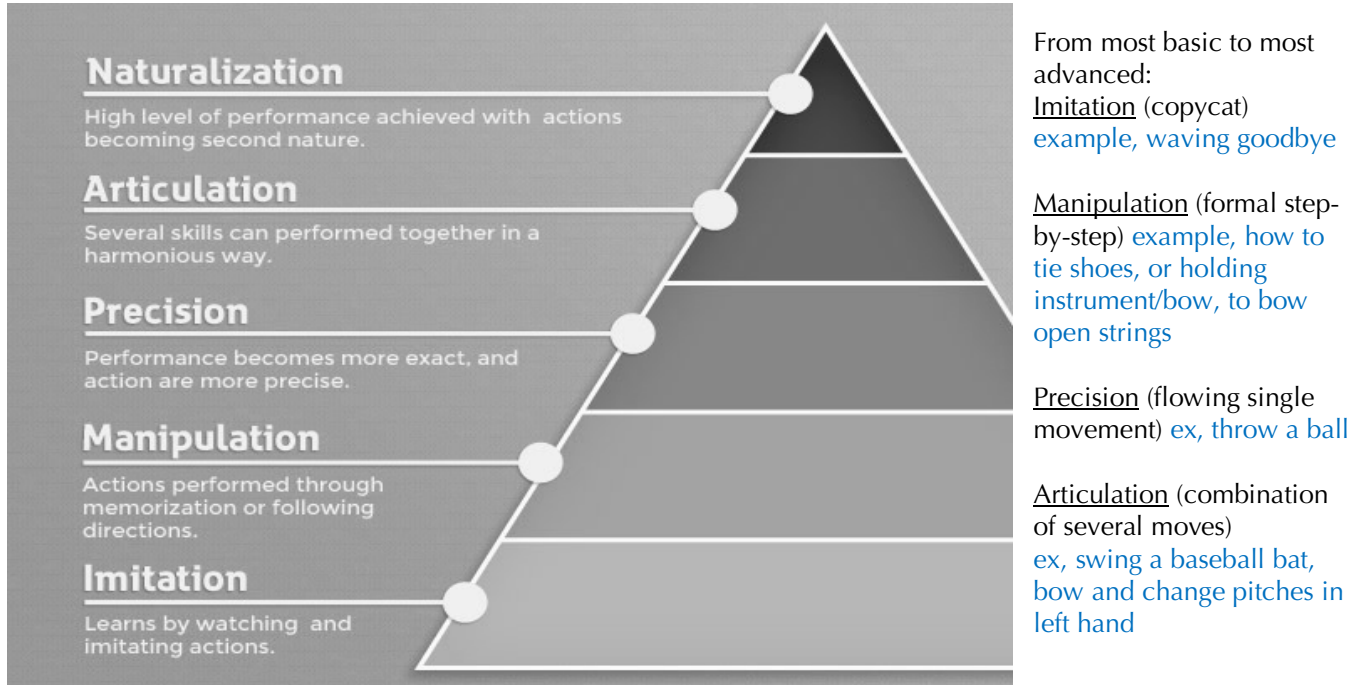TEACHING IN THE PSYCHOMOTOR DOMAIN
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Especially in Strings and Orchestra, we really have more in common with the Physical Education teachers than we realize! When we are teaching physical skills, we can be more effective if we remember to integrate mind and muscle, give attention to the Psychomotor Domain.

So many of the things we do while playing strings are complex movement combinations, which often must be done in rapid succession with other complex movements---and also simultaneously. This requires more attention than the brain can muster if dealing with every little muscle movement. So we rely on a muscular parallel to cognitive chunking for memory, and we build to a type of automaticity in standard gestures and movements that are commonly required. Don't let anyone tell you that string players aren't athletes: We just train mostly very small muscles.

Clarifying the different levels of learning in the Psychomotor domain— there are several ways to describe it, several different models. I like this pyramid based on RH Dave's model (1975) (*though it is missing the very top level)*.

From most basic to most advanced:
Imitation (copycat)
example, waving goodbye

Manipulation (formal step-by-step) example, how to tie shoes, or holding instrument/bow, to bow open strings

Precision (flowing single movement) ex, throw a ball

Articulation (combination of several moves)
ex, swing a baseball bat, bow and change pitches in left hand

Naturalization (automaticity)
ex, hit a baseball?

Origination/new movement creation
ex, "busting a move"?

Is this Muscle Memory? what we really are talking about (such as never forgetting how to ride a bike) is a type of procedural memory. The brain and muscles learn together how to do a task, and with enough repetition it lives on as an automatic sort of response to the stimulus of starting the task.

BUT HOW CAN WE TEACH MOTOR SKILLS?
To teach a complex movement we must break it down to its component parts—we must analyze it, be sure to teach the different parts, and then teach the process of putting them together.

Strategies and Games, Isolating and repeating
There are types of <u>neuro priming</u> that help cement these learned procedures into the brain. These can also be called teaching strategies or pedagogical games. The trick is to practice in lots of different ways that involve a few changing variables. (there are parallels to getting out of the lower levels of cognitive domain through applying, analyzing, evaluating and synthesizing/creating). Excellent resources for such activities are in the work of Paul Rolland, George Bornoff, Kato Havas, and Phyllis Young. Rolland & Havas especially thought about this in context of teaching beginners with later skills in mind. Rolland called them pre-emptive exercises. Bornoff was one of the first to write about LH spacing patterns as a thing you learn kinesthetically as well as conceptually. And Young's books are delightful collections of dozens (hundreds?) of games and scenarios to get the student to move the way you need them to.

Analyzing the moves then strategizing the teaching/learning activities:

Let's look at one fine motor example and a gross motor example.
A. Doing a 1-2 (E-F) half step trill (left hand), or a whole step trill E-F#. How do these differ?

B.   Moving the <u>whole bow</u> for 3 beats (dotted half note), Frog to Tip and Tip to Frog.

Remember that to accurately and consistently perform a physical movement skill, one must have a sense of where in space your arm/hand/whatever is, and where in relationship to the rest of your body, as well as to be able to repeat the movement sequence. Give students this frame of reference when they are learning—for example, the idea that when you place the bow out at the tip, your hand is more over your right knee than it is to the side.

Taken individually, these skills are pretty basic. But of course most of playing combines the left and the right hand. Think of playing the melody from Offenbach's Barcarolle: three-note slurs using the whole bow, and two-note slurs that change at the 2/3 point of the whole bow, as well as a 6 beat long whole bow at the cadence.

Another factor in undertaking a complex movement, is that generally speaking, to every movement there is a preparation, an execution and a follow-through. The size of prep and follow-through will be different according to the scale of the motion, and to the number of muscle groups involved. Understanding this is an essential part of your analysis of any complex movement before you choose to teach it. For example, shifting is often taught in classes without thought to the preparation of the shifting movement—much to the chagrin of the bassist who cannot shift accurately without a good prep.

CHUNKING and moving to Automaticity

SCALES are one of those things, that especially for violins/violas, there is a lot of automaticity /chunking that can be developed. It is essential for a violinist because of the speed at which composers ask for scale passages. (link to sound of "Love's theme" from 70s, the opening scale flourish)

So when you look at this passage the advanced player will think in chunks—bowing patterns, rhythm patterns, scale or arpeggio patterns. It is these patterns the player directs as a unit rather than all the individual notes, fingers, and bowing movements.

This is from a Mozart Divertimento I found on www.imslp.org.

Second passage to analyze for component movements (Tchaikovsy Serenade for Strings, mvt 1cello):

Practicing triple stops and double stops and then playing them in the musical context may unfold in several ways. We'll discuss this in the session as time allows.

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