WE'RE PSYCH-ED

Chunks and Links

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With the coming of the information age, it was inevitable that our everyday vocabulary would begin to include expressions related to computer use. Dot-com, downloading, and cyberspace, for example, are used routinely, even by some who aren't completely familiar, or comfortable, with what those terms mean. Words like menu, link, spam, and file have taken on additional, computer-specific meanings.

It's no surprise, then, that some in the "psych" world now refer to learning as "information processing." It's as if the mind is a very smart machine that can be programmed. Steven Pinker vividly sketches the computational theory of mind in his book, *How the Mind Works*. "Beliefs are inscriptions in memory, desires are goal inscriptions, thinking is computation, perceptions are inscriptions triggered by sensors, trying is executing operations triggered by a goal."

Thinking about learning in this way has led, also, to special focus on short- and long-term memory, crucial steps in the learning "process." Short-term memory is the place where you rehearse things, where you try out and manipulate bits of information to determine whether the information belongs in the long-term memory. It's the "scratchpad," as Pinker would say.

One of the most efficient ways to pack more into the short-term memory (it has a limited capacity) is to reduce longer streams of information into short bits—a process called *chunking*. All mnemonics and acronyms are "chunks": SCUBA to stand for self-contained underwater breathing apparatus, NATO to represent North Atlantic Treaty Organization, HOMES, to remind you of the names for the Great Lakes (Huron, Ontario …), and—Every Good Boy Does Fine.

Memory aids and acronyms are useful because they are catchy reminders and short forms of more complex ideas and expressions. In the case of a memory aid like HOMES, you have less to remember. An acronym provides a single term for a string of words. Again, less to remember.

The importance of the chunking process in a learning situation is not merely to accept and use ready-made aids, but to learn *how* to chunk. That's the key to efficient learning. It's also the key to easy and reliable memorization. The significant chunks are those you store in long-term memory. And it's evoking these chunks that enables you to trigger recall of items from long-term memory.

Let's consider chunking in a musical context. C-E-G, as separate, but combined pitches, make up a chord. C-E-G then becomes a single unit, a C Chord. Other chords develop into single units in the same way. Soon I and V become symbols for important chords. I-V or V-I evolve as cadences; two related chords have become a single unit, a half or authentic cadence.

Recognizing cadences—chunking chords—leads to an understanding of form. An eight-measure musical period—perhaps I-I-I-V, I-I-V-I—is seen and heard as two units balancing one another in a musical statement. A period then becomes a single unit in itself, constituting an A or B section, making it possible to diagram a piece as A-A', A-B, or A-B-A'. Smaller part-forms evolve as separate sections of larger forms, such as a rondo or sonata-allegro form. In each case, something that was two (or multiple) units becomes a single unit. A-B-A', then, is a mnemonic that represents a more complex set of sub-units.

It's important to note that in the just-described progression of sub-sets, chunking is not the only activity. The chunks themselves are *linked*, in a musically logical way, in order to see the growth from the smaller units to the larger.

- Understanding chords precedes understanding cadences.
- Grasping the function of cadences leads to recognition of musical periods.
- Musical periods become the building blocks of larger forms.

The linking process itself is the strong connecting thread that binds smaller, multiple bits of information into logical "wholes."

That overview sketches the process from the standpoint of the learner. How do you *teach* in a way that fosters chunking and linking?

- You yourself must chunk and link. Unless—and until—these processes have become second nature to you, you can't stimulate others to do the same. You can't draw a map unless you know the territory.
- Ask questions in an order that draws attention to how parts of a phrase or sections of a piece are linked. (See "How To Teach 'Painting with Pastels' By Asking Questions: Picture the Shape" in *The Piano Adventures Teacher*, August, 2003, page 9.)
- Show students how to reduce information in the score to a simple diagram.
- Encourage students to find original ways to summarize complex ideas.
- Use ear-training activities so that students make comparisons by listening.
- Choose materials that reinforce concepts and forms used previously.
- Remind students how to use what they already know to solve new problems.

And remember—it's the *mind* that's the smart machine, not the computer!