Unraveling the Mystery of the *RELATIVE PLACEMENT SCORING SYSTEM*

Of the myriad of issues involved in dancing, many are approached subjectively and can be debated endlessly. One issue that is quite often misunderstood, is actually objectively defined – the *Relative Placement Scoring System (RPSS).* This is an attempt to dissect the concepts of the Relative Placement Scoring System and de-mystify this process, so that, through education, dancers can understand this scoring system and its application and value to dance competitions. While not necessarily easy to understand, it can be broken down, hopefully, clearly and concisely. This comprehensive explanation *is* lengthy; but does address all the scenarios that can arise.

Before discussing the RPSS, it is important to understand other scoring concepts previously used and their pitfalls. First of all, it is important to note that all of this discussion is based on the assumption that the contest has the judges assigning each couple a numerical "raw score" of the performances, with '10.0' being the highest possible score.

Some History:

The most common system previously used was simply to convert the judge's raw scores into an *average score* (total the judge's raw scores and divide by the number of judges); and then rank the average scores from highest to lowest to determine the winners. The inherent problem with this system was the inequality of a given judge's score relative to other judges, and its effect on the final outcome. A judge whose highest score is '9.9' is going to have *their* first place couple be more heavily weighted over the *other* judges' first place couples if the other judges' highest scores were, say, '9.1' to '9.3'. Also, if a judge has used a relatively small range of scores, the smaller incremental differences between scores will not impact the average as much as a judge whose scores have a large margin between scores. For instance, if a judge has (3) scores that are '8.8', 9.2', '9.0', the larger gap in values will affect the final average more than a judge who assigned those same three couples '9.10', '9.18', '9.15'. Finally, a judge could overly bias the results if their top three scores were, '9.9', '9.2', '9.1' and the next judge's top three scores were '9.3', '9.2', '9.0', as their very high '9.9' makes *their* 1st place 'higher' than the other judges' 1st place. Of course, the results could also be biased towards an overly low score and anywhere in the middle. Since judges cannot valuate the performances equally, with a similar range of scores, the mathematics of the average score system was problematic.

Averaging 'weighted' (ranked scores) was equally problematic, as any one judge's out-of-line score (i.e. giving an otherwise highly scored couple a very low score) would still skew the results. Running any number of raw and average scores exercises quickly proves these points and I won't elaborate further.

Other attempts at eliminating bias included removing high and low scores (trying to work with 'the middle ground'), or randomly eliminating one judge's scores in each contest (thus, if there was bias or unsound scores, there was a potential for such scores to not even be used). Without lengthy elaboration, these methods *still* did not solve all of the potential problems. And, since the more judges and scores that are used, the more credible results that will result; it is somewhat ludicrous to hire judges and then not utilize all of that knowledge and effort.

Relative Placement Concepts:

The first concept utilized in the *Relative Placement Scoring System (RPSS)* is the idea of EQUALITY. Judges' raw scores are converted to a ranking (each couple's placement relative to the number of contestants). The judge's highest score is '1', their next highest score is '2' and so on. Each judge's highest score is '1', whether that highest score is a '9.8' or '8.8'; and each judge's first place couple is equal to any other judge's first place couple. Also, the conversion of the raw scores to the ranking (ordinal) creates an "equal" spacing from 1st to 2nd to 3rd (versus a raw score of '9.5', '9.2', '9.1). In other words, 'close only counts in horseshoes' and 2nd is 2nd whether by "a lot" or "just a little" (just as you win a race whether by 1/20 of a second or 3 seconds or you win a ball game by 1 point or 9 points, etc). Of course, there *is* a 1st in *this* contest, whether or not it would not be 1st with another set of contestants or wasn't the same as that couple's previous 1st place performance.

The second concept utilized in Relative Placement scoring is the concept of UNIQUENESS. Each couple is assigned a single score, unique to them. A judge *cannot* assign the same score to multiple couples; there are no ties. Each judge must have a 1st place, a 2nd place and so on. This process of 'splitting hairs' to absolutely place 'equal' couples one over another is what often makes a judge's job almost impossible!

The third concept, quite important, and most commonly misunderstood, is the concept of MAJORITY. Decisions are made once the *majority* of judges agree on a couple's placement. Like most voting situations, once 50+% of the judges agree, a decision is derived. Once a decision is made (a couple is placed), the process continues. Since an even number divides to exactly 50%, the concept of majority (50% +) works best with an odd number of judges. Seven judges is the most common number of judges (i.e. it requires four to reach a majority); nine is preferable (but usually limited by events' financial concerns); five is allowable (but since three is a majority, more ties occur more often). Naturally, the higher the number of judges, the more it takes to reach a majority, and thus, the more credible results; and the less impact (good or bad) any individual judge has on the final outcome.

From here, it is much easier to explain this concept, and the methods of handling ties, by looking at an actual example and the steps / thought processes that are involved, whether scoring by hand, or by the computer. So, let's dig in!

A Sample Contest:

Figure 1 shows a hypothetical contest of 12 couples, with 7 judges and a Chief Judge, containing the raw scores. The 1^{st} step in the *Relative Placement Scoring* process is to verify that each judge did not have any tied scores. *Figure 2* shows the 2^{nd} step in the RPSS, converting each judge's score to its ranking (ordinal). All other functions of the RPSS utilize only the scores' ordinals.

Figure 3 illustrates the 3^{rd} step in the RPSS: counting how many 1^{st}'s each couple had, then how many 1^{st}-2^{nd}'s each couple had, how many 1^{st}-3^{rd}'s, etc.

Figure 4 reflects the concept of *majority.* Until a majority is reached, it doesn't matter what the tally of placements is; nothing is decided until a majority is reached. Remember that in this example, 7 judges required 4 for a majority; therefore, any tabulation of 3 or less "doesn't come into play at that point".

Figure 5 carries the majority concept to its final result: once a majority *is* reached, a couple's placement is determined, and they are out of the equation while the balance of the couples are placed. Also, if *more* than one couple reach a majority at any given point, *each* of those couples' placements must be determined and assigned, *prior* to going on to the next level of tallies. From here, we can analyze how final placements are determined and discuss how ties are broken.

Looking at *Figure 5,* we see that no couple had a majority (4) of the judges think they were 1^{st}; therefore, no couple's placement is determined, yet. Moving on the 1^{st}-2^{nd}'s column of *Figure 5,* we find two couples had four 4 or more judges finding them to be 1^{st} or 2^{nd}. The fourth couple (Order of Dance), Jack & Annie, has five (5) 1^{st}-2^{nd}'s, and the couple that danced ninth, Ricky & Lucy, has four (4) 1^{st}-2^{nd}'s. Thus, Jack & Annie receive *1^{st} Place* in this contest; Ricky & Lucy receive *2^{nd} Place.* These couples are now placed and are no longer a consideration (this is designated in *Figure 5* by the dashes in the remaining cells in their row following their majority tally number). Naturally, if a couple were to have six (6) or even all seven (7) of the judges scores within this ranking, that couple would place before any couples receiving five (5) or four (4) scores within this ranking.

Continuing on (in *Figure 5)*, four (4) 1^{st}-3^{rd}'s were received by the seventh couple, Fred & Ginger. They've received their majority and are awarded *3^{rd} Place.* No couple had a majority (4) of 1^{st}-4^{th}'s and when we look at the 1^{st}-5^{th}'s, we see the twelfth couple, Ward & June, have four (4) and become the *4^{th} Place* couple.

Ties:

Whoa: looking at 1^{st}-6^{th}'s, we see that three (3) couples are tied at four (4) apiece! So, let's discuss ties. Ties are broken by analyzing the QUALITY (for lack of better term) of those scores that produce the tie. Let's start in easy terms: *if* two couples were tied with four (4) 1^{st} -2^{nd}'s, the couple that had three (3) 1^{st}'s and one (1) 2^{nd} received 'better" scores than the couple that had only two (2) 1^{st}'s and two (2) 2^{nd}'s. This can be defined mathematically by adding those ordinals (rankings): (1+1+1+2 = *5*) versus (1+1+2+2 = *6*). Since the *lower* the ranking ordinal is a *higher* (better) score (1 is lower than 2, 1^{st} is better than 2^{nd}), then the lower *sum* of the ordinals comprising the tie is the higher (better) placement (in this case, the lower sum of 5 is better than 6). Remember, this process is *only* the sum of the ordinals that form the tying *majority*. The other judges' scores for the couples who are tied do not come into the equation.

In returning to our hypothetical contest, in *Figure 5,* the third, fifth and tenth couples each had four (4) 1^{st}-6^{th}'s. We return to *Figure 2* and sum the four (ordinal) scores for each couple that are 6^{th} or better. The sums at this tie-breaking stage *(Figure 6)* are: Third couple: (4+6+3+5 = *18*); Fifth couple: (6+6+4+2 = *18*); Tenth couple: (5+6+4+6 = *21*). Of this three-way tie, the third and fifth couple have lower sums, and therefore will place better, than the tenth couple. However, the third and fifth couples are still tied at this point, so we go to the second round of tie-breaking.

When couples are still tied after summing the ordinals of the tying majority, we look at the next placement level. In our example, since the third and fifth couple each have four (4) 1^{st}-6^{th}'s (and the sum of those ordinals is 18 for both), we move on (back to *Figure 3)* and analyze the 1^{st}-7^{th}*'s* for these *two* tying couples. The third couple has two (2) 7^{th}'s (for a total of six (6) 1^{st}-7^{th}'s) and the fifth couple only has one (1) 7^{th} (for a total of five (5) 1^{st}-7^{th}'s). Therefore, the tie is broken and the third couple places before the fifth couple. Now we can return to *Figure 5* and, at the 1^{st}-6^{th}'s column, proceed to determine the final placement of the three (3) couples tied at that point: the third couple, George & Gracie, receive this contest's *5^{th} Place* (their four 1^{st}-6^{th}'s sum to 18, they have six 1^{st}-7^{th}'s); the fifth couple, Rhett & Scarlett, are *6^{th} Place* (their four 1^{st}-6^{th}'s sum to 18, they have only five 1^{st}-7^{th}'s); and the tenth couple, Ken & Barbie, are the next couple, *7^{th} Place* (the four 1^{st}-6^{th}'s summed to 21).

Had the two couples each had the same amount of 1^{st}-7^{th}'s, we would've looked at their number of 8^{th}'s; if still tied (or if both couples had no 8^{th}'s), the number of 9^{th}'s, etc. If two couples tied all the way out to the end, *then* the tie is broken by evaluating the scores of *only* those two couples, comparing them only between each other, to see which couple placed higher over the other couple by a majority of the judges.

The following example (outside of the hypothetical contest) illustrates this concept:

	J1	J2	J3	J4	J5	J6	J7
Couple 'A' Scores:	**1**	2	**1**	2	3	2	**1**
Couple 'B' Scores:	2	**1**	3	**1**	**2**	**1**	2

The couples are completely tied, as each has three (3) 1^{st}, three (3) 2^{nd}, and one (1) 3^{rd} place scores (note that Judge #3 gave another couple 2^{nd} Place and Judge #5 awarded 1^{st} to neither of these couples). Couple 'A' was placed higher than Couple 'B' by three (3) judges (Judges #1, #3 & #7)(in bold). Couple 'B' received higher scores than Couple 'A' by four (4) judges

(Judges #2, #4, #5 & #6)(in bold). Therefore, between these two couples, Couple 'B' places higher than Couple 'A' in the final results, as a *majority* of the judges scored Couple 'B' over Couple 'A'.

With this technique, the judging panel still resolves all ties; and a Chief Judge's score is *only* used in the rare situation of replacing another's judge's set of scores, should that judge have gotten so confused so as to have incomplete or unusable scores, or that judge was unavailable to correct a missing or duplicate score, or the judge became ill and left the contest, etc. Sometimes Chief Judge's scores are used as one of 5, 7, or 9 judging slots (particularly at smaller events). However, Chief Judges prefer to rely on their judging panel, as they may be distracted with other contest / event issues, or may be involved with, or watching for, contest irregularities, etc. that may prevent them having their full attention on each performance at hand.

Please remember that had the sum of George & Gracie and Rhett & Scarlett's 1st-6th places *not* tied at 18 each, the fact that George & Gracie had two (2) 7th's and Rhett & Scarlett had only one (1) 7th, would *not* have been a factor. Also note that should a double two-way tie, say two couples have a majority of five (5) and two couples have a majority of four (4) at a given point, the two couples who have the five (5) would have their tie broken and they would each place prior to breaking the tie of the two couples with the majority of four (4).

Returning to *Figure 5,* to complete our hypothetical contest: at the 1st-7th's column, the second couple, Marc & Cleo, have a majority and become the *8th Place* couple. The eighth couple, Barney & Betty, have six 1st-9th's and are *9th Place.* The first and sixth couples tie at four 1st-10th's each. Per *Figure 5,* the sixth couple's sum of their 1st-10th's is 27 (3+10+4+10 = *27*) and Rocky & Adrian become *10th Place;* over the first couple, Romie & Julie, whose sum of 1st-10th's is 30 (5+6+9+10 = *30*), and they therefore become *11th Place.* Finally, the eleventh couple, Ike & Mamie, has a consensus of the judges assigning them 1st-11th's and they are last, *12th Place.*

Figure 7 shows the final results, listed in order of placement. This is the typical results sheet that you would see at an event. We will now discuss some additional issues and questions that typically arise when discussing RPSS.

Common Questions:

This hypothetical contest illustrates a relatively common occurrence: the second place couple, Ricky & Lucy, have three (3) 1st's, more than anyone else; and yet, they placed second, behind a couple with only two (2) 1st's. Remember, RPSS does *not* give the couple with 'the most' 1st's first place, but first place honors are received by whichever couple 'first' gets a majority of judges scoring them higher than anyone else; and 1st Place is not necessarily decided at the 'counting 1st's' stage, and 2nd Place is not necessarily decided after counting 1st-2nd's, etc. In this case, Ricky & Lucy *did* have three (3) 1st's, *but* the *majority* (4) judges *didn't* have them in first! Since they did not (nor anyone else) receive a majority of 1st's, the RPSS continued on to counting the number of 1st-2nd's. In doing so, Jack & Annie's five (5) 1st-2nd's placed them higher than Ricky & Lucy's four (4) 1st-2nd's.

Since this concept is *so* misunderstood, let's drill this point home with another *extreme* example (outside of the hypothetical contest): a Couple 'A' with the scores of 2-2-2-2-12-12-12 (i.e. no 1st's at all) would receive 1st Place over a Couple 'B' with scores of 1-1-1-3-3-3-3. Neither couple has a majority (4) of 1st's, and when counting 1st-2nd's, Couple 'A' has four (4), while Couple 'B' still *only* has three (3). Couple 'B' doesn't receive a majority until counting 1st-3rd's (of course, at that point, it's a grand slam majority with all seven (7) judges!). Couple 'A' has a majority of judges scoring them 2nd or better, and they place over Couple 'B' which only has a majority of judges scoring them 3rd or better. Well, you ask, what about Couple 'A's three (minority) last place scores? They are simply "outvoted" by a majority of the judges and the 50+% vote carries the decision.

Here's one final, *extreme* illustration of why this concept works over any type of totaling or averaging of *all* the judges' scores. Even in a W*eighted Scores* system (where, the lower sum or average is best, since 1 (1st), a lower number, is better than 2 (2nd), etc), an out-of-line score can create an incorrect result. Clearly, a couple with six (6) 1st's out of seven (7) judges deserves to be first. Yet, if a Couple 'A' had scores of 1-1-1-1-1-1-12 (sum of 18; 2.57 ave.), they would be second behind a Couple 'B' with scores of 2-3-2-2-2-5-1 (sum of 17; 2.42 ave.). That seventh judge whose out-of-line score of 12th for Couple 'A' actually pushed them into 2nd Place, even with six 1st Place scores! This does not happen in the RPSS.

This hypothetical contest and the illustration in the previous paragraph make good examples to discuss a second common misconception: that the other (minority) judges' scores are not used. It is *not* that these other judges' scores aren't *used* (they *are* used to determine if a majority is reached)*,* it is that the minority scores *"don't matter" once* the majority is reached. Looking at *Figure 6,* the 1st Place Couple, who had five (5) 1st-2nd's, also had a 3rd and a 5th. They *still* would've had 1st place (and five (5) 1st-2nd's) *even if* their other two scores had both been dead last! So, "had" the judge who gave them 5th, been biased or simply been "way out of line with the other judges" and given then a 12th, it *wouldn't* have affected the outcome. This is the overriding beauty of the RPSS.

To make the point that *all* judges *do* matter, you only need to look at the 2nd Place Couple, who had three (3) 1st's. Had one of the *other* judges *also* given them a 1st, they would've won 1st Place, as they then would've had a majority (4) of 1st's. Actually, had this couple received even another 2nd, they also would've won the contest with five (5) 1st-2nd's (with a sum of 7), over Jack & Annie, whose five (5) 1st-2nd's summed to 8! To reiterate: *all* judges' scores *are* used, they *do* count, they *are* important; *but,* once a majority is reached, the minority judges' scores *do not* affect the final outcome of *that* couple. So, having a panel of knowledgeable, credible judges *is* important, but a score that *is* out of line, will be less likely to significantly or negatively affect the final results with the RPSS. Our sample contest also illustrates how the Chief

Judge's scores do not enter into the majority calculations, as the CJ gave Ricky & Lucy a 1st, yet they received *2nd Place.*

Evaluating Results:

Let me share a couple of other comments about analyzing results in the RPSS and analyzing judges' scores. In a *perfect* world, all judges would identify and valuate all elements of dance the same and produce equal scores, with unquestionable results. Obviously, this is not possible, and the goal is to have as consistent scores as possible from a credible panel of judges. Generally, judges hope to have each of their scores within a couple placements of the final outcome. Good judges will *generally score within an acceptable range of the final results, most of the time.* Mistakes or misjudgments can be made, and I often joke that, "In any given contest, one judge will be 'off', and each judge will be 'off' at least once during a given competition event!"

While the hypothetical contest I developed for this example had scores "all over the place," it actually happens relatively frequently. Perhaps all couples *were* relatively equal (good and bad elements) and no one "clearly stood out", so judges' scores really are a function of how they *weighed* all of the elements. A judge may have missed some crucial moments of a performance while making notes; or may have really focused on (and rewarded or penalized) a particular element or aspect of a performance that the other judges valued differently. It doesn't mean that judge isn't credible or knowledgeable, *but* they may have scores that aren't in line with the majority of the judges. (For more comments on understanding judges, I invite you to read my article, *"Judging: The Impossible Job!",* originally published in the July/August 2002 issue of *5678 Swing* magazine.)

Contests with couples judged one at a time (when each judge can focus on each couple) will generally have more consistent scores than when judging multiple couples on the floor (and trying to give separate, distinct, raw scores to each couple!). With multiple couples in a heat, a judge might have seen / been focused on a "good" couple during their worst 10 seconds and on a "poorer" couple's best 10 seconds. If so, their scores will be quite different than some or all of the other judges. Performances that contain any silly or comedic elements are quite often judged at opposite ends of the spectrum ("…they really connected, that took talent…" or "…they just goofed around, they really weren't dancing…").

Finally, remember that the judges are making the hard decisions and "splitting hairs" in assigning, and being able to stand by, their first five or six placements – as those most obviously affect the winners, prizes and prestige of the final results. Therefore, as a contestant, don't over-analyze that a judge gave you 9th, and gave an 8th to a couple you thought did more poorly than you. One Chief Judge wisely advised contestants to look at their general placement (top, middle or bottom third), versus 7th vs. 8th, or 12th vs. 13th! The bottom line is still the same as it's always been: have fun, and don't necessarily compare yourself to other competitors, but concentrate on your own dancing and learn from your own performances!

Callback Scoring:

I'd like to have a brief discussion of the Callback Scoring system. While not part of the RPSS, it is the most commonly used system for scoring preliminary and semi-final rounds, whether as a couple or an individual. Callback Scoring (also known as "Yes/No/Maybe" or "Go/No Go") doesn't require the judges to assign specific and individual scores to the contestants, nor to necessarily rank one over another. Instead, it simply asks the judges, "Is this contestant one of the top 'xx number' who should progress to the next round?"

The large heats generally utilized in Callback Scoring rounds allow the judges to see all or almost all of the contestants at one time, directly and peripherally. Evaluations are made, whether utilizing raw scores, pluses and minuses, or notes, and then the judge gives a 'yes' to the top 'xx number'. Generally, the judges will be asked to bring back (provide 'yes' votes) a number equal to or slightly more than the number anticipated to progress to the next round and have a couple of alternates. The balance of the contestants would obviously receive 'no' scores. The scores are tallied and ranked and the cutoff is determined.

A typical contest calling back to the finals might be consist of 25 contestants, with the judges asked to provide 10 'yes' votes and 2 'alternate (maybe)' votes. As a contestant analyzing the scores in that contest, a 'yes' from any given judge means they felt you were in the top 10 (regardless of whether you were their 1st choice or you got their last 'yes' spot!). If you received all 'no' votes, it doesn't mean you were in last place, it simply means that none of the judges felt you were in the top 12 (a 'yes' or 'alternate'). You could've been each judge's 13th choice for all you know! All 'no' votes also does not mean that you are a not a good dancer nor that you aren't worthy to compete in that division; just that no judges found you to be in the top 'xx' of that contest.

In closing, the results of any contest are a reflection of the majority of *this* panel of judges, scoring *this* grouping of contestants, with *these* specific performances, at *this* particular time. A different or additional judge, a different or additional couple, any given couple's different performance (with or without a mistake, or with or without a highlight), and the results would be different. Mathematically, the RPSS produces the fairest results and most effectively reduces the possibility of an individual judge from overly affecting the results.

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HYPOTHETICAL DANCE CONTEST

Number of Couples: **12** ***Number of Judges:*** **7** ***Majority:*** **4**

Order of Dance #	Leader's Name	Follower's Name	Judge #1	Judge #2	Judge #3	Judge #4	Judge #5	Judge #6	Judge #7	Judge #8	Judge #9	Chief Judge
	Contestants		**Raw Scores**									
1	Romie	Julie	8.75	8.00	9.34	7.70	9.10	7.00	8.30			*8.90*
2	Marc	Cleo	8.63	8.60	9.20	8.60	9.15	7.20	8.80			*9.10*
3	George	Gracie	8.85	8.25	9.33	7.90	9.20	7.60	9.00			*8.70*
4	Jack	Annie	9.00	8.38	9.35	9.00	9.60	8.50	9.50			*9.40*
5	Rhett	Scarlet	8.69	8.30	9.31	8.50	9.50	7.24	8.60			*9.00*
6	Rocky	Adrian	8.60	8.10	9.65	7.80	9.30	7.10	8.10			*8.00*
7	Fred	Ginger	9.10	8.35	9.70	8.80	8.70	7.15	9.40			*9.30*
8	Barney	Betty	8.64	8.20	9.25	7.95	9.25	7.25	8.50			*8.60*
9	Ricky	Lucy	8.90	8.50	9.72	8.20	9.40	8.60	9.60			*9.50*
10	Ken	Barbie	8.65	8.32	9.32	8.25	8.60	7.40	8.90			*8.80*
11	Ike	Mamie	8.40	8.23	9.28	7.75	8.65	7.05	7.90			*8.40*
12	Ward	June	8.67	8.15	9.45	8.30	9.12	7.30	9.20			*9.20*

Figure 1: *Raw Scores for 12 Couples by 7 Judges.*

Judge #1	Judge #2	Judge #3	Judge #4	Judge #5	Judge #6	Judge #7	Judge #8	Judge #9	Chief Judge
Ranking (Ordinals)									
5	12	6	12	9	12	10			*7*
10	1	12	3	7	8	7			*5*
4	7	7	9	6	3	5			*9*
2	3	5	1	1	2	2			*2*
6	6	9	4	2	7	8			*6*
11	11	3	10	4	10	11			*12*
1	4	2	2	10	9	3			*3*
9	9	11	8	5	6	9			*10*
3	2	1	7	3	1	1			*1*
8	5	8	6	12	4	6			*8*
12	8	10	11	11	11	12			*11*
7	10	4	5	8	5	4			*4*

Figure 2: *Converting raw scores to their Ranking Ordinal.*

Order of Dance #	Leader's Name	Follower's Name	1st's	1st-2nd's	1st-3rd's	1st-4th's	1st-5th's	1st-6th's	1st-7th's	1st-8th's	1st-9th's	1st-10th's	1st-11th's	1st-12th's
	Contestants		**Count of Placements**											
1	Romie	Julie					1	2	2	2	3	4	4	7
2	Marc	Cleo	1	1	2	2	2	2	4	5	5	6	6	7
3	George	Gracie			1	2	3	4	6	6	7	7	7	7
4	Jack	Annie	2	5	6	6	7	7	7	7	7	7	7	7
5	Rhett	Scarlet		1	1	2	2	4	5	6	7	7	7	7
6	Rocky	Adrian			1	2	2	2	2	2	2	4	7	7
7	Fred	Ginger	1	3	4	5	5	5	5	5	6	7	7	7
8	Barney	Betty					1	2	2	3	6	6	7	7
9	Ricky	Lucy	3	4	6	6	6	6	7	7	7	7	7	7
10	Ken	Barbie				1	2	4	4	6	6	6	6	7
11	Ike	Mamie								1	1	2	5	7
12	Ward	June				2	4	4	5	6	6	7	7	7

Figure 3: *Tallying the quantity of placements at each level.*

Maj:1st's	Maj:1st-2nd's	Maj:1st-3rd's	Maj:1st-4th's	Maj:1st-5th's	Maj:1st-6th's	Maj:1st-7ths's	Maj:1st-8th's	Maj:1st-9th's	Maj:1st-10th's	Maj:1st-11th's	Maj:1st-12th's
"Majority +" Only Placement Count											
									4	4	7
						4	5	5	6	6	7
					4	6	6	7	7	7	7
	5	6	6	7	7	7	7	7	7	7	7
					4	5	6	7	7	7	7
									4	7	7
		4	5	5	5	5	5	6	7	7	7
								6	6	7	7
	4	6	6	6	6	7	7	7	7	7	7
					4	4	6	6	6	6	7
										5	7
				4	4	5	6	6	7	7	7

Figure 4: *Displaying the tally only when a majority is reached.*

Order of Dance #	Leader's Name	Follower's Name	Place? 1st-	Place? 1st-2nd	Place? 1st-3rd	Place? 1st-4th	Place? 1st-5th	Place? 1st-6th	Place? 1st-7th	Place? 1st-8th	Place? 1st-9th	Place? 1st-10th	Place? 1st-11th	Place? 1st-12th	Final Placement
#	Contestants		Placement Decided												
1	Romie	Julie										4	-	-	11
2	Marc	Cleo							4	-	-	-	-	-	8
3	George	Julie						4	-	-	-	-	-	-	5
4	Jack	Annie		5	-	-	-	-	-	-	-	-	-	-	1
5	Rhett	Scarlet						4	-	-	-	-	-	-	5
6	Rocky	Adrian										4	-	-	10
7	Fred	Ginger			4	-	-	-	-	-	-	-	-	-	3
8	Barney	Betty									6	-	-	-	9
9	Ricky	Lucy		4	-	-	-	-	-	-	-	-	-	-	2
10	Ken	Barbie						4	-	-	-	-	-	-	7
11	Ward	June											5	-	12
12	Ike	Mamie					4	-	-	-	-	-	-	-	4
Placements Decided:				2	1		1	3	1		1	2	1	=	12

Figure 5: *Displaying the tally only at the point that a placement is determined; and indicating that the couple has been ranked.*

Sum: 1sts	Sum: 1st-2nds	Sum: 1st-3rds	Sum: 1st-4ths	Sum: 1st-5ths	Sum: 1st-6ths	Sum: 1st-7ths	Ties Sum: 1st-8ths	Sum: 1st-9ths	Sum: 1st-10ths	Sum: 1st-11ths	Sum: 1st-12ths
Ties: Sum of Ordinals											
									30	-	
							-	-	-	-	
					18	-	-	-	-	-	
		-	-	-	-	-	-	-	-	-	
					18	-	-	-	-	-	
									27	-	
			-	-	-	-	-	-	-	-	
									-	-	
		-	-	-	-	-	-	-	-	-	
					21	-	-	-	-	-	
					-	-	-	-	-	-	
				-	-	-	-	-	-	-	-

Figure 6: *The first level of tie-breaking (the sum of the ordinals).*

FINAL RESULTS (Order of Placement)

Number of Couples: **12** ***Number of Judges:*** **7** ***Majority:*** **4**

Order of Dance	Leader's Name	Follower's Name	Judge #1	Judge #2	Judge #3	Judge #4	Judge #5	Judge #6	Judge #7	Judge #8	Judge #9	Chief Judge	FINAL RANK (PLACEMENT)	
Contestants			Judges Information											
4	Jack	Annie	2	3	5	1	1	2	2			*2*	**1**	*st*
9	Ricky	Lucy	3	2	1	7	3	1	1			*1*	**2**	*nd*
7	Fred	Ginger	1	4	2	2	10	9	3			*3*	**3**	*rd*
12	Ward	June	7	10	4	5	8	5	4			*4*	**4**	*th*
3	George	Gracie	4	7	7	9	6	3	5			*9*	**5**	*th*
5	Rhett	Scarlet	6	6	9	4	2	7	8			*6*	**6**	*th*
10	Ken	Barbie	8	5	8	6	12	4	6			*8*	**7**	*th*
2	Marc	Cleo	10	1	12	3	7	8	7			*5*	**8**	*th*
8	Barney	Betty	9	9	11	8	5	6	9			*10*	**9**	*th*
6	Rocky	Adrian	11	11	3	10	4	10	11			*12*	**10**	*th*
1	Romie	Julie	5	12	6	12	9	12	10			*7*	**11**	*th*
11	Ike	Mamie	12	8	10	11	11	11	12			*11*	**12**	*th*

Figure 7: *Final results, listed in the Order of Placement.*

RELATIVE PLACEMENT SCORING SYSTEM
Alternate Scores / Scoring Methods Explanations

Our first study of Alternate Scores is to simply compare the results of our hypothetical contest with seven (7) judges to results of that same contest with only five (5) judges. The Figures 8A – 8C illustrate three (3) different results if various combinations of two (2) judges were eliminated from this hypothetical contest. We often joke about "who's right and who's wrong", but these examples clearly illustrate the effect if two judges weren't part of this contest.

Figure 8A:
The results of this contest based on five judges (without Judges #4 & #5) is shown in Figure 8A. When comparing these results (the right-hand-most-column) against the results from the seven judge scenario (as per the left-hand-most- column); the 1^{st} and 2^{nd} Place couples have switched and the 4^{th} – 6^{th} Place couples have switched order, as have the 10^{th} & 11^{th} Place couples.

The primary example shown in this scenario is that if the two judges who had given Jack & Annie 1^{st} Place honors were *not* part of the judging panel, Jack & Annie do not have a majority (3 of 5) until tallying 1^{st}-2^{nd}'s, whereas the three 1^{st} Placements received by Ricky & Lucy give them their majority when tallying 1^{st}'s. Therefore, Ricky & Lucy would place 1^{st} over Jack & Annie.

Figure 8B:
If the judging panel for this hypothetical contest consisted of five (5) judges (without Judges #2 & #3), Jack & Annie still receive 1^{st} Place by having all five (5) judges rank them 1^{st} or 2^{nd} (Judges #2 & #3 had given them their lowest scores -3^{rd} and 5^{th}). Thus, it appears they were undoubtedly 1^{st} Place, as they had *no scores* lower than 2^{nd} Place.

Ricky & Lucy still receive 2^{nd} Place (as they did with seven judges), but they don't receive that placement until tallying 1^{st} - 3^{rd} Placements; not at the tallying 1^{st}-2^{nd} Placements level, as with the seven judge scenario.

Also, the 4^{th} & 5^{th} Place couples (per the right-hand-most-column) have switched order (from the seven judge scenario – the left-hand-most-column). With George & Gracie's two 7^{th} place scores removed (Judges #2 & #3), they receive 4^{th} Place in this example. Their three 1^{st}-5^{th} Placements' ordinals sum to 12, over Ward and June's three (3) 1^{st}-5^{th} Placements, whose ordinals sum to 14.

Figure 8C:
If Judges #6 & #7 had not been part of this judging panel, the new scenario of five judges results (right-hand-most-column) in changes in *almost every* placement from the results of the seven-judge-*RPSS* (left-hand-most-column). However, other than Ward & June, whose placement changed by three places (from 4^{th} to 7^{th} Place), no one else changed more than 2 places.

This scenario most clearly illustrates that a different or larger / smaller panel of judges *will* create different results. However, it is *generally* unlikely that any given couple would change more than two or so places in *whatever* judging panel configuration or size was assembled. This is one of the overriding advantages of the *RPSS*. If a contestant who came in 5^{th} in a contest feels they were unfairly judged by a judge, the contestant can rest assured they still wouldn't have placed 1^{st} or 2^{nd}, even if that judge was not on that panel!

Figure 9:
If this contest was scored on an *Averaged Raw Score* basis, the seven judges' raw scores for each couple would be summed and divided by the number of judges to derive an Average Score. The results, in the right-hand-most-column, have three couples changing final placements from the seven-judges-*RPSS* results (left-hand-most- column).

Due to having seven judges in this hypothetical contest, the Averaged Raw Score scenario doesn't produce a dramatic change in results from the *RPSS.* However, with only five judges, the impact of any given judge's scores is much more apparent. In particular, if that judge's scores are somewhat out of line with the others, or if they used a very tight or very broad range of scores, or if their highest raw scores were much lower than the other judges' highest raw scores, etc., the results are quite different. Do to space limitations, I am *not* showing the following calculations, but: averaging the raw scores of the five judges used in *Fig. 8A's* scenario results in *seven* couples receiving different placements than in the seven-judge-*RPSS* results, including four of the top five! Averaging the raw scores for the five judges used in *Fig. 8C's* scenario also result in *seven* placements changing from the seven-judge-*RPSS* results! Two placements change when averaging the raw scores of the five judges used in *Fig. 8B's* scenario.

Figure 10:
In a *Weighted Scores* method, each couple's ranking ordinals from the seven judges are summed and then divided by the quantity of judges. The result (right-hand-most-column) is five couples changing placements from the seven-judge-*RPSS* results (left-hand-most-column). The most dramatic change is Ward and June, whose 10^{th} Place from Judge #2 drops them to 6^{th} Place, versus their 4^{th} Place result in the *RPSS*.

Again, having seven judges mathematically lowers the impact of any given judge. When looking at the five-judge scenarios (also not shown due to space limitations), the results of the *Fig. 8A* scenario have four couples receiving different places (versus the *RPSS*); *Fig. 8B's* results have *seven* couples changing placements; and the *Fig. 8C* scenario produces a different final placement for *eight* of the twelve couples!

ALTERNATE SCORES / SCORING METHODS

5 Judge Results (Without Judges #4 & #5)

Order of Placement **Couples:** *12* **Judges:** *5* **Majority:** *3*

RANK IF 7 JUDGES	Order of Dance	Leader's Name	Follower's Name	Judge #1	Judge #2	Judge #3	Judge #4	Judge #5	Judge #6	Judge #7	Judge #8	Judge #9	Chief Judge	FINAL RANK (PLACEMENT)
		Contestant Information		Judges Information										
2nd	9	Ricky	Lucy	3	2	1			1	1			1	1 st
1st	4	Jack	Annie	2	3	5			2	2			2	2 nd
3rd	7	Fred	Ginger	1	4	2			9	3			3	3 rd
5th	3	George	Gracie	4	7	7			3	5			9	4 th
4th	12	Ward	June	7	10	4			5	4			4	5 th
7th	10	Ken	Barbie	8	5	8			4	6			8	6 th
6th	5	Rhett	Scarlet	6	6	9			7	8			6	7 th
8th	2	Marc	Cleo	10	1	12			8	7			5	8 th
9th	8	Barney	Betty	9	9	11			6	9			10	9 th
11th	1	Romie	Julie	5	12	6			12	10			7	10 th
10th	6	Rocky	Adrian	11	11	3			10	11			12	11 th
12th	11	Ike	Mamie	12	8	10			11	12			11	12 th

Figure 8A: *Final results, listed in the Order of Placement, if* ***ONLY 5 Judges*** *(Without #4 & #5)*

5 Judge Results (Without Judges #2 & #3)

RANK IF 7 JUDGES	Order of Dance	Leader's Name	Follower's Name	Judge #1	Judge #2	Judge #3	Judge #4	Judge #5	Judge #6	Judge #7	Judge #8	Judge #9	Chief Judge	FINAL RANK (PLACEMENT)
		Contestant Information		Judges Information										
1st	4	Jack	Annie	2			1	1	2	2			2	1 st
2nd	9	Ricky	Lucy	3			7	3	1	1			1	2 nd
3rd	7	Fred	Ginger	1			2	10	9	3			3	3 rd
5th	3	George	Gracie	4			9	6	3	5			9	4 th
4th	12	Ward	June	7			5	8	5	4			4	5 th
6th	5	Rhett	Scarlet	6			4	2	7	8			6	6 th
7th	10	Ken	Barbie	8			6	12	4	6			8	7 th
8th	2	Marc	Cleo	10			3	7	8	7			5	8 th
9th	8	Barney	Betty	9			8	5	6	9			10	9 th
10th	6	Rocky	Adrian	11			10	4	10	11			12	10 th
11th	1	Romie	Julie	5			12	9	12	10			7	11 th
12th	11	Ike	Mamie	12			11	11	11	12			11	12 th

Figure 8B: *Final results, listed in the Order of Placement, if* ***ONLY 5 Judges*** *(Without #2 & #3)*

5 Judge Results (Without Judges #6 & #7)

RANK IF 7 J	Order Danc	Leader's Na	Follower's N	Judge #1	Judge #2	Judge #3	Judge #4	Judge #5	Judge #6	Judge #7	Judge #8	Judge #9	Chief Judg	FINAL RANK (PLACEMEN
		Contestant Information		Judges Information										
1st	4	Jack	Annie	2	3	5	1	1					2	1 st
3rd	7	Fred	Ginger	1	4	2	2	10					3	2 nd
2nd	9	Ricky	Lucy	3	2	1	7	3					1	3 rd
6th	5	Rhett	Scarlet	6	6	9	4	2					6	4 th
5th	3	George	Gracie	4	7	7	9	6					9	5 th
8th	2	Marc	Cleo	10	1	12	3	7					5	6 th
4th	12	Ward	June	7	10	4	5	8					4	7 th
7th	10	Ken	Barbie	8	5	8	6	12					8	8 th
9th	8	Barney	Betty	9	9	11	8	5					10	9 th
11th	1	Romie	Julie	5	12	6	12	9					7	10 th
10th	6	Rocky	Adrian	11	11	3	10	4					12	11 th
12th	11	Ike	Mamie	12	8	10	11	11					11	12 th

Figure 8C: *Final results, listed in the Order of Placement, if* ***ONLY 5 Judges*** *(Without #6 & #7)*

Alt. Method: Averaged Raw Score

Rel. Plct.	Order of Da	Leader's Name	Follower's Name	Judge #1	Judge #2	Judge #3	Judge #4	Judge #5	Judge #6	Judge #7	Judge #8	Judge #9	Average Raw Sc.	Results
Rank	#	Contestants		Raw Scores									Ave.	Rank
1st	4	Jack	Annie	9.00	8.38	9.35	9.00	9.60	8.50	9.50			9.05	1
2nd	9	Ricky	Lucy	8.90	8.50	9.72	8.20	9.40	8.60	9.60			8.99	2
3rd	7	Fred	Ginger	9.10	8.35	9.70	8.80	8.70	7.15	9.40			8.74	3
4th	12	Ward	June	8.67	8.15	9.45	8.30	9.12	7.30	9.20			8.60	4
5th	3	George	Gracie	8.85	8.25	9.33	7.90	9.20	7.60	9.00			8.59	7
6th	5	Rhett	Scarlet	8.69	8.30	9.31	8.50	9.50	7.24	8.60			8.59	6
7th	10	Ken	Barbie	8.65	8.32	9.32	8.25	8.60	7.40	8.90			8.49	8
8th	2	Marc	Cleo	8.63	8.60	9.20	8.60	9.15	7.20	8.80			8.60	5
9th	8	Barney	Betty	8.64	8.20	9.25	7.95	9.25	7.25	8.50			8.43	9
10th	6	Rocky	Adrian	8.60	8.10	9.65	7.80	9.30	7.10	8.10			8.38	10
11th	1	Romie	Julie	8.75	8.00	9.34	7.70	9.10	7.00	8.30			8.31	11
12th	11	Ike	Mamie	8.40	8.23	9.28	7.75	8.65	7.05	7.90			8.18	12

Figure 9: *Results based on an Average of all judges' Raw Scores (highest average raw score is best).*

Alt. Method: Averaged Ordinals (Weighted Score)

Rel. Plct.	Order Danc	Leader's Name	Follower's Name	Judge #1	Judge #2	Judge #3	Judge #4	Judge #5	Judge #6	Judge #7	Judge #8	Judge #9	Average Ordinals	Results
Rank	#	Contestants		Ordinals									Ave.	Rank
1st	4	Jack	Annie	2	3	5	1	1	2	2			2.29	1
2nd	9	Ricky	Lucy	3	2	1	7	3	1	1			2.57	2
3rd	7	Fred	Ginger	1	4	2	2	10	9	3			4.43	3
4th	12	Ward	June	7	10	4	5	8	5	4			6.14	6
5th	3	George	Gracie	4	7	7	9	6	3	5			5.86	4
6th	5	Rhett	Scarlet	6	6	9	4	2	7	8			6.00	5
7th	10	Ken	Barbie	8	5	8	6	12	4	6			7.00	8
8th	2	Marc	Cleo	10	1	12	3	7	8	7			6.86	7
9th	8	Barney	Betty	9	9	11	8	5	6	9			8.14	9
10th	6	Rocky	Adrian	11	11	3	10	4	10	11			8.57	10
11th	1	Romie	Julie	5	12	6	12	9	12	10			9.43	11
12th	11	Ike	Mamie	12	8	10	11	11	11	12			10.00	12

Figure 10: *Results based on an Average of all judges' scores converted to Ordinals (lowest average ordinal is best).*