

# **Cognitive Limits and Making it Easier**

**Compiled by Dottie Welch, August 2011**

(Reference: "What Makes Square Dancing Hard" by John Sybalsky)

There are cognitive limits to what the human mind can do. Studying these limits and how people cope with them helps teachers understand the learning process.

## **Short Term Memory**

Every action that a person takes is under control of short-term memory. That's where he keeps track of what he is doing, what the next step is, which hand to use next and so on. It is also where he keeps interim information while working on a problem. A person can only keep five to seven "chunks" in short-term memory at once. In square dancing the chunks might be the call definition, the current part of the call, the next part of the call, and listening for the following call.

## **Memory Limits – "Chunking" – Memory Overload**

When short-term memory fills up, dancers experience memory overload. New dancers are especially subject to frequent memory overloads (fumbling) because they must deal with all the small pieces of the definition as they apply to hand, foot and body actions. But with repetition, the mind begins to group actions together in "chunks". With practice, the call resolves itself into fewer and fewer parts until, finally, the dancer is only aware of the call and does it. This frees up the short-term memory for other things such as listening for the next call.

## **Decision Making – Decision Overload**

A human can make about five decisions per second. With wind-in-the-face dancing the dancer only has about one beat of music to figure out what the caller said and how to begin the next call. One beat of music is about half a second. Increasing the decisions that the dancer has to make in a given time period, increases the difficulty, and it increases the chance that the dancer will fall behind.

## **Sense of "Rightness"**

If a dancer senses something wrong, he'll try to "fix it". Dancers will try to make unneeded mid-course corrections, leaving them in the wrong place and leading to potential breakdown. There are at least three ways in which something can feel wrong.

- 1) Positional: Dancers who find themselves facing out tend to turn around. Dancers expecting a call to end in normal couples will tend to "fix it".
- 2) Flow: The body flow is different than expected (left-handed perhaps).
- 3) Unexpected: Calls that begin in an unusual formation and/or arrangement automatically require the dancer to apply the definition in a new way which means moving through new positions with new body flow.

## **Long-Term Memory Recall Time**

The less often the dancer has heard the call, the longer it takes to react to it.

If there are two calls that sound alike, it takes more time to decide between them.

If there are two calls with similar definitions, it will take more time to make a decision.

### Anticipation

Often a dancer can anticipate the full call after hearing the first word or two. If such assumptions are safe, let the dancer take advantage of it.

Frequently used sequences of calls will also be chunked with both positive and negative consequences – positive if the anticipation is correct, negative if the sequence is different. Callers should be aware of the commonly used sequences and use words to avoid anticipation if changing the sequence.

### Clues from the Senses (Feeling, Sight, and Hearing)

Experienced dancers join hands to give them a tactile clue for knowing the formation.

Dancers expect good body flow and will continue to move in the anticipated direction while figuring out the next action. Any call that disrupts the flow will be more difficult.

Dancers obtain visual clues by watching the other dancers in the square or in a nearby square. Gentle pointing or reaching out with a hand to make a formation can solidify the square. Knowledgeable dancers check their position with respect to that of their diagonal opposite to quickly provide a feeling of security or a warning that there is a problem.

Dancers obtain audio clues by listening to extra hints provided by the caller.

### Call to Avoid the Limits

1. Use appropriate timing so the dancer only has to concentrate on one call at a time. Avoid "stacking calls", which forces the dancer to hear and remember the next call while still thinking about the action of the last call.
2. Use the timing charts as a guide and watch the dancers to adjust for their abilities.
3. Give additional time for insufficient space and slippery floors.
4. Give clear and concise calls to minimize time spent interpreting the call.
5. Intermix difficult calls with easier ones to avoid memory overload.
6. Remember that long sequences mean more chance for a mistake before the rewarding resolution is reached.
7. Be aware of the sense of rightness, minimize the time in odd formations, and make reassuring noises so dancers know they are where they should be.
8. Give clues to help dancers differentiate commonly confused calls.
9. Be prepared to give clues when using uncommon calls or non-standard applications.
10. Plan workshop material paying attention to the Standard Applications and gradually progressing into less used formations and arrangements.
11. Avoid the development of call sequence chunks by varying the sequences.
12. Aim for smooth body flow that includes gentle right and left turns interspersed with forward motion. Ideally the calls should alternate hand usage. Stop and go dancing may be necessary during workshop time but it increases body fatigue.
13. Avoid abrupt changes in motion. Also avoid over turning and the consequent dizziness and disorientation.
14. Help with changes in focus such as from waves to boxes.
15. Give clues to help dancers sort out facing directions so that minor mistakes don't become major disasters.
16. Adjust the tip length to compensate for such issues as excessive heat or aging dancers.