CHAPTER 5

PERFORMANCE CHARACTERISTICS OF COMPLEX SKILLS
Specific characteristics of the performance of various skills provide the basis for much of our understanding of the process involved in motor control.
SPEED-ACCURACY SKILLS

- Speed-Accuracy Trade Off
- Fitt’s Law provide a mathematical model
  - MT = a + b log_2(2D/W)
  - Variables that predict performance is distance to move and target size
INDEX OF DIFFICULTY

- Fitts law results in an index that measures the difficulty of the task

- Fitts’ law has many skill implications for instruction and practice
PREHENSION

- Act of reaching and graphing

- Motor control issues
  - Each phase is highly independent
    - Different mechanisms control each phase

- Prehension applies to speed accuracy trade off
  that is the time of prehension is affect by distance and size of target.
Implications for Practice

- If you want to refine or relearn a skill that involves prehension:
  - Provide functional (real life prehension skill) skills
  - Practice should involve reaching, grasping and manipulating a variety of object characteristics and manipulation goals.
Handwriting

- Difference control mechanism are involved in controlling:
  - What people write (e.g., letters, words)
  - How people write (e.g., writing surface)

- Writing involves both cognitive (retrieve letters, words, grammatical construction, spelling) and motor skills (holding the pen, size of letters).
HANDWRITING

- Based on motor equivalence, that is, one can adapt to specific demands of the writing context.

- Motor equivalence provide for similarity in letters and stroke production across many contexts.
BIMANUAL COORDINATION

- Motor skill requiring simultaneous performance of two limbs
  - Limbs do the same thing (symmetric)
  - Limbs do something different (asymmetric)
- Two limbs prefer to do move in the same manner
- Some bimanual task do not relate to Fitt’s Law.
- What if one limb had to do a more difficult task while the other limb completed a easier task?
- Through practice one becomes uncoupled or dissociated
GAIT

- Important characteristic of gait is the rhythmical structure of the walk or run is distinctly different.

- The role speed plays in the transition from walk to run puzzles researchers.
  - Change of walk to run pattern is spontaneous.
    - Walk-to-run transition occurs at a higher speed then run-to-walk???
SUMMARY

- Speed and accuracy of a movement is trade-off.
- Performance motor equivalence demonstrated enable one to adjust their movement.
- Coupling between arms/limbs is dominate in bimanual skills but through practice one can become decoupled.
- Locomotion skills consists of a rhythmical relationship of limb components.