Howells, Mitchells and Arrow Switches.
ARE THEY FAIR?

A fair or balanced competition is one that reflects how well a pair played on the day and rewards a pair for getting good results with a good score. In the pairs competitions we play, we are compared with other pairs who have played the same hands and get 2 points for each pair we beat and one point for each we draw with, but are the movements we play fair.

When we play a hand of duplicate we have a partner, who is presumably on our side and opponents at the table who are not. However, the scoring system for pairs means that we are in direct competition with every other pair who plays the same hand and in consequence every pair opposing them is our ally. For a completely fair competition all the pairs in the room should be our allies and opponents an equal number of times.

Balance

Count the number of times that each partnership plays the same boards in the same direction as each other partnership, thereby allowing a direct comparison of the scores obtained. The movement is said to be completely balanced when these are the same for every pair of partnerships. A movement is better balanced than another if the movement is a fairer test of ability—it is less subject to correlations between the overall performances of different pairs due to their positions within the movement.

Movements

Depending on the number of tables different movements may be chosen so we can;
a) Play against a variety of opponents, say thirteen 2 board or nine 3 board rounds.
b) Play a convenient number of boards in an evening, usually 26 to 28
c) Avoid, with an odd number of pairs, too many boards sat out by playing 2 or 3 board rounds.
d) Produce one winner for competitions.

The movements we play with different advantages and disadvantages are basically

Mitchells, when we stay North South or East West, are simple but give two independent winners.
> For even numbers of tables the movement requires sharing of boards or a skip to prevent players meeting the same boards.
> Suitable for up to 16 tables, but when competitors have not all played the same boards, because the movement is not completed or there is a skip, the competition becomes unbalanced.

Mitchells with an arrow switch, ideally 1/8 of the boards to give one winner.
> Unfortunately the arrow switch (3 of 27 or 4 of 26 & 28 boards) cannot produce equal comparisons between all pairs.

Full Howells where all play all but each pair does not compete equally with all other pairs.
> Only suitable for 3, 4, 5 & 7 tables if 25 to 28 boards are to be played..
> The seven-table Howell is often praised as an ideal game because all pairs meet and pairs play every board. However it is unbalanced as pairs have played different hands (hands , not boards) and are compared with the other pairs an unequal number of times (5, 6, or 7 times).

3/4 **Howells** are the most unbalanced of movements but often the best for allowing a, b, c &d above.
> Commonly used for 6, and 8 to 12 tables
> The bad balance of comparisons arises because pairs compare with the other pairs a vastly different number of times.

Arrow switching.

In a standard Mitchell movement the balance betwen allies and enemies is not quite right - more matchpoints are at stake against those who sit the same way as we do than against the opposing line. Arrow-switching redresses this balance. Theoretically it should apply to around 1/8 of the boards but in practice we do not fiddle around too much - it is normal to arrowswitch once in 7, 8, 9, 10 or 11 rounds and twice in longer movements

For an analysis by John Probst of London as to why just over 1/8 of the boards should be arrow switched for a one winner movement see http://www.blakjak.demon.co.uk/why_1in8.htm .

In general terms, less than 1 switch in 8 favours the pairs sitting in the weakest direction and more than 1 switch in 8 favours the pairs sitting in the strongest direction.

Probst's Rule for Seating Strategy with imperfect arrow switching is:

If more than one eighth of the rounds are switched, sit half the number of tables away from the strongest pair in the room in the same line as them. It's worth up to 2%

Failing which, sit as close as possible to the weakest pair, making sure you switch the same boards as they do. That's worth up to 2%

Combine both if you can.

What about Sims Pairs.

You are then only playing a tiny fraction of the competitors and once comparisons start to be made with other clubs changes in the scores occur. The only direct opponents you have are those you play each hand against. With a very large number of players overall, the average strength and number of your indirect opponents and allies should be approximately equal. While a different movement or an arrow switch may have changed your score it will not usually increase the fairness or balance of the competition. Thus arrow switching is not relevant to Sims Pairs.

However if there is an overall tendency for stronger pairs to sit North South in Mitchell movements, you should sit East West so as to have stronger allies and weaker indirect opponents. The other way you may be at an advantage or disadvantage is if the opponents you meet in the club are strong or weak. Thus in a club if all the strong players sit North South they will have weak opponents and their percentages will tend to rise when rescored across the whole field. Equally the East West pairs with stronger opponents will find their percentages fall.

Conclusion

The analysis given on the next two pages shows that of common movements only a **completed two winner Mitchell** gives completely fair placings, but the percentages scored in each direction are not comparable. Missing a few sets of boards is not a large contributor to unfairness, unless the number missed is excessive. In general competing pairs should share in the play of at least 80 percent of the boards if the game is to be considered a fair contest. A Mitchell movement for 16 tables, 32 boards in play, meets this criterion when 26 boards are played. With more tables it is fairer if the movement is split, but this would require duplication of boards.

Does it matter

Analysis shows that most of the movements we play are not strictly fair and that the final results have an element of luck. But that is bridge. **Enjoy the game**.

To illustrate one of the problems with various movements the percentages and positions have been calculated for 5 tables with 9 equally good pairs and one novice. The novice always makes a mistake and gets a bottom while at all other tables the par contract is bid and made. On each hand the pair playing the novice will beat the 4 other pairs and score 8. The other 4 pairs playing in the same direction will draw with each other scoring 3. The novice will score zero. The other 4 pairs playing in that direction will have a win and 3 draws for 5 MP

Mitchell movement. 5 boards per round 25 boards played   Pair 10 is the novice

Board 1-5			Board 6-10			Board 11-15			Board 16-20			Board 21-25		
NS	EW	MP	NS	EW	MP	NS	EW	MP	NS	EW	MP	NS	EW	MP
1	6	3 5	2	7	3 5	3	8	3 5	4	9	3 5	5	10	8 0
5	9	3 5	1	10	8 0	2	6	3 5	3	7	3 5	4	8	3 5
4	7	3 5	5	8	3 5	1	9	3 5	2	10	8 0	3	6	3 5
3	10	8 0	4	6	3 5	5	7	3 5	1	8	3 5	2	9	3 5
2	8	3 5	3	9	3 5	4	10	8 0	5	6	3 5	1	7	3 5

Scores for each pair (Total MP as above X 5 for boards per round).-

Pair	NS 1	NS 2	NS 3	NS 4	NS 5		EW 6	EW 7	EW 8	EW 9	EW 10
Score/200	100	100	100	100	100		130	130	130	130	0
Percentage	50	50	50	50	50		62.5	62.5	62.5	62.5	0
Position	1=NS	1=NS	1=NS	1=NS	1=NS		1=EW	1=EW	1=EW	1= EW	5EW

This gives the expected result, the good pairs in each direction coming first equal and the poor pair coming last. But look at the percentages for the win. NS all score 50% and EW score 62.5%. This shows that you will get a higher percentage score if you play in the line with the weakest pair.

Mitchells are fair only if NS & EW are two separate competitions and if they are completed without skipping a pair. For even numbers of tables this involves sharing rather than skipping

The same **Mitchell with an Arrow Switch of 3 boards** to give a single winner.   Pair 10 is the novice

Board 1-5			Board 6-10			Board 11-15			Board 16-20			Board 21-25			
NS	EW	MP	NS	EW	MP	NS	EW	MP	NS	EW	MP	NS	EW	MP	
1	6	3 5	2	7	3 5	3	8	3 5	4	9	3 5	5	10	8 0	5
5	9	3 5	1	10	8 0	2	6	3 5	3	7	3 5	4	8	3 5	5
4	7	3 5	5	8	3 5	1	9	3 5	2	10	8 0	3	6	3 5	5
3	10	8 0	4	6	3 5	5	7	3 5	1	8	3 5	2	9	3 5	5
2	8	3 5	3	9	3 5	4	10	8 0	5	6	3 5	1	7	3 5	2
8	2	3 5	9	3	3 5	10	4	0 8	6	5	3 5	7	1	3 5	3 AS

Pair		1	2	3	4	5	6	7	8	9	10
Score/200		112	112	112	100	112	113	113	113	113	0
Percentage		56	56	56	50	56	56.5	56.5	56.5	56.5	0
Position		5=	5=	5=	9	5=	1=	1=	1=	1=	10

This shows that although the percentages are closer the movement is unfair. It penalises heavily the pair who arrow switch against the weak pair! With an arrow switch below 1/8 boards the pairs in line with the weak pair still gain.

The same **Mitchell again but with too many arrow switches.(5/25)**   Pair 10 is the novice

Board 1-5			Board 6-10			Board 11-15			Board 16-20			Board 21-25			
NS	EW	MP	NS	EW	MP	NS	EW	MP	NS	EW	MP	NS	EW	MP	
1	6	3 5	2	7	3 5	3	8	3 5	4	9	3 5	5	10	8 0	
5	9	3 5	1	10	8 0	2	6	3 5	3	7	3 5	4	8	3 5	
4	7	3 5	5	8	3 5	1	9	3 5	2	10	8 0	3	6	3 5	
3	10	8 0	4	6	3 5	5	7	3 5	1	8	3 5	2	9	3 5	
8	2	3 5	9	3	3 5	10	4	0 8	6	5	3 5	7	1	3 5	Arrow S

Scores for each pair -

Pair		1	2	3	4	5	6	7	8	9	10
Score/200		120	120	120	100	120	105	105	105	105	0
Percentage		60	60	60	50	60	52.5	52.5	52.5	52.5	0
Position		1=	1=	1=	9	1=	5=	5=	5=	5=	10

This is even more unfair. But with an arrow switch above 1/8 boards now the opposite pairs win. **Mathematics shows that for best balance 1/8 of the boards should be arrow switched**. Usually the compromise is one round of three or four boards or two rounds of two boards in a normal evenings bridge of 26 to 30 boards.

A full Howell. 3 boards per round 27 boards played in 9 rounds .   Pair 1 is the novice

There are many movements but all have one sitting pair. If the weak pair moves.

Board 1-3				Board 4-6				Board 7-9				Board 10-12				Board 13-15		
NS	EW	MP		NS	EW	MP		NS	EW	MP		NS	EW	MP		NS	EW	MP
2	4	3 5		3	5	3 5		4	6	3 5		1	9	0 8		2	1	8 0
3	9	3 5		4	1	8 0		5	2	3 5		5	7	5 3		6	8	3 5
5	1	8 0		6	2	3 5		7	3	3 5		6	3	5 3		7	4	3 5
7	6	3 5		8	7	3 5		9	8	3 5		8	4	5 3		9	5	3 5
10	8	3 5		10	9	3 5		10	1	8 0		10	2	5 3		10	3	3 5

Board 16-18				Board 19-21				Board 22-24				Board 25-27		
NS	EW	MP		NS	EW	MP		NS	EW	MP		NS	EW	MP
1	6	0 8		2	7	3 5		1	7	0 8		1	3	0 8
3	2	5 3		4	3	3 5		3	8	5 3		2	8	5 3
7	9	5 3		8	1	8 0		5	4	5 3		4	9	5 3
8	5	5 3		9	6	3 5		9	2	5 3		6	5	5 3
10	4	5 3		10	5	3 5		10	6	5 3		10	7	5 3

Scores for each pair -

Pair	1	2	3	4	5	6	7	8	9	10
Score/216	0	114	126	114	126	126	114	126	114	120
Percentage	0	52.8	58.3	52.8	58.3	58.3	52.8	58.3	52.8	55.6
Position	10	6=	1=	6=	1=	1=	6=	1=	6=	5

This movement gives a 5.5% advantage to some pairs. A Full Howell is only fair if all the moving pairs are of equal ability.

A 3/4 Howell.   3 boards per round 24 boards in 8 rounds   Pair 10 is the novice

In a **3/4** Howell all pairs do not play each other and there may be several sitting pairs. There are many possible movements but none can be perfectly balanced.

Board 1-3				Board 4-6				Board 7-9				Board 10-12				Board 13-15		
NS	EW	MP		NS	EW	MP		NS	EW	MP		NS	EW	MP		NS	EW	MP
1	9	3 5		1	10	8 0		1	3	5 3		1	4	3 5		1	5	3 5
2	3	3 5		2	4	3 5		2	5	5 3		2	6	3 5		2	7	3 5
4	7	3 5		5	8	3 5		6	9	5 3		3	5	3 5		4	6	3 5
7	6	3 5		6	7	3 5		7	8	5 3		7	10	8 0		8	3	3 5
8	10	8 0		9	3	3 5		10	4	0 8		8	9	3 5		9	10	8 0

Board 16-18				Board 19-21				Board 22-24		
NS	EW	MP		NS	EW	MP		NS	EW	MP
1	6	5 3		1	7	5 3		1	8	3 5
2	8	5 3		2	9	5 3		2	10	8 0
5	7	5 3		3	4	5 3		3	6	3 5
9	4	5 3		6	8	5 3		4	5	3 5
10	3	0 8		10	5	0 8		7	9	3 5

Scores for each pair -

Pair	1	2	3	4	5	6	7	8	9	10
Score/192	105	105	111	99	111	108	111	99	111	0
Percentage	54.7	54.7	57.8	51.6	57.8	56.3	57.8	51.6	57.8	0
Position	6=	6=	1=	8=	1=	5	1=	8=	1=	10

So, this movement gives a 5.2% advantage to some pairs and positions which do not match performance.

Conclusion.

The reason that these errors show up is that the pairs that do equally well in the strong line get 3 points while the pairs in line with the weak players get 5 points. As such we are not comparing like with like.

This idea was first published in Hallén, Hanner and Jannersten et al 'Movements - The fair approach'