Technical Zeros are Useful!

by **Barry Johnson**

Introduction

From a technical perspective, the choreographic state of a square can be described by using four characteristics: the Formation, Arrangement, Sequence and Relationship of the dancers. These four characteristics are commonly abbreviated as "FASR", and the square is said to be "in" a particular "FASR".

A choreographic "zero" is a sequence of one or more calls that preserves the FASR of the square – that is, the FASR at the end of the sequence is the same as the FASR at the beginning of the sequence. Several classes of choreographic zeros have been identified: Some zeroes return dancers to the exact footprint locations from which they started; others may rotate the "long axis" of a formation with respect to the dance hall. Other sequences will serve as zeroes only if they are repeated a particular number of times.

Technical Zeroes are a particular class of zeroes with the troublesome property that they only work under certain circumstances. Excepting those sequences that fail because gender-specific calls behave differently in various boy-girl arrangements, the reasons why some sequences work (or fail) as zeroes aren't necessarily clear. Consider the classic "invert and rotate" module: From a corner box (an in-sequence Eight Chain Thru formation with the normal arrangement), the sequence Slide Thru, Pass Thru, Bend the Line, Slide Thru is a zero: dancers finish the call facing the same people they were facing when they started. The sequence will still work as a zero if the dancers are all out of sequence at the beginning – they'll simply be out of sequence when they finish.

But if the ladies were to trade places (perhaps with a Ladies Chain) or the men were to change places (with a Flutterwheel), the sequence falls apart. The dancers would again finish in an Eight Chain Thru formation with normal couples and with the same sequence, but when they finish the sequence, they'll be facing different people!

So this particular sequence has the interesting property that it works as a zero when four people begin standing in one place, but the same sequence does *not* work as a zero if two of those four people exchange places with one another before the sequence start. Somehow, this sequence seems to know not only what gender each person is dancing, but also knows *which* dancer is standing in which place!

Because of this, Bill Davis (in his seminal book *The Extemporaneous Caller*) eventually dismissed technical zeroes as a choreographic oddity that weren't worth using.

Bill Davis was wrong. Once a caller understands *how* a technical zero works, then it becomes easy to see when and how they are useful both as a zero – but even more useful when they *don't* behave as zeroes!

What makes a sequence a "zero"?

For a call or sequence of calls to be a zero, the sequence must preserve the Formation, Arrangement, Sequence and Relationship (all four parts of FASR): That is, the FASR of the square at the end of the sequence must be the same as the FASR when the sequence was started. For a sequence to be considered a

technical zero, that means that it must preserve the FASR of the square in some cases but not others.

Preservation of Formation, Arrangement and Sequence isn't something that can be sensitive to which particular dancers are doing calls. (Again, we're disregarding those sequences that change because of a Star Thru or Slide Thru causing differences between arrangements, or else always using those sequences from the same boy-girl arrangements.) If a call starts in two-faced lines, it's not going to end in two-faced lines sometimes and in ocean waves just because two dancers exchanged places before the call started. If a sequence preserves Formation, Arrangement and Sequence when you use it one way, it's *always* going to preserve Formation, Arrangement and Sequence even if you put dancers with different names (but the same dancing gender) into the same spots.

But Relationship, the final R in FASR, is different than the others. These technical zeroes will always preserve the Formation, Arrangement and Sequence of the square – but *sometimes* change the Relationship. And it's that specific difference that makes Technical Zeroes so fascinating.

A brief overview of relationships

If one splits a square into two groups of four such that every dancer's diagonally opposite dancer is in the *other* group of four, then at all times exactly one of these statements will be true:

- Every man's partner is in his group of four
- Every man's corner is in his group of four
- Every man's opposite lady is in his group of four
- Every man's right-hand lady is in his group of four

We call these four conditions "stations"[1], and say that the dancers are in the Partner, Corner, Opposite Lady or Right-Hand Lady station. The station of the dancers is independent of the Formation, Arrangement or Sequence of the dancers. As long as symmetric choreography is used, and as long as the dancers haven't made a mistake, it is fairly easy to recognize the current station at any point in a sequence.

There are techniques to recognize the "station lady" – the man's corner in a Corner station, the man's opposite lady in the Opposite Lady station, etc.

The stations are generally described as being in a circle (much like the dancers in a static square), where we progress in a clockwise direction from Partner to Corner to Opposite Lady to Right-Hand Lady. The Corner station is considered to be across from the Right-Hand Lady station, and the Partner and Opposite Lady stations are considered to be across from one another.

Calls (or sequences of calls) can affect the station by changing the membership of a group of four dancers. If we disregard the formation, arrangement, sequence and geographic position of a group of four dancers, there are only three possibilities:

- The membership of the group remains unchanged
- The call (or sequence of calls) replaces one member of the group with someone from the other group
- The call (or sequence of calls) replaces two member of the group with someone from the other group.

Obviously, a call that replaces all four members of a group can be considered to have just moved the original group "over there" without changing membership. Perhaps less obviously, a call that replaces three

members of the group can be considered to have just moved the original group while replacing one member.

Calls that do not affect the membership of the group of four will never change the station of the dancers. If every man's right-hand lady was in his group of four at the start of the call (the Right-Hand Lady station) and the call doesn't change the people in the group, then the dancers still have to be in the Right-Hand Lady station afterwards.

Calls that replace one dancer in the group will "rotate" the station in either a clockwise or counter-clockwise direction – for example, from Opposite Lady to either Corner or Right-Hand Lady.

Calls that exchange two dancers between the groups will either retain the beginning station, or will change the station to the one "across" from the original station.

As an example of this last point, consider two-faced lines where each man has his original partner. The dancers are obviously in the Partner station – every man's partner is somewhere in his line (and, in fact, happens to be adjacent to him). If the couples circulate, we're exchanging two dancers from one two-faced line to the other, and bringing two new dancers into the first line. In this example, the men being exchanged took their original partners to the new line (and the men that stayed in their original lines also kept their original partners with them) – it's easy to see that this means the new lines will still be in the Partner station.

On the other hand, consider those same two-faced lines – but have the ladies trade. After the ladies trade, the two-faced lines are still in the Partner station (because each man's partner is still somewhere in the line). But the Couples Circulate call causes two men to leave their partners behind, while two ladies move to the other line leaving *their* partners behind. When we're finished, no man's partner will be in the same as he is. We've switched to the Opposite Lady station.

You can apply the same logic to each of the stations – regardless of the station of the two-faced lines, if the man crossing from one two-faced line takes his "station lady" with him as part of a Couples Circulate, then the station *must* remain unchanged. If he *doesn't* take his station lady with, then the station will switch to the station across from the beginning station.

Technical Zeroes from a Relationships Perspective

As we've said, a technical zero preserves the Formation, Arrangement and Sequence of the dancers – and sometimes preserves the Relationship, but not always.

So how many dancers does the technical zero move from one group of four to the other?

The answer cannot be 0: Any call that doesn't exchange dancers between the groups cannot change the station, which means that it would *always* preserve relationships. Since a technical zero sometimes changes relationships, it *must* affect the membership of the groups.

The answer cannot be 1: Any call that exchanges just one dancer with the other group *always* changes the station. Since there are times our technical zero works as a zero (which means that sometimes it preserves the station), it cannot be exchanging just one dancer.

This implies that every technical zero *must* exchange two dancers from one group to the other. We now also see the circumstances under which the technical zero actually does work as a zero – if the two dancers being

exchanged are a man and his "station lady" then the technical zero will preserve relationship as well as formation, arrangement and sequence.

If the two dancers being exchanged are *not* a man and his station lady, then the technical zero will cause the station to change in a known and predictable fashion. This might involve exchanging the two men, the two ladies, or one man and his "not station lady".

More than that, we now gain a new insight into technical zeroes: In fact, any call or sequence of calls that preserves Formation, Arrangement and Sequence while sending two dancers from one group to another *is*, by definition, a technical zero.

With this, we can suddenly start recognizing technical zeroes all around us:
- "Couples Circulate" is a technical zero
- Spin Chain the Gears is a technical zero
- Bend the Line (from lines facing in) is a technical zero (!!!!)[2]
- All 8 Circulate from ocean waves is a technical zero
- And many, many more.

Using Technical Zeros for a Purpose

Now that we understand what a technical zero does (exchange two dancers in a group of four while preserving Formation, Arrangement and Sequence), we can put these mysterious creatures into harness.

Suppose that we have the dancers in a Right-Hand Lady setup of some sort. We can use a technical zero to have our dancers interact with a different group of people while preserving the relationship station by sending either one of the men and his "station lady" to the other group of four in the square… we've exchanged dancers while doing nothing choreographically. Or, just by changing who we chose to "send across the way", we can *intentionally* change the relationship station to a Corner setup.

Consider this: from a static square, call Heads Square Thru 2. All of the men are facing their Right-Hand Lady, and each group of four is in the Right-Hand Lady station. Call the classic "Invert and Rotate" module (Slide Thru, Pass Thru, Bend the Line, Slide Thru), which we now realize is a technical zero because it changes two members of each group of four while preserving Formation, Arrangement and Sequence.

From there, let's say that we consciously want to change from this Right-Hand Lady station to a Corner station: We can have the dancers Veer Left, Centers Trade (!), Wheel and Deal (each man is now beside his Right-Hand Lady instead of facing her!), and call that same Invert and Rotate. When we're done, without a doubt, we *know* that the dancers have changed to a Corner station. Every man's original corner will now be in his same group of four, guaranteed – in fact, every man's corner is his current partner.

And after that last Slide Thru, we have good body flow to call Reverse Flutterwheel, which will put every man's corner facing him, and the men are in sequence – so ALLEMANDE LEFT!

In caller schools, we often teach new callers how to use an Invert and Rotate module as a zero. But now, by learning just a little more, we suddenly realize we can use that same Invert and Rotate module as part of a nifty get-out from a Right-Hand Lady setup!

Summary

With appropriate allowances for a few gender-specific calls, any call or sequence of call that preserves Formation, Arrangement and Sequence of the square while exchanging two dancers in each group of four will be a technical zero. If the dancers "sent to the other group" happen to be a man and his "station lady", then the sequence will act as a choreographic zero; if any other two dancers are sent across, then the sequence will still preserve Formation, Arrangement and Sequence while changing the relation station from Corner to Right-Hand Lady (or the other way around), or from Partner to Opposite Lady (or the other way around).

These calls or sequences are Technical Zeroes, and can be deliberately used to either act as a choreographic zero while changing the membership of a group of four, or to change the relationship station in a known and predictable way.

Callers can use these "troublesome choreographic oddities" to great purpose, including expanding their repertoire of get-outs and surprise endings, where the same sequence can have quite different results when only tiny changes (like two dancers trading) are applied.

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[1] This terminology is beginning to change. Kip Garvey has suggested using the phrase "relationship groups" (or just "groups") instead of "stations", and his terminology is growing in acceptance.

[2] How can Bend the Line be a technical zero? From lines of four facing in, the Formation is preserved: It finishes in lines facing in. It's easy to see that Arrangement and Sequence are preserved. But the dancers finish facing a different pair of dancers than when they started, which is just like having the call take two dancers from the original group of four (the facing couples on each end of the lines) and replacing them with two other dancers (the ones that were originally in the same line). And *that* changes the membership of the group, which either does or does not change the Relationship station.