Bridge Theory for the Practitioners

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1. Where battles are won

Terence Reese is one of the earliest Bridge theorists and has made major long-lasting contributions in developing ideas both in card play and defense. His bidding was atrocious, however. Ah well, you cannot have it all --- where are you going to keep it? (By the way, the answer to that question is *everywhere)*. He was also my type of a modest person. Just read this acknowledgement from his classic *Master Play in Contract Bridge:* "In memory of my mother who taught me Bridge and many other things that I learned less well". How can you not love this guy?

In his another famous book *Play these hands with me,* Reese has a chapter called "Where battles are won". He describes a hand and a cute play and then ends the chapter with the following observation: "Players tend to go for the legitimate chance on these occasions, because if it fails they will have a sound defense in the post-mortem; but that is not where battles are won."

My task in these columns is to prepare you better for winning the battles. However, the first step must be to know the legitimate chances for a specific hand: be that for safely making the contract (relevant in Knock-Out or Swiss matches or in "good contracts" in Matchpoints) or for making an up trick (in Matchpoints). My first column will thus start discussing the chances that a suit breaks in a

specific way --- the so-called *suit breaking probabilities.*

For lack of better things to do in life, Mathematicians have figured out all these probabilities. For example, if we see that the opponents have 7 cards in a suit, we know precisely the probabilities of that suit breaking in 7-0, 6-1, 5-2, or 4-3 fashions. Charts of these probabilities are found in many books and also on the web (any one ever checked them for accuracies?) So I picked up my dad's Goren book (*Goren on play and defense,* C.H. Goren, Doubleday, 1974) and found a table listed on page 57. Let me put the information in that table here in *my way*.

Table of Probabilities

Cards Outstanding	Suit Breakup	Approx. Probability (%)
7	4-3	62
	5-2	31
	6-1	7
6	4-2	48
	3-3	36
	5-1	15
5	3-2	68
	4-1	28
	5-0	4
4	3-1	50
	2-2	40
	4-0	10

3	**2-1**	**78**
	3-0	**22**
2	**1-1**	**52**
	2-0	**48**

One immediately notes two interesting facts: 1) if the total number of cards out is an odd number, the chance of that suit breaking approximately equal between the two hands is always the highest among all the options. For example, if 7 cards are outstanding the chance of breaking as 4-3 is 62% and 5-2 is 31%. Similarly, if 5 cards are outstanding the chance of breaking as 3-2 is 68% and 4-1 is 28%. 2) But this is not true if the total number of cards out is an even number. Now a "bad break" is more probable. For example, if 6 cards are outstanding, the chance of breaking evenly as 3-3 is only 36% while the chance of a bad break of 4-2 is about 48%. Similarly, when 4 cards are out, the chance of breaking evenly as 2-2 is 40% while the chance of a bad break of 3-1 is about 50%.

I will bring another set to your attention: when only 2 cards are outstanding. This will be relevant in a 6S contract for example when you have 11 trumps but not the King. In this case, the equal breaking probability (i.e. 1-1) is 52% and higher than the "bad break" (i.e. 2-0) probability which is 48%. The equal breaking wins in this special situation even though an even number of cards is outstanding. This is why they say that exception proves the rule!

Let's continue to work with the 2 cards outstanding case. This is the simplest case. Let's say that the suit is Spades and the cards

outstanding are K and 2. Let’s count the ways this suit can break with possible East-West holdings:

	East	West
1.	K2	void
2.	K	2
3.	2	K
4.	void	K2

So it seems that the probability of this suit breaking either 1-1 or 2-0 is *equal* (2 possible cases for each) and so both must be 50%. How in the world then, can one get *ugly* numbers like 52% and 48% for such a simple case?

Counting this way where we focus on only one suit, we are neglecting an important *constraint* in our calculations --- the fact that both these defenders (East and West) must had 13 cards to start with. So I cannot just look at the breaking of only one suit separately. I must calculate in the context of them holding 13 cards each. Alright then; let’s count again.

*At the very beginning (*the technical name is *a priori)*, what is the probability that East has one spade? That is simple. There are 26 cards outstanding between East and West and any one of East’s 13 cards can be this spade card we are looking for. So the probability is 13/26 or 1/2.

What is the probability that East has a second spade? I need to keep in mind that now East has only 12 remaining cards and the total number of outstanding cards between East and West are 25. So the probability that East started with two spades is: 13/26 times 12/25 = 0.24 or 24%. I can repeat the calculation for West as well and find that the probability that

West started with two spades is also 0.24 or 24%. Thus the probability that the spade suit breaks 2-0 or 0-2 (to be technically accurate) is 48% and hence that of a 1-1 break is 52%. ***Voila!***

You are now on the right track and can ***figure out*** **the rest of the table. The calculations are tedious but you now** ***understand*** **the method and realize that the probability table that you can get from any standard bridge book and listed above is the so-called** ***a priori*** **probability. This means that this probability is computed before anything else is known about how any other suits might be breaking.**
I will stop for today by telling you an example of how probabilities matter in our everyday life and then asking you an interesting question that you can ponder about while I prepare my next column.

We have a security system in our home and for best result that needs to be turned off every morning before opening any door. Otherwise bad things happen. I am usually very good about turning this off but I miss once in a while. Several years ago I estimated that I screw up once in about 100 days (i.e. one false alarm every 3 months). I told my daughter that she should check the alarm system independently as well and if she has equal skill (like screwing up once in 100 days) then together we will have one false alarm in every 10,000 days (i.e. instead of once every 3 months we will have once every 27 years). She did not believe me (where does dad get these numbers?) but continued to do her job and we did not have a false alarm in the last 3 years once. 24 years more to go!

Now the question: Imagine you are in a game

show and the host shows you 3 separate doors (A, B and C) all closed. You are told that behind two of those doors there are two goats and behind the other door there is a Porsche waiting for you. All you have to do is to pick the right door. So you choose one door randomly. Let's call that door C. Now the game show host opens one of the two remaining doors (say the door A) and shows you that there is a goat behind it. He then does something real strange. He gives you an option of changing your mind and choosing the other remaining door if you want to. Does it change your chance of winning or does it remain the same if you switch from door C (your original choice) to door B (the new possible option)?