

# Grand Slam Point Outcomes – ATP Tour

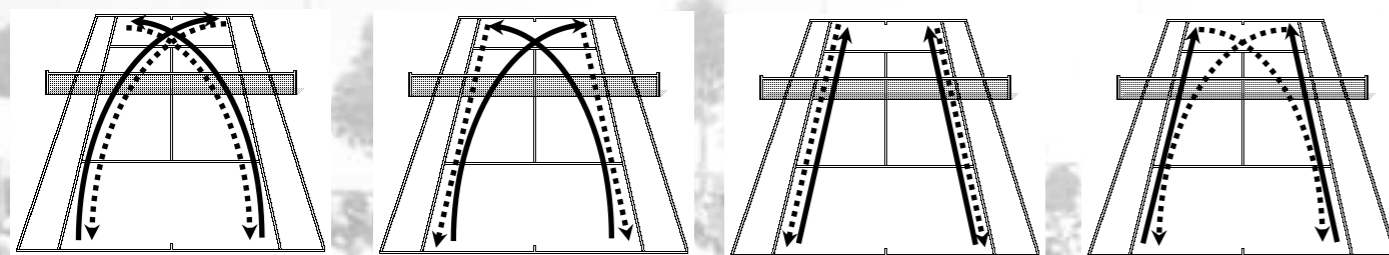
## A Study into the 4 Shot Combinations™ in Tennis

Peter D. McCraw (2008)

### 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.



**Rule 1**  
X – X

**Rule 2**  
DTL – X

**Rule 3**  
DTL – DTL

**Rule 4**  
X – DTL

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 2008 Australian Open (Hard Court – Plexi Cushion), Roland Garros (Clay Court), Wimbledon (Grass Court) and US Open (Hard Court - Deco Turf) Championships.
- Men'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 (Ufe) and Forced Error (Fe).

### Conclusions

- Grand Slam level tennis is a game of unforced errors. (Figures 1.1-1.4 & Figures 2.1-2.4). Regardless of surface speed and point outcome, unforced errors remained the highest outcome type for all surfaces except Grass Court for Rule 2 & 3 (Figures 2.2 & 2.3).
- As demonstrated by Table 1.2, the percentages of point outcomes across surface show no significant difference. Therefore, point outcome is not surface dependent.
- There is no significant difference in point outcome type for Australian Open (Hard Court – Plexi Cushion) and US Open (Hard Court – Deco Turf).
- Rule 1:** Outcome type was surface dependent for Grass and Clay Courts. There were increased forced errors on Grass, at the expense of winners on Clay Court.
- Rule 2:** Grass Court produced the most winners and least unforced errors of any point outcome type and surface. As surface speed slowed, forced errors increased on all surfaces
- Rule 3:** Was by far the lowest used point outcome for all surfaces and the most surface dependent rule for outcome type. As surface speed increased, forced errors decreased and winners increased.
- Rule 4:** The most frequent point outcome irrespective of surface. As speed of surface decreased, so does the number of winners with a corresponding increase in forced errors.
- Surface speed does not dictate the point outcome used at Grand Slam level on ATP Tour.

### Results

**Table 1.1 – Sample Size**

	US Open	Roland Garros	Wimbledon	Aust. Open	Total
# Matches	6	7	6	7	26
# Sets	19	22	20	23	84
# Games	186	191	178	222	777
# Points	688	803	587	829	2907

**Table 1.2 – Percentage Point Outcomes for Surface**

	Rule 1	Rule 2	Rule 3	Rule 4
Roland Garros	30	20	17	33
Wimbledon	25	25	19	31
Australian Open	28	22	13	37
US Open	29	21	14	36
Total (Ave)	28	22	12.5	34.25

\* Values in percent (%)

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Figure 1.1

Roland Garros (Clay Court)

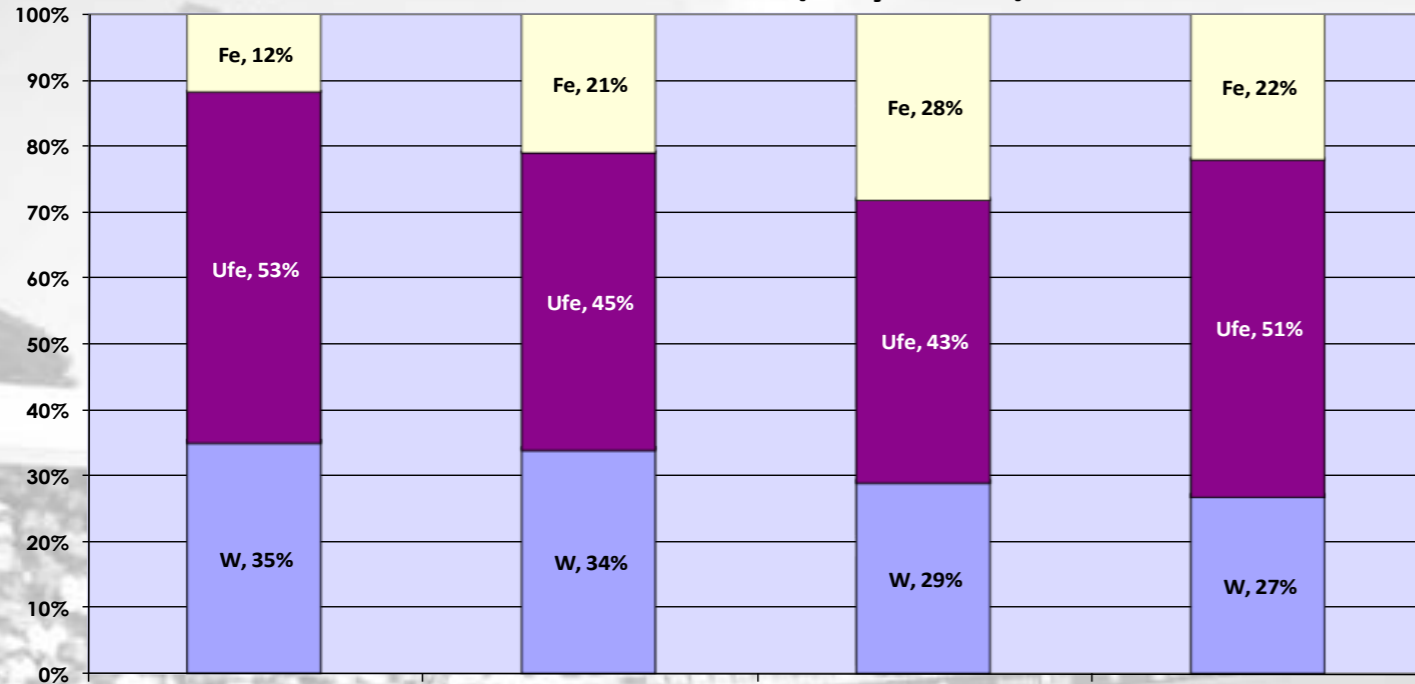


Figure 1.2

Wimbledon (Grass)

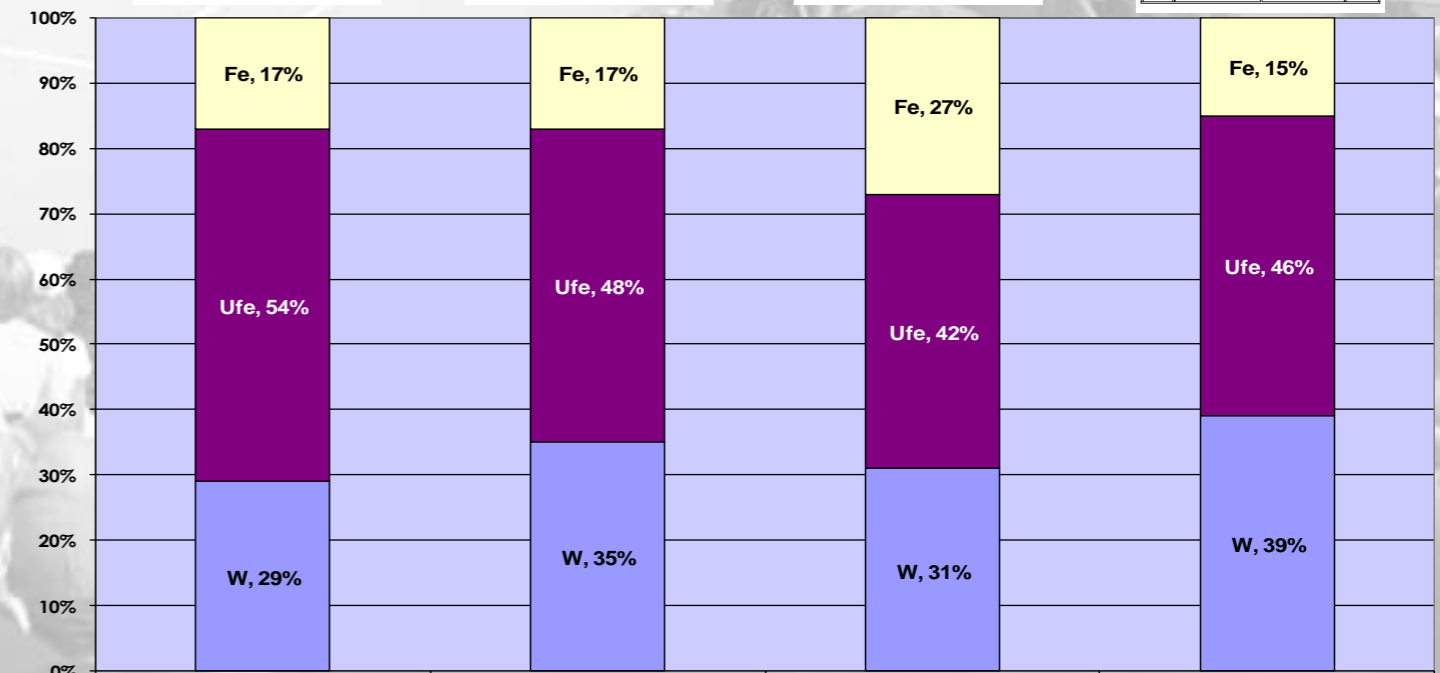
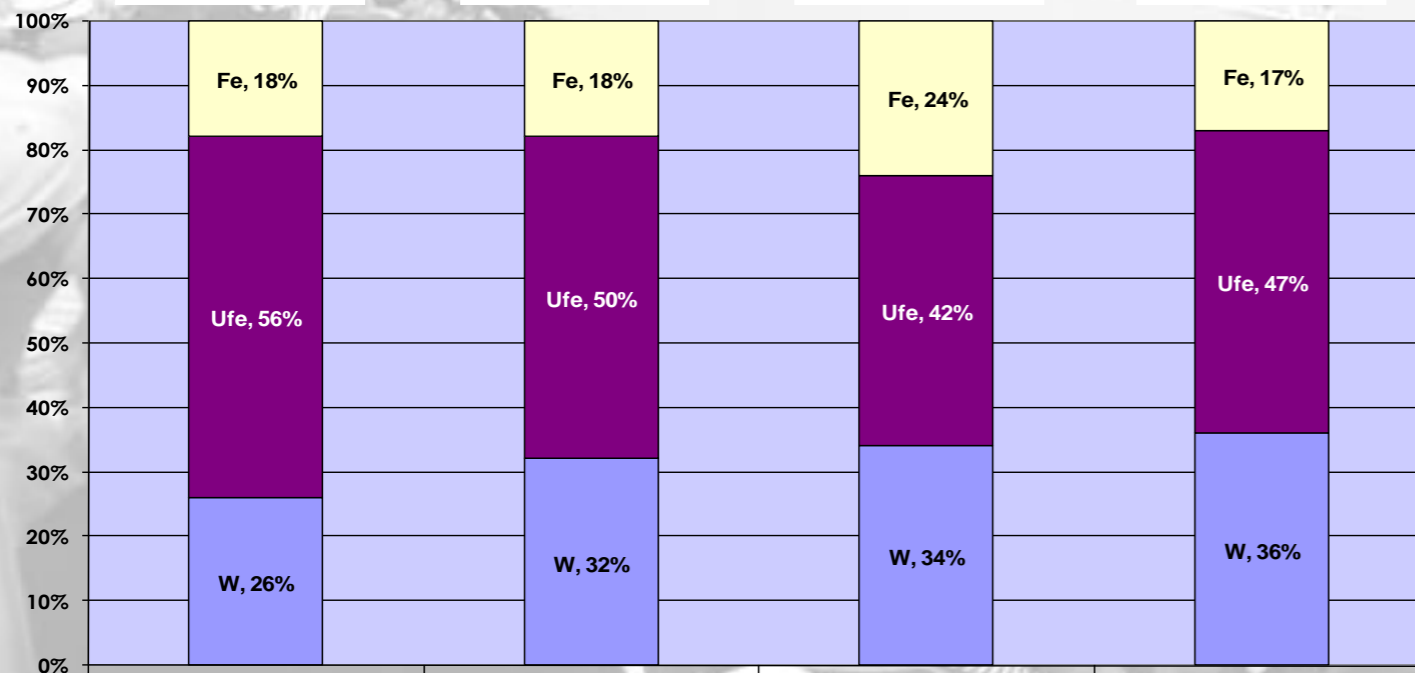
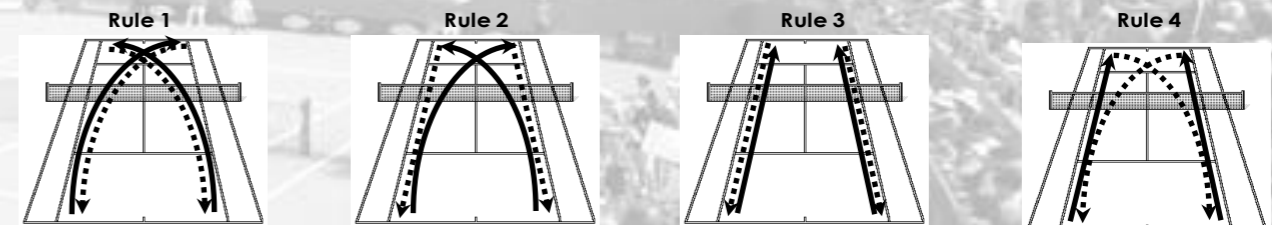
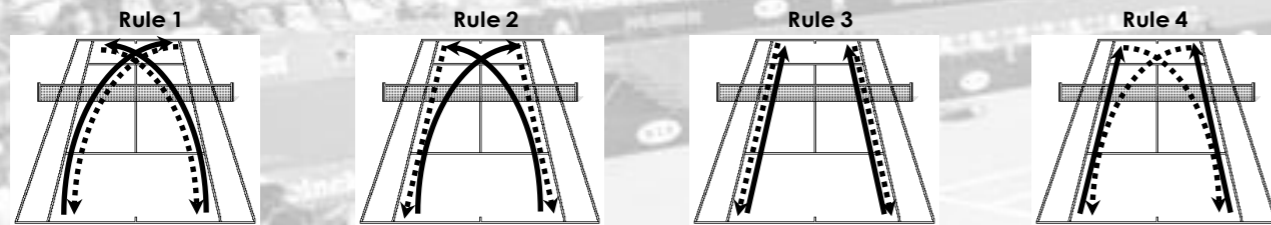
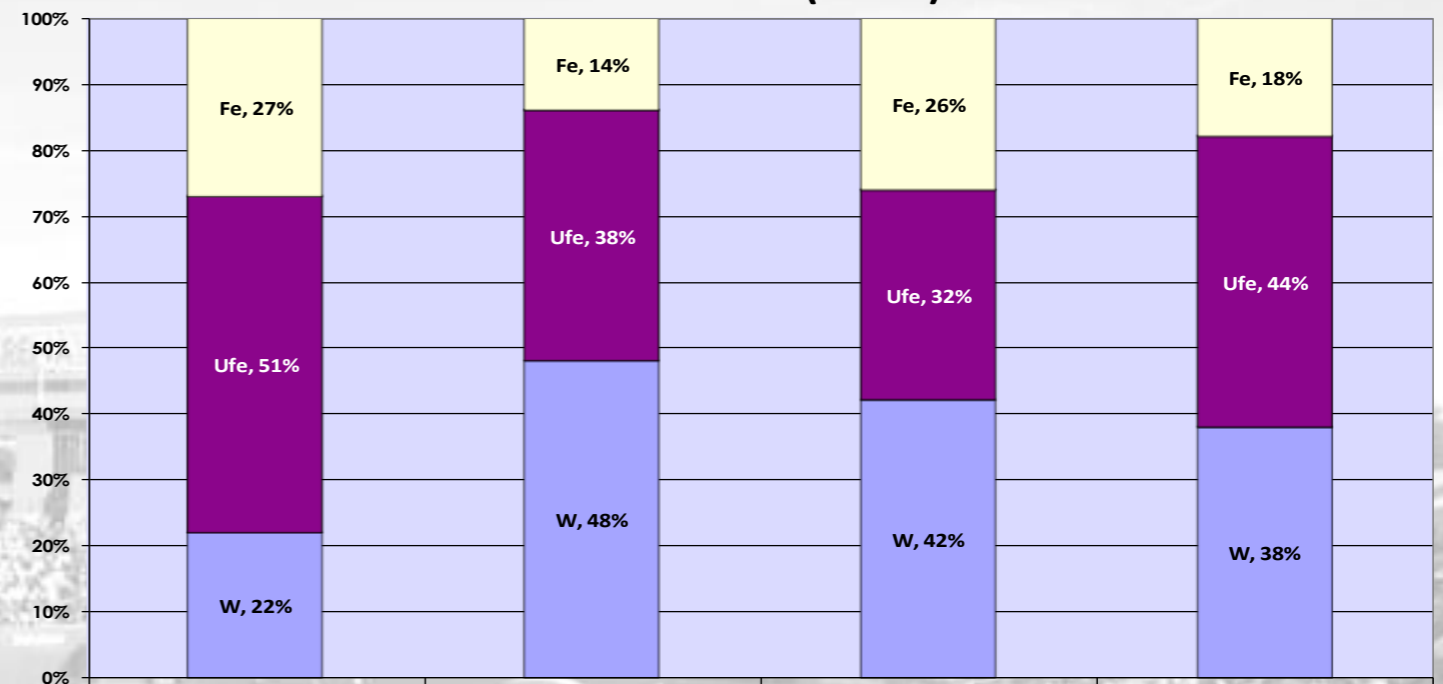


Figure 1.3

Australian Open (Hard Court – Plexi Cushion)

Figure 1.4

US Open (Hard Court – Deco Turf)

### Rule 1 (X – X) Results & Graphs

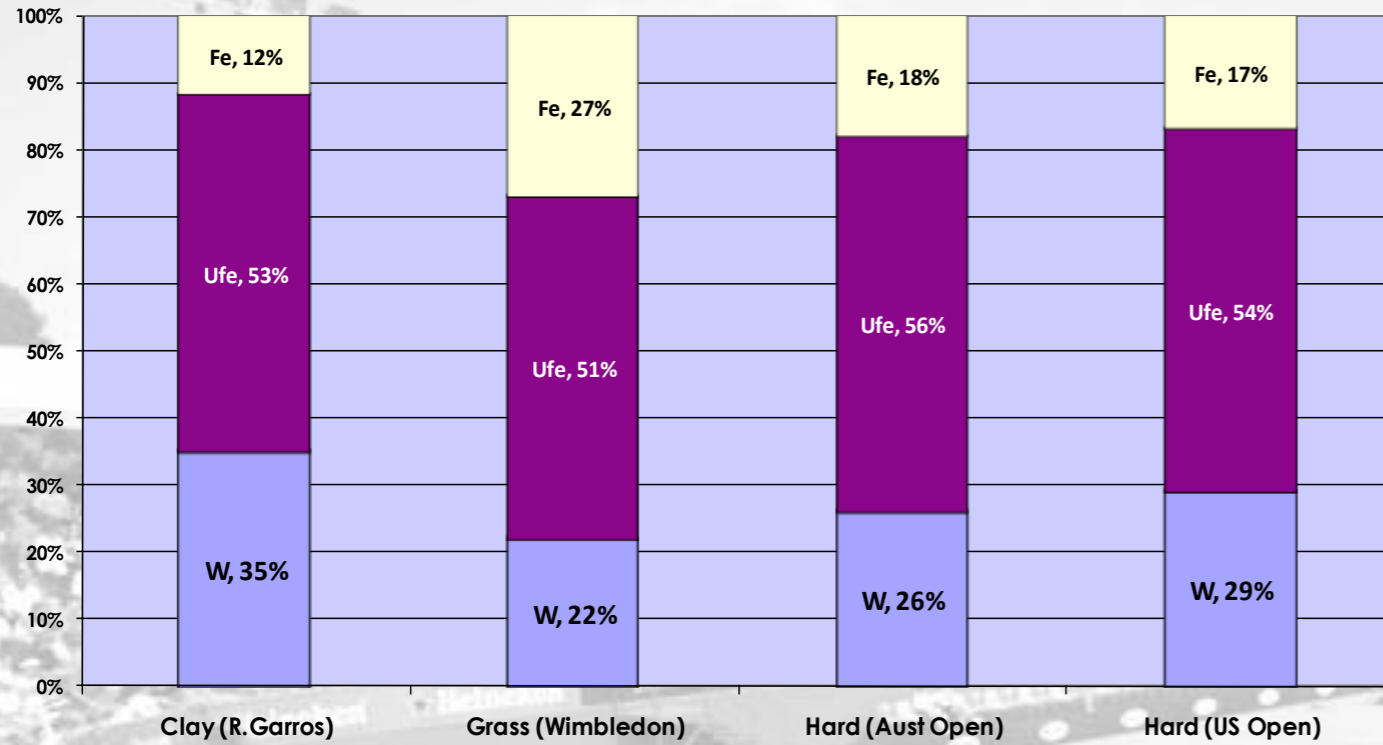


Figure 2.1

### Rule 2 (DTL – X) Results & Graphs

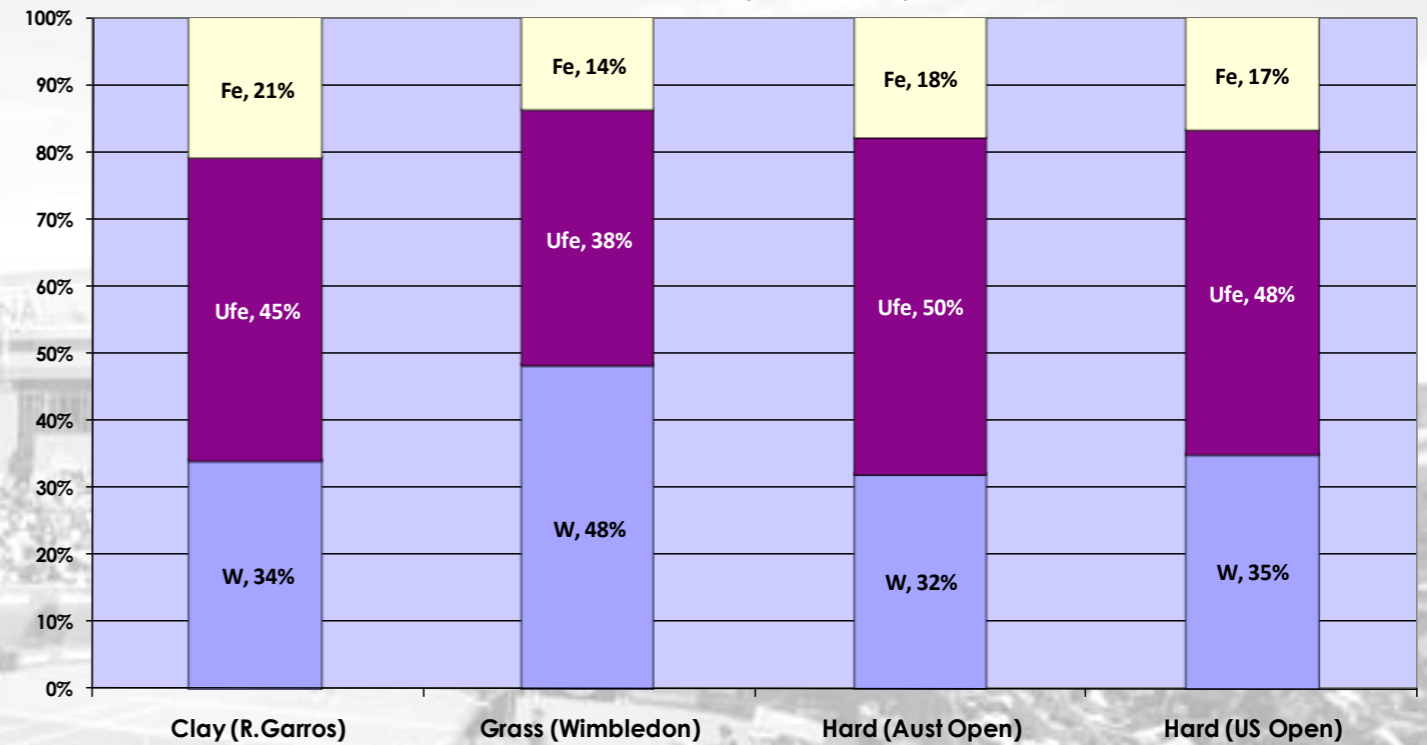


Figure 2.2

### Rule 3 (DTL – DTL) Results & Graphs

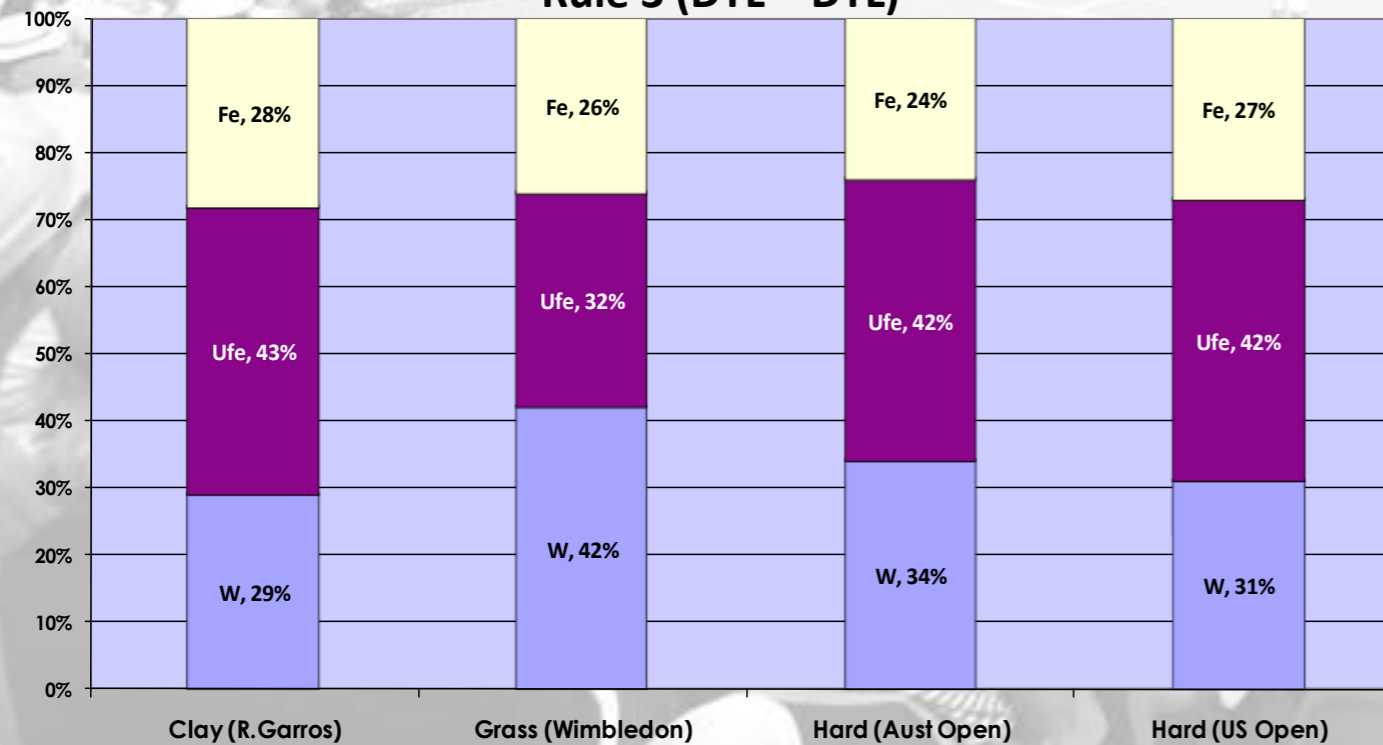


Figure 2.3

### Rule 4 (X – DTL) Results & Graphs

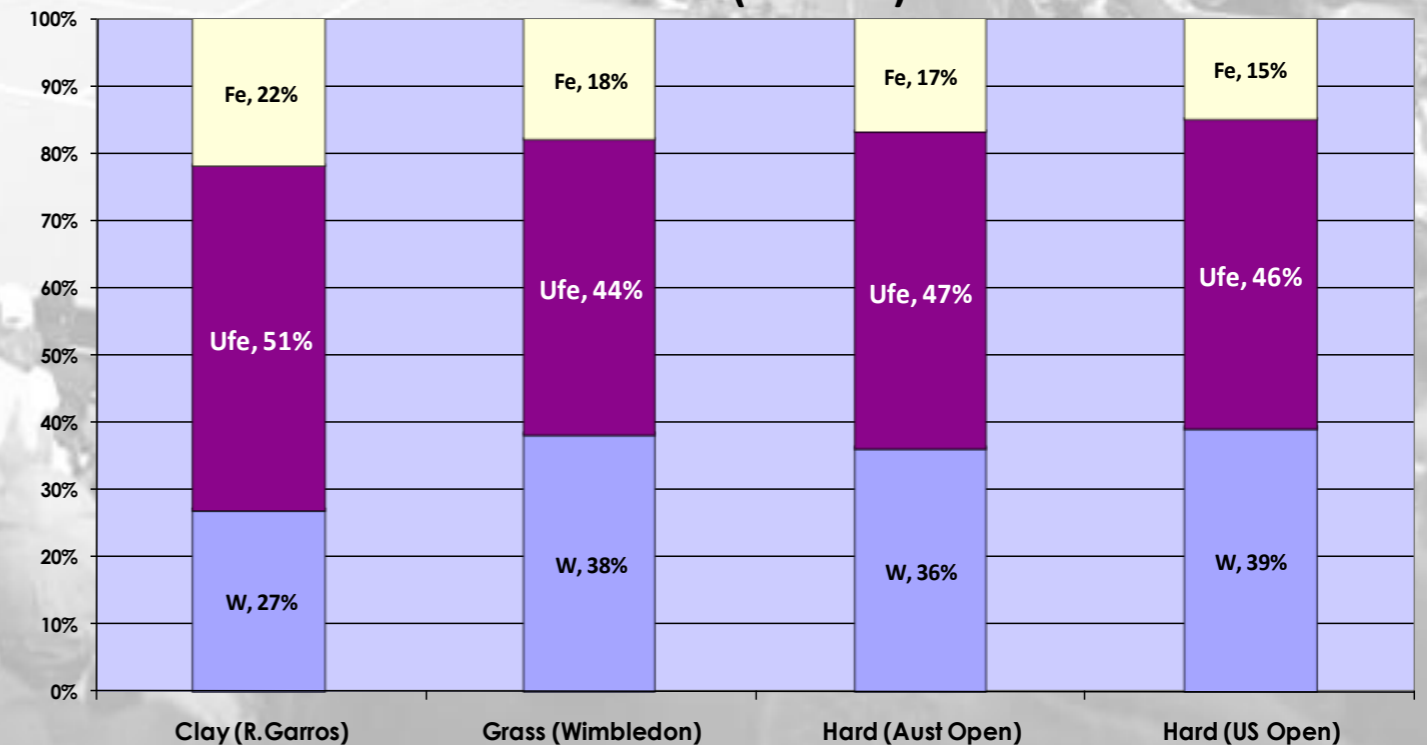


Figure 2.4

### Discussion

- **Figures 1.1 – 1.4** 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 no significant difference in point outcome type for Hard Court (Australian Open and US Open). Grass Court forced errors were 15% higher than Clay Court. This was offset by 13% more winners on Clay compared to Grass Court. There is no significant difference in the number of unforced errors committed across all surfaces. As surface speed increased, forced errors increased and winners decreased on all surfaces.
- **Rule 2:** Point outcome type for Hard Court (Australian Open and US Open) illustrates no significant difference (Figure 2.2). Clay Court unforced errors were 7% higher than Grass Court and offset by 14% more winners on Grass compared with Clay Court. Unforced errors were the highest point outcome type on Hard Court (12% more) and Clay (5% more) than Grass Court. The most number of winners were hit on Grass Court. As surface speed slowed, forced errors increased.
- **Rule 3:** Figure 2.3 shows no significant variation in point outcome type for Hard Court (Australian Open and US Open) or forced error outcome across all surfaces. As surface speed increased, winners increased at the expense of unforced errors across all surfaces.
- **Rule 4:** Point outcome type for Hard Court (Australian Open and US Open) varied illustrated no significant difference (Figure 2.4). Clay Court produced the most forced errors and least winners. Unforced errors were the highest point outcome type for all surfaces.
- **Table 1.2:** Demonstrates there was no significant difference between the individual surface point outcomes on the ATP Tour at Grand Slam Events.

### Further Discussion

- **Rule 1:** Previous research shows the ratio of X : DTL 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. We can also see from Table 1.2 that Rule 1 and Rule 2 combine to represent 50% of total point outcomes irrespective of surface. Also, Rule 1 represents the second biggest percentage of point outcomes.
- **Rule 2:** This rule demonstrates both positive court and shot geometry working for the player. As surface speed increased the number of forced errors decreased because positive court geometry was working with the surface speed to enhance the effectiveness of the 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 12.5% of total point outcomes.
- **Rule 4:** As surface speed decreased more forced errors are made as players are reaching the ball. Here court speed is more of a factor than negative court geometry. This is illustrated by an 11% difference in the number of winners hit on Grass over Clay Court; and on average, only 1% less forced errors committed compared to Rule 2. Hence, if the influence of negative court geometry was greater than surface speed, more forced errors would have occurred.

### What – Where – Why – When?

The four W's is a simple formula that helps put in context the 4 Shot Combinations™ in Tennis.

**What to hit? (Rule 1):** Cross-court forms the foundation from which all shot combinations emanate. It is supported by both positive court and shot geometry. Remember, the 2.9:1 ratio!

**Where to hit Winners? (Rule 2):** By focusing on hitting Rule 2 winners, a player has the open court to hit into in addition to having positive court and positive shot geometry working for them. It does not get any better than that!!

**Why to hit? (Rule 3):** It's tactical. Use it for specific purposes as you have negative court geometry working against you. So send a strong message by using it to exploit an obvious weakness in an opponent's game. Remember you will leave the cross-court, open-court option for them to hit.

**When to hit? (Rule 4):** The right shot at the right time is more important than how often you hit it. Rule 4 is the most important shot in tennis, so you have use it. Make sure you think forced error over winner because you are facing negative court geometry.

### 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.

### Glossary

- **Point Outcome:** The final two shots of a point as classified by one of the 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.