



WORKING WITH STATISTICS



If you were asked who won a game of footy, but you don't know the final score, then a clever answer would be:

“The team that kicked the most goals won that game.”

However, this isn't always true.

In a real season of Australian Rules football where over 200 games were played, there were 13 matches where the team who kicked the most goals **did not win the game!** This is because there are more ways to score points than just kicking goals. The 6 points awarded for 1 goal could also be produced by 6 behinds, worth 1 point each. We can summarise the entire season's wins, losses and draws based on the difference in goals kicked in the following table:

Difference in Goals per Game	Total Games	
	Won	Lost/Draw
Teams that kicked more goals than their opposition	194	13

However, by using statistics we can make predictions about match results without knowing the final score. For example, you could say:

“Any team that kicked 2 or more goals than their opposition always won that game.”

Not every match will have a difference of 2 or more goals, but for the games that do, we will know who won it!

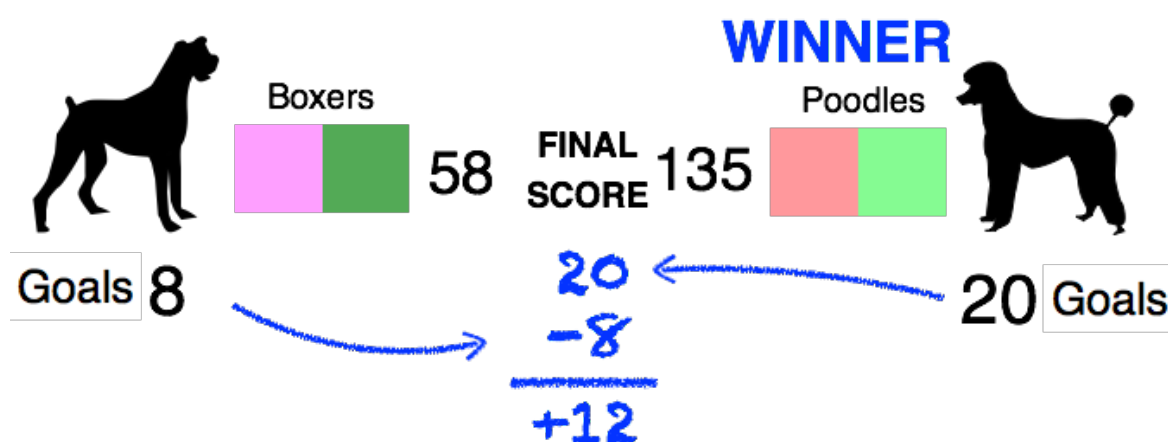


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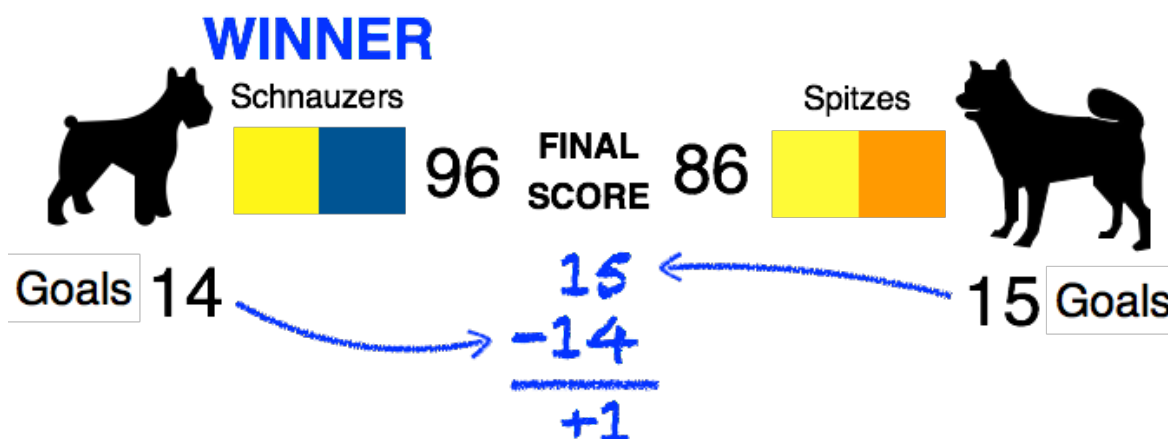


To see how this works, let's look at two matches. We are interested in 3 questions:

1. Which team kicked more goals?
2. How many more goals did they kick?
3. Did they win or lose?



In a match between the Poodles and the Boxers, the Poodles kicked 12 more goals than the Boxers and won the game. This shows that the team that kicked 2 or more goals than their opposition won the game.



However, in a match between the Spitzes and the Schnauzers, the Spitzes lost the game despite having 1 more goal than the Boxers. Since the goal difference was less than 2 goals, we cannot say for sure which team won based on just goal difference. However, this still shows our rule: that a team who kicks 2 or more goals over their opposition always wins the game.



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These two matches were the first and last in Round 1 of the competition. We can look at other matches in this round and see which teams had a bigger goal difference and whether or not they won.

Round	Match	Team that kicked more goals	Goal Difference	Won, Lost or Drawn?
Round 1	Pdl - Bxr	Poodles	+12 more	Won
Round 1	Pgs - Dlm	Pugs	+1 more	Won
Round 1	Ter - Spn	Terriers	+1 more	Won
Round 1	Mst - StB	Mastiffs	+1 more	Won
Round 1	Chi - Bgl	Chihuahuas	+9 more	Won
Round 1	Shp - Dch	Sheepdogs	+4 more	Won
Round 1	Hnd - Pnt	Hounds	+4 more	Won
Round 1	Shp - Crg	Shepherds	+1 more	Won
Round 1	Sch - Spz	Spitzes	+1 more	Lost

We have used red to distinguish teams that lost despite kicking more goals and green for those that won. If we re-sort the games by goal-difference, then the distinction becomes clear: there was only one goal difference that linked to a losing team – the Spitzes with ‘+1 more’.

Round	Match	Team that kicked more goals	Goal Difference	Won, Lost or Drawn?
Round 1	Pgs - Dlm	Pugs	+1 more	Won
Round 1	Ter - Spn	Terriers	+1 more	Won
Round 1	Mst - StB	Mastiffs	+1 more	Won
Round 1	Shp - Crg	Shepherds	+1 more	Won
Round 1	Sch - Spz	Spitzes	+1 more	Lost
Round 1	Shp - Dch	Sheepdogs	+4 more	Won
Round 1	Hnd - Pnt	Hounds	+4 more	Won
Round 1	Chi - Bgl	Chihuahuas	+9 more	Won
Round 1	Pdl - Bxr	Poodles	+12 more	Won

+1 goal up

+4 goals up

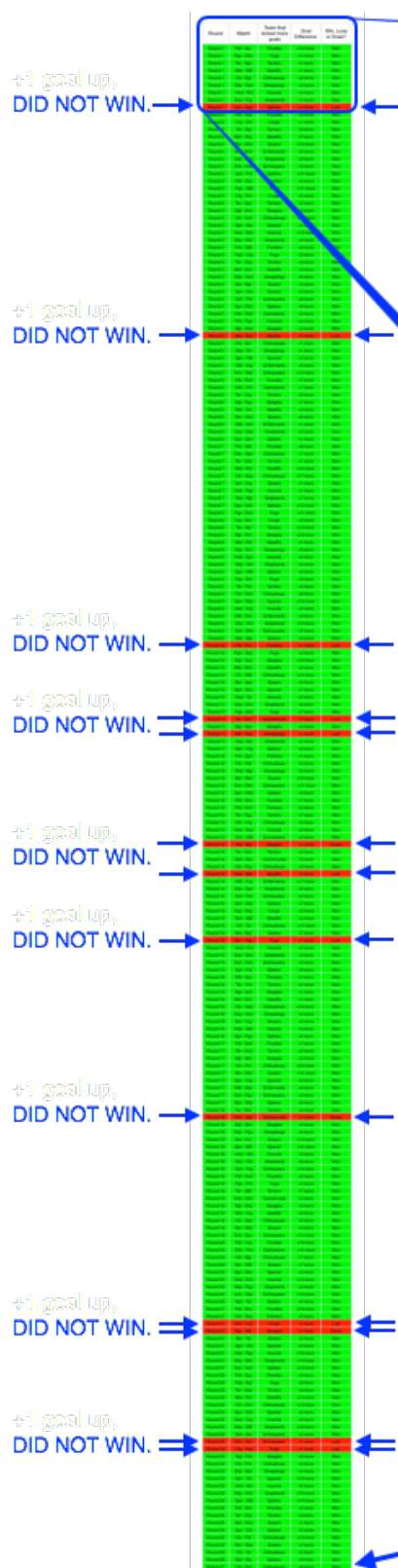
+9 goals up

+12 goals up

← +1 goal up, DID NOT WIN.



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Round 1	Pgs - Dlm	Pugs	+1 more	Won
Round 1	Ter - Spn	Terriers	+1 more	Won
Round 1	Mst - StB	Mastiffs	+1 more	Won
Round 1	Chi - Bgl	Chihuahuas	+9 more	Won
Round 1	Shp - Dch	Sheepdogs	+4 more	Won
Round 1	Hnd - Pnt	Hounds	+4 more	Won
Round 1	Shp - Crg	Shepherds	+1 more	Won
Round 1	Sch - Spz	Spitzes	+1 more	Lost

We now move from Round 1 to the entire season. We list every match - in the order played - and look at the same information as before: the team that kicked the most goals, the goal difference and whether they won or not.

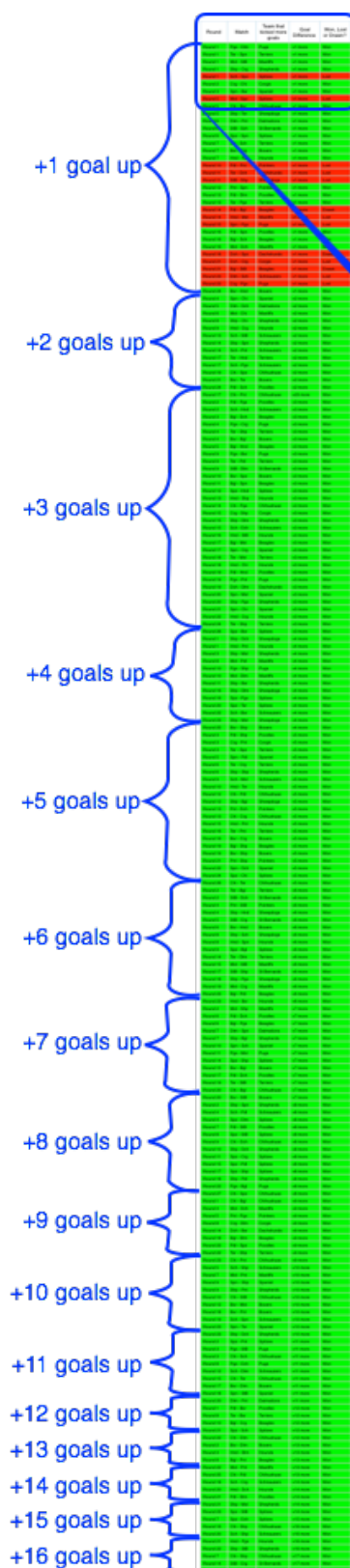
Again, we have used red to distinguish teams that lost despite kicking more goals and green for those that won.

While the text is too small to read, the 'Red' matches/teams are clearly visible. Without having to look directly at each match we can see how few there were of these Red teams and how far they were spread throughout the entire season

The Grand Final is GREEN!



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Round	Match	Team that kicked more goals	Goal Difference	Won, Lost or Drawn?
Round 1	Pgs - Dlm	Pugs	+1 more	Won
Round 1	Ter - Spn	Terriers	+1 more	Won
Round 1	Mst - StB	Mastiffs	+1 more	Won
Round 1	Shp - Crg	Shepherds	+1 more	Won
Round 1	Sch - Spz	Spitzes	+1 more	Lost
Round 2	Crg - Chi	Corgis	+1 more	Won
Round 3	Spn - Bxr	Spaniel	+1 more	Won
Round 5	Mst - Spz	Spitzes	+1 more	Lost
Round 5	Chi - Bxr	Chihuahuas	+1 more	Won

When we re-order the entire season by goal difference from smallest to largest a definite pattern emerges.

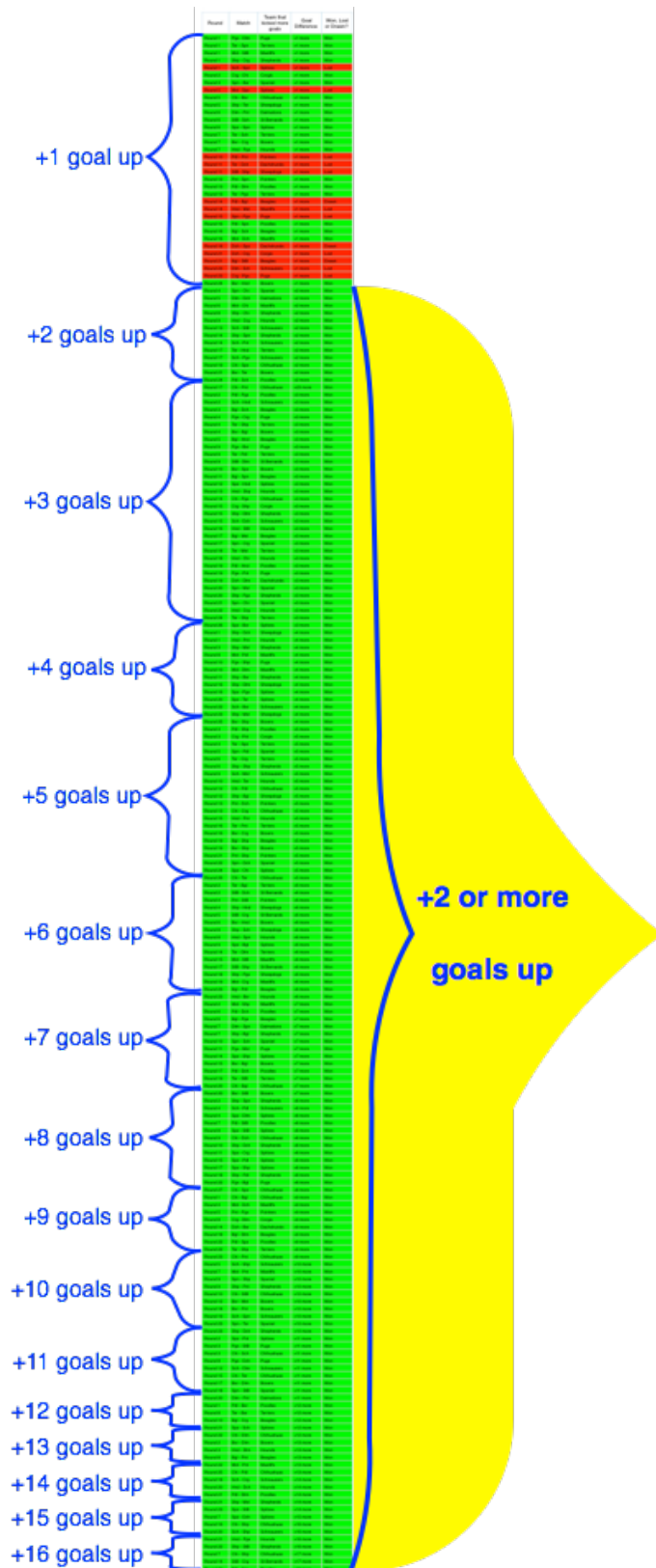
In the close-up window above, the Spitzes are shown to have lost twice despite kicking more goals: one game we have already seen from Round 1 and in a different game from Round 5. Each time the Spitzes had a '+1 more' goal difference.

While there are lots of matches grouped by different goal differences, there is only one goal difference associated with losing - the '+1 more' teams.

We can now summarise this information into a useful statistical rule about the entire season.



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GOALS RULE

In this season, any team that kicked 2 or more goals over their opposition always won that game.

We will not be using the Goals Rule in this activity since it predicts the winner of a match too easily. Instead we have used this method to find other statistical rules that will allow you to work out **Who Won It**.