1. Grand Slam level tennis is a game of unforced errors. (Figures 1.1-1.3 & Figures 2.1-2.4). Regardless of surface speed and point outcome, unforced errors remained the highest outcome type for all surfaces except Rule 2 Grass Court (Figure 1.2) and Rule 3 Hard Court (Figure 1.3).
2. As demonstrated by Table 1.2, the percentage of point outcomes across surface shows no significant difference. Therefore, point outcome is not surface dependent.
3. **Rule 1:** Outcome type was not surface dependent. Unforced errors were the highest point outcome type.
4. **Rule 2:** As surface speed increased, forced errors decreased and winners increased.
5. **Rule 3:** Was by far the lowest point outcome of the four and the most surface dependent for outcome type. As surface speed increased, forced errors decreased and winners increased.
6. **Rule 4:** As speed of surface increased, so did the number of forced errors. Rule 4 was the most frequent point outcome and Unforced errors were the highest point outcome type.
7. Surface speed does not dictate the point outcome used at Grand Slam level on WTA Tour.

Coaching Applications

1. A player who possesses the ability to reduce the number of unforced errors has a distinct advantage over their opponent.
2. It is essential for a player to develop the ability to maintain a cross-court rally without committing unforced errors. This should be reflected in the structure of drills and practice in both their purpose and the time spent hitting cross-court in relation to down-the-line directions for both rallying and point ending situations.
3. Players must focus on creating forced error outcomes at the expense of unforced errors and not focus on hitting winners at the expense of increased unforced errors.
4. The better the bio-mechanical foundation and understanding of court geometry the less a player's tactical development is influenced by surface. The more open a player's tactical development remains, the more a complete game style can be developed within the player's potential.
5. Coaches should emphasise creating forced errors over hitting winners on Rule 4. Although being the largest point outcome, the rule itself should be taught with the understanding that it is more important to hit the right shot at the right time rather than the number of times it is hit in a match. In practice, coaches should train the execution of hitting down-the-line in the context of a Rule 4 combination.
6. The faster the court surface the more coaches should emphasise the importance of creating Rule 2 forced errors and winners.
7. REMEMBER: You can only implement tactically what you execute bio-mechanically, and you can only execute bio-mechanically what you can perform athletically. Hence, the foundation for a player's game begins with maximizing their athletic capabilities.

Results & Graphs

Table 1.1 – Sample Size

	Roland Garros	Wimbledon	Aust. Open	Total
# Matches	7	8	11	26
# Sets	17	18	26	61
# Games	167	171	228	566
# Points	784	648	1016	2448

Table 1.2 – Percentage Point Outcomes for Surface

	Rule 1	Rule 2	Rule 3	Rule 4
Roland Garros	26.5	22.6	14.5	36.4
Wimbledon	28.2	23.6	14.5	33.6
Australian Open	28.5	23.2	12.3	36.0
Total	27.8	23.1	13.8	35.3

* Values in percent (%)

Roland Garros (Clay Court)

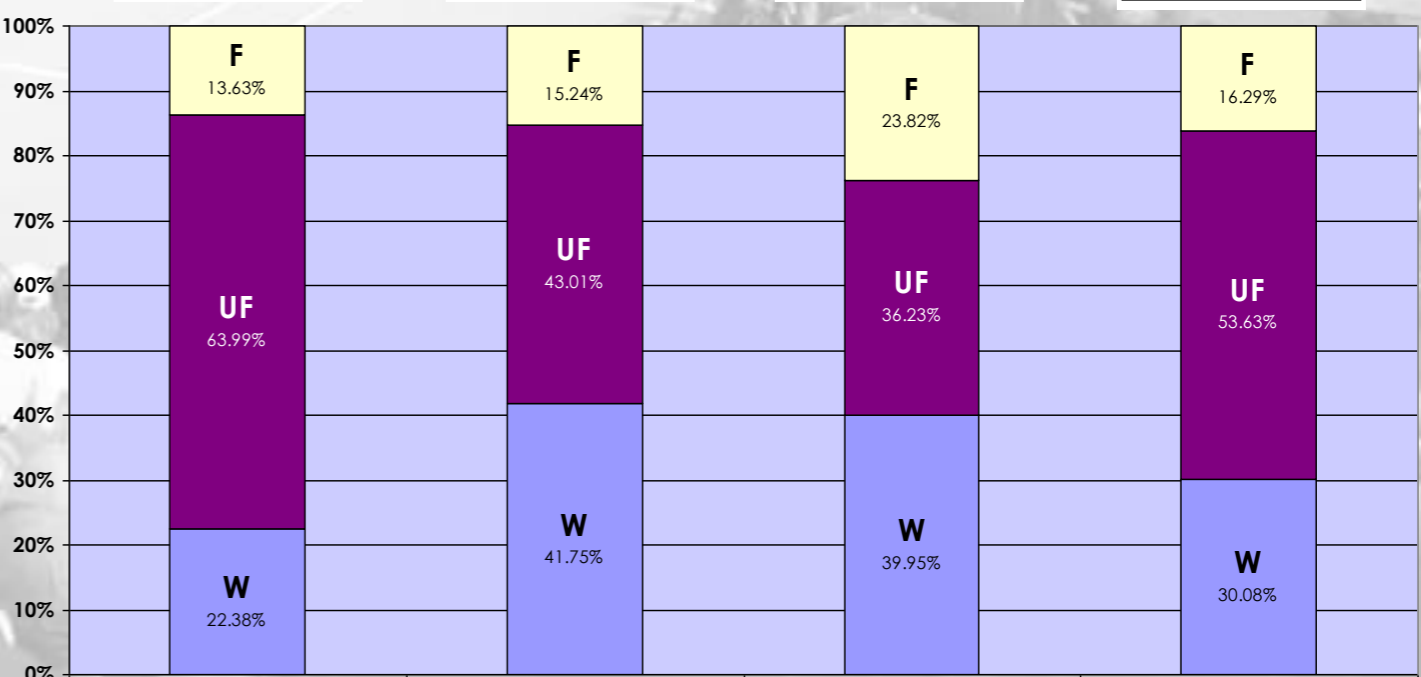
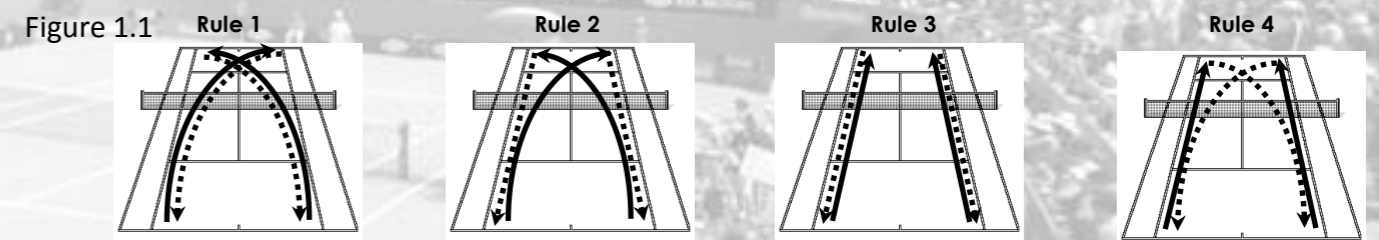
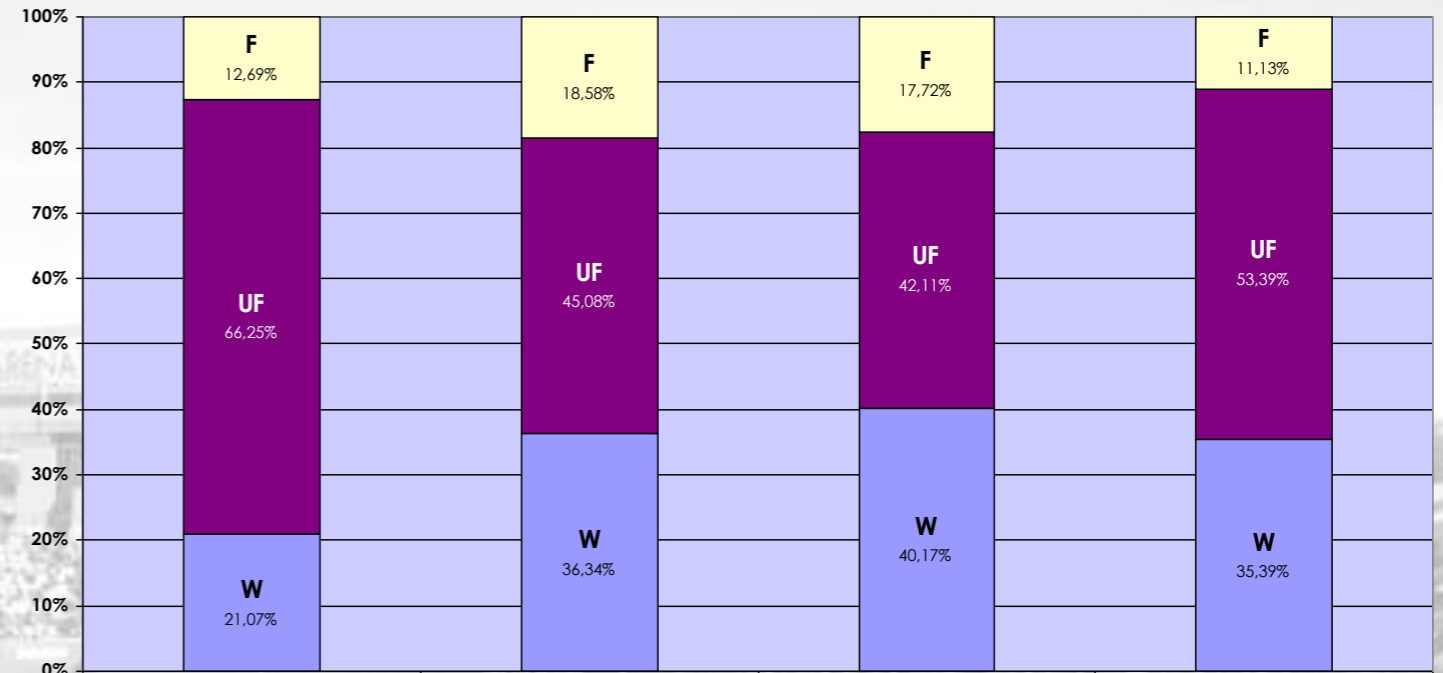


Figure 1.1 Rule 1 Rule 2 Rule 3 Rule 4

Figure 1.3 Rule 1 Rule 2 Rule 3 Rule 4

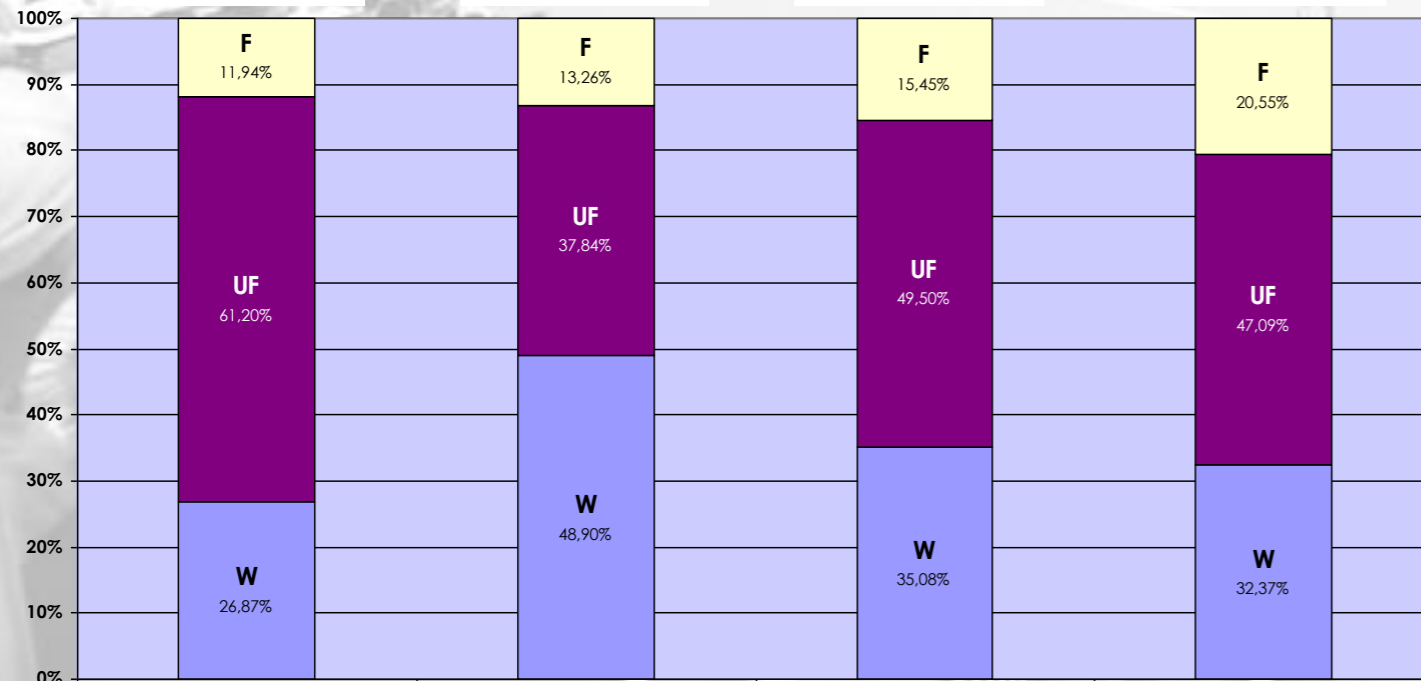
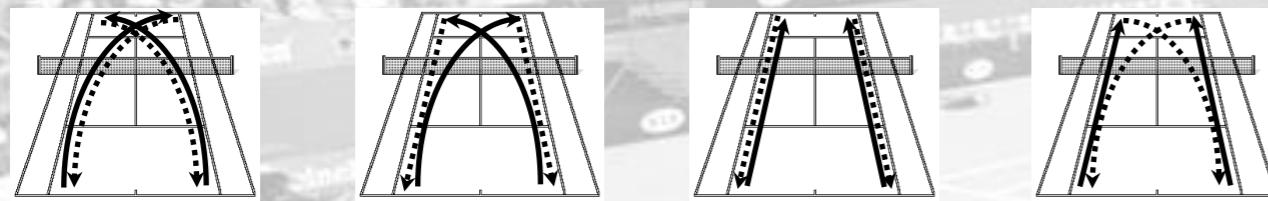


Figure 1.2 Rule 1 Rule 2 Rule 3 Rule 4

Wimbledon (Grass)

Australian Open (Hard Court – Rebound Ace)

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Rule 1 (X – X) Results & Graphs

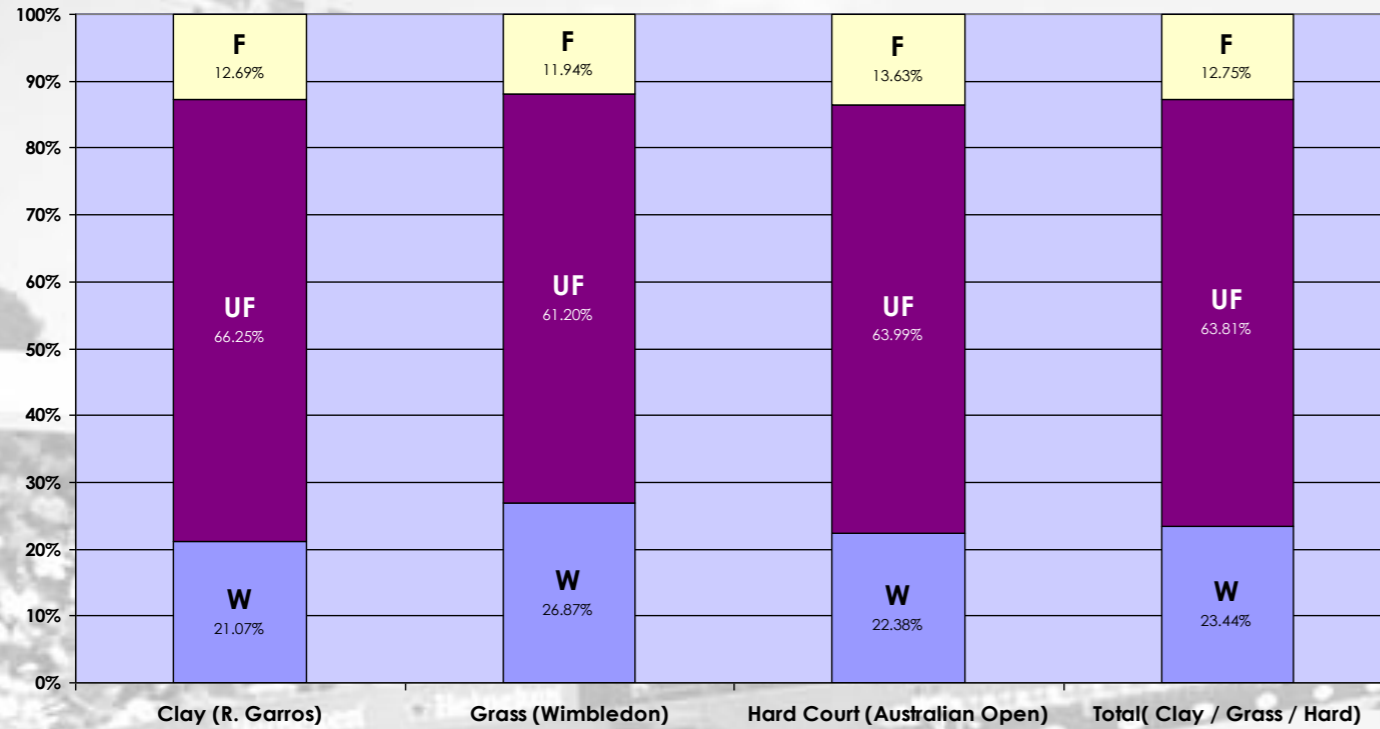


Figure 2.1

Rule 2 (DTL – X) Results & Graphs

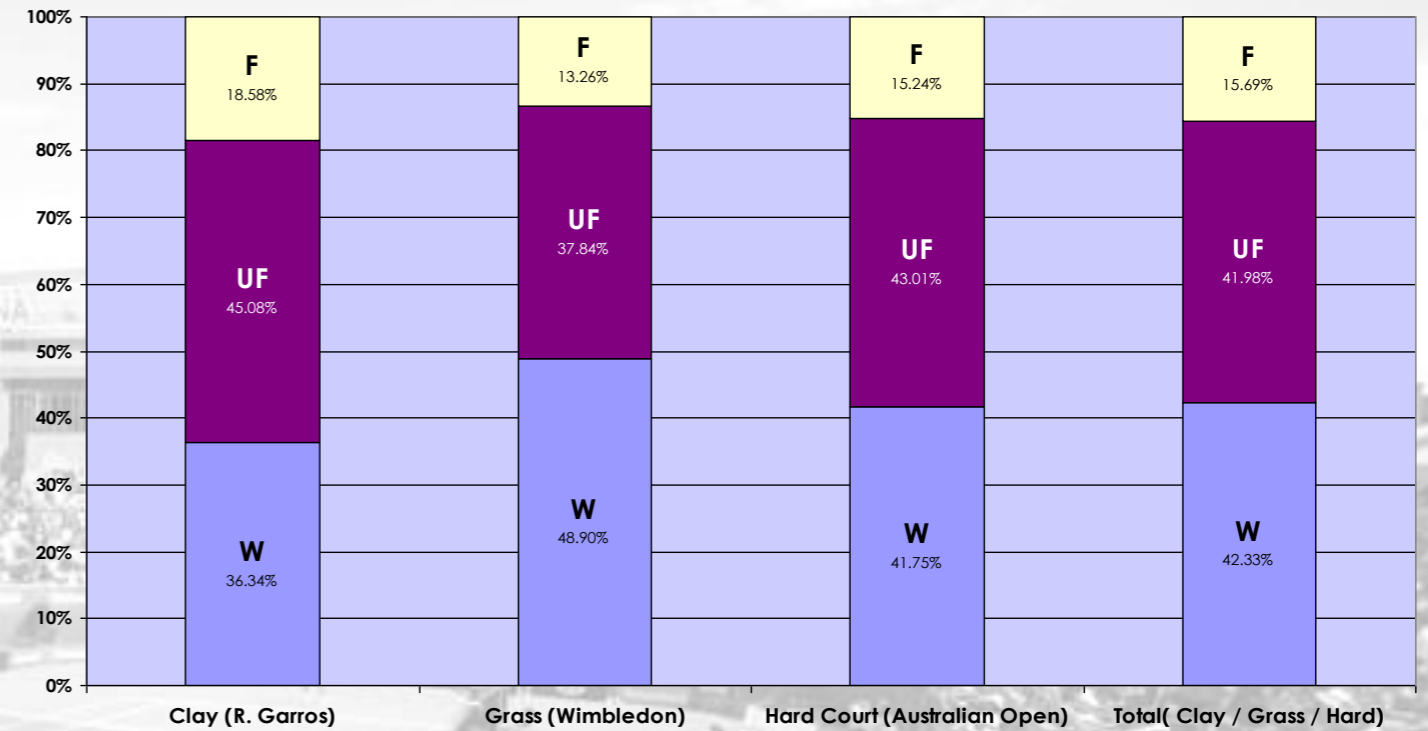


Figure 2.2

Rule 3 (DTL – DTL) Results & Graphs

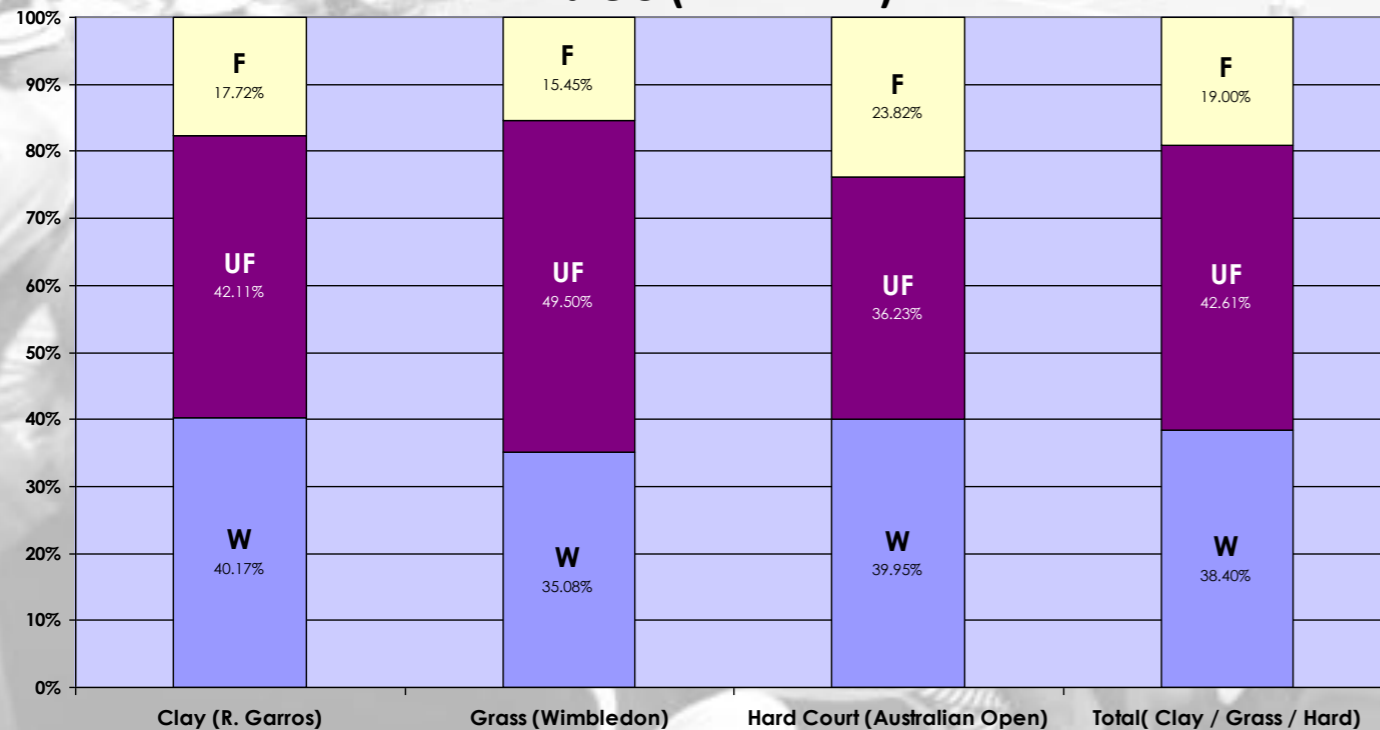


Figure 2.3

Rule 4 (X – DTL) Results & Graphs

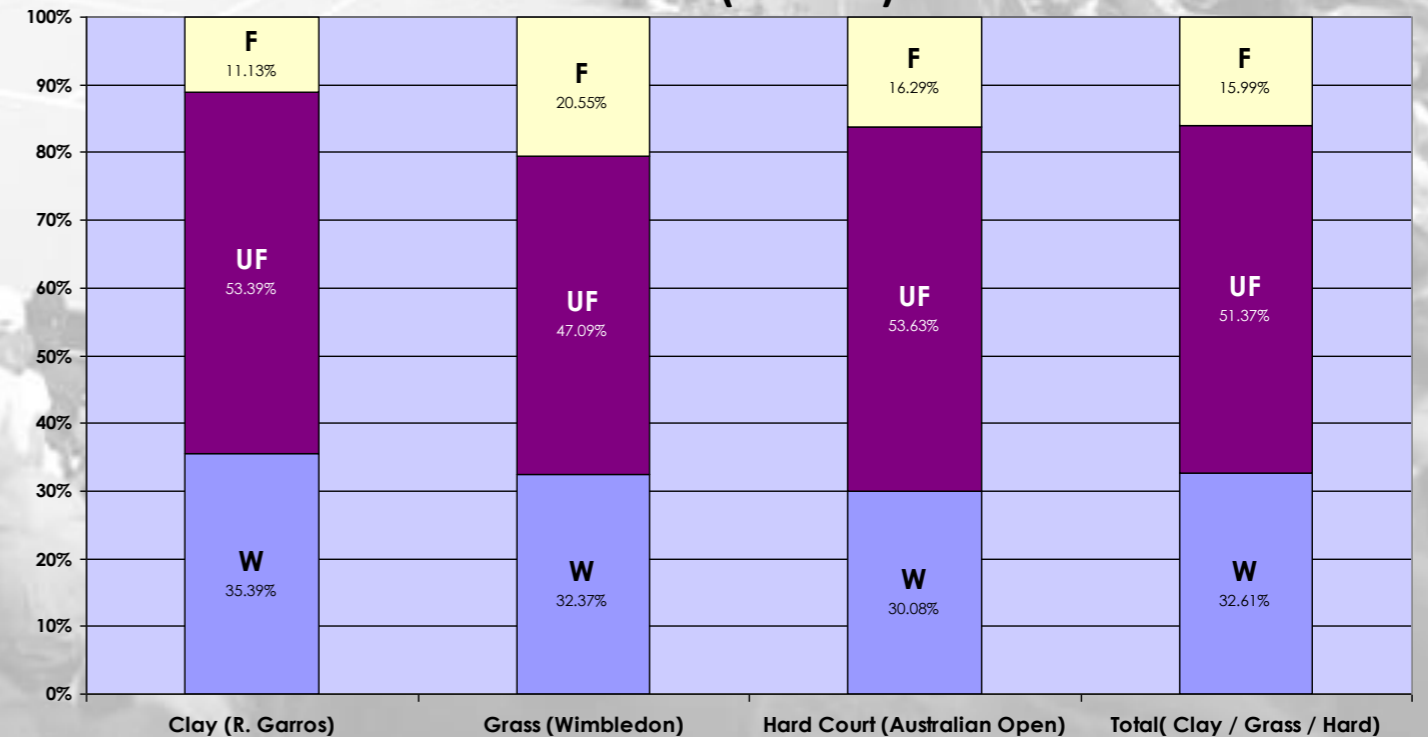


Figure 2.4

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Discussion

- **Figures 1.1 – 1.3** illustrate point outcome type for each point outcome categorized by rule and surface.
- **Table 1.2** illustrates percentage point outcomes for surface.
- **Rule 1:** Figure 2.1 illustrates there was no significant difference in point outcome type on all surfaces. Unforced errors were the highest outcome type.
- **Rule 2:** Forced and Unforced errors on Clay and Hard Court show no significant difference (Figure 2.2). Winners were 7% higher on Grass compared with Hard Court and 12.5% higher than Clay Court all at the expense of unforced errors. As surface speed slowed, forced errors increased and winners decreased on all surfaces.
- **Rule 3:** Figure 2.3 illustrates Grass Court produced the highest number of unforced errors. Hard Court forced errors were 6.1 and 8.3% higher than Clay and Grass Court respectively. There was less than 5% difference in winners across surfaces. As surface speed increased, forced errors decreased and winners increased across all surfaces.
- **Rule 4:** Unforced errors were the highest point outcome type. Grass Court created 4% more forced errors than Hard and 9% more than Clay Court. Grass Court produced the highest number of forced errors and Clay Court created the highest number of winners. As surface speed increased forced errors increased also. (Figure 2.4).
- **Table 1.2:** Figures 2.1-2.4 demonstrate there was no significant difference between the individual surface outcome type and the total outcome type for all surfaces on the WTA Tour.

Further Discussion

- **Rule 1:** Previous research revealed the ratio of X : DTL shot directions during a rally is 2.9 : 1 at Grand Slam level. Therefore, Rule 1 and Rule 2 are used more often during the point. Table 1.2 illustrates Rule 1 and Rule 2 combine to represent 50% of total point outcomes irrespective of surface. Rule 1 also represents the second biggest percentage of point outcomes.
- **Rule 2:** Demonstrates both positive court and shot geometry working for the player. As surface speed increased, winners also increased and forced errors decreased, because positive court geometry was working with surface speed to enhance the effectiveness of this Rule.
- **Rule 3:** Employs negative court geometry and should be used as a tactical rule. Its tactical use can be validated as it accounts for only 13.8% of total point outcomes and the outcome type is surface dependent.
- **Rule 4:** As surface speed increased more forced errors were created indicating that players were able to reach the ball. When the number of winners was examined it revealed a 5% difference across all surfaces. In addition, Rule 4 winners were on average 10% lower than Rule 2. This illustrates negative court geometry was more of a factor than surface speed.

Glossary

- **Point Outcome:** The final two shots of a point as classified by one of four rules.
- **Outcome Type:** The way in which a point is concluded as classified by one of the three categories.
 - **Winner (W):**
 - (i) *Clean Winner:* A point won where no touch of the ball is made by opposing player's racquet.
 - (ii) *Effective Winner:* A point won where a touch of the ball is made by opposing player's racquet, but no competent attempt to return the ball was possible.
 - **Unforced Error (UF):** A mistake made from a competent attempt where the player is not under significant pressure and tactically is in relative control of the ball.
 - **Forced Error (F):** A mistake made from a competent attempt where the player is under significant pressure and tactically is not in relative control of the ball.
- **Court Geometry:** Dealing with the measurement and relationship of lines, angles and surfaces of a tennis court. The two major components are distance of usable court that shots can be hit to and what situation a shot direction leaves your opponent in.

Court Geometry is governed by the laws and physics of tennis. It cannot be changed unless the shape and size of the court, height of the net or laws of the game are altered. Therefore, court geometry governs the overall implementation of a player / opponent match strategy.

 - **Negative Court Geometry:** A situation where a player changes the direction of the ball with the court geometry working against them. E.g. A shot down-the-line travels the shorter distance than cross-court and leaves the opponent no wider than the singles side line.
 - **Positive Court Geometry:** A situation where a player changes the direction of the ball with the court geometry working for them. E.g. A shot hit cross-court travels a longer distance than down-the-line and can force the opponent wider than the singles side line.
- **Shot Geometry:** The angle of deflection from two shot directions combined with a margin of error of the ball landing in the playable court. It also includes the way in which the shot is constructed in relation to the body.
 - **Positive Shot Geometry:** The angle of deflection and direction is across the body.
 - **Negative Shot Geometry:** The angle of deflection and direction is away from the body.

In general it is considered easier to hit the ball across the body regardless of technique. Negative shot geometry can be counteracted by hitting the 'inside-in' shot.
- **Player / Opponent Match Strategy:** Is the specific plan a player uses to give themselves the highest probability of winning a single match. It drives the type and number of tactics executed during the course of a match.