DEVELOP CAT-LIKE REFLEXES

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Fighting or grappling not only requires fast reflexes but accurate reflexes. Reflex is defined as "pertaining to an involuntary response to a stimulus or any automatic, unthinking, often habitual behavior or response." This action is so engrained in our minds that we don't have to physically think about it. However, the "habitual response" is where we can train ourselves by practicing or repeating an activity enough to where it becomes a reflex.

CLOSED-LOOP CONTROL SYSTEMS

When performing daily activities, individuals process information in three stages: stimulus identification, response selection and response programming. How this happens has been described by researchers as a Close-Loop Control System. Take for example a heating and cooling system in your home. This system is designed to maintain an ideal temperature.

The components of the Close-Loop System are a Comparator which would be the thermostat that senses the difference or change in temperature. If it detects a change, it relays a signal to the Executive or control center, which relays a command to the Effector, which turns on the AC or the heat depending on the temperature sensed by the Comparator.

In the body, once the effector sends a signal to the effector mechanism, several things happen. First, a motor program that produces movement occurs which is relayed to the nervous system located in the spinal cord. This results in a contraction of muscles and movements of joints. Feedback from this movement is provided from various forms of proprioception derived from forces generated from the contracting muscles, pressures exerted by objects in contact with the skin and from the joints signaling changes in body position. Exteroceptive information comes from the environment and is sensed by sight, hearing and even smell from the outside stimuli.

However, the draw back of the Close-Loop system is its inadequacies in explaining performance skills that are brief in duration such as a punch or a kick. If a fighter decided to pull a punch or dodge a kick and something changed, the stages of processing the change would take several hundred milliseconds before the first modification in the movement could be made.

While this processing is occurring, the movement would continue to proceed as originally planned. Scientists assume that rapid actions such as a punch or kick happen in an all-or-none fashion like a trigger on a rifle. Once a critical point of threshold is reached

in the system, the movement is initiated. The close-loop model is useful in understanding how the nervous system maintains a particular state of motor behavior such as posture in a standing position or a learned posture such as in cycling or gymnastics. The comparator continually monitors feedback of the correct or desired body position and the actual body position. If there is a discrepancy, then these errors are relayed to the executive for corrections.

M1, M2, TRIGGERED REACTION & REACTION-TIME RESPONSE

To put things into perspective, the M1response is one of the most rapid reflexes underlying limb control. It is prompted by the stretching of the muscle spindles when a load is added. The spindles are propriocepters that lie against the muscle fiber that monitor muscle length and rate of stretch. The muscle spindle relays sensory information to the spinal cord where a connection or synapse is made. The information is sent directly back to the same muscle that was stretched. This all happens in about 30-50ms after the load is added.

The M2 response has been demonstrated as a second burst of EMG activity with a longer duration contributing far more to movement compensation than the M1 reflex. Like the M1 response, the M2 response arises from the activity in the muscle spindles and travels to the spinal cord. However, the impulses continue further up the cord to higher centers in the brain (i.e., the motor cortex and/or cerebellum) where they are processed and sent back to activate muscles. The longer distance traveled and higher brain levels of activity account for the longer response times of 50-80ms.

The Triggered Reaction is too fast to be a voluntary reaction but is longer than an M2 response and occurs at 80 -120ms. This reaction can affect musculature far from the actual stimulation site. However, this reaction can also be learned. These reactions are sometimes referred to as the "wineglass effect." When a person lifts a wine glass and feels it starting to slip, the glass generates skin vibrations sensed by the cutaneous ▸▸

HOW TO BUILD YOUR REFLEXES

Reaction Time is the perception of an attack or the time between the stimulus and the start of the response

- ▸▸ Try dodge ball with multiple throwers
- ▸▸ Play around with a "reaction ball"
- ▸▸ Try wearing an eye patch or close one eye to affect depth perception
- ▸▸ Try to develop your peripheral vision. Practice describing people, cars or anything that you aren't directly looking at
- ▸▸ Hot hands is always fun
- ▸▸ Hold a pen out at arms length and then look across the room. Shift your focus back and forth bringing the pen closer and closer
- ▸▸ If possible, watch videos of your opponent and study body movements that give clues on the direction he or she is moving in
- ▸▸ Have multiple strikers stand around you, throwing punches and kicks. Try and preempt their strike but take note of their body language, breathing, etc.
- ▸▸ Be like Rocky and chase a rooster

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TRAINING TIPS TO GET FASTER

MOVEMENT

Speed is how quickly you can create an action or reaction. There is no other way to get better at this other than to train fast.

However, it is important to practice each movement slowly at first using the blocked order to concentrate, but engrain and refine the performance of each task. If you train too slow, you will be slow. However, as discussed earlier, it is very rare an individual will repeat the same task in succession under the same conditions. Progress to the random order of training once you have the movement or motion down.

FLEXIBILITY

Being flexible is important because it allows the limbs to move freely without unwanted tightness. You'll find the less you tense up the faster you will be.

KEEP IN MIND

- If possible, train with people who are faster than you
- Try to remain unemotional or unattached to preconceived notions
- Be in the moment and breathe deeply
- Allow yourself to flow through the movements
- Practice visualization techniques
- See yourself performing the tasks and then get out of your own way
- Be like a cat, use all your senses and you should develop cat-like reflexes

receptors in the fingertips. This in turn triggers several reactions of the forearm tightening, the bicep slowing the upward motion of the arm, etc.

THE VOLUNTARY REACTION - TIME RESPONSE

The final response, which is a voluntary response, is sometimes referred to as the M3 response. The latency of this reaction is about 120 – 180 ms depending on the task and circumstances. It can also affect all the muscles of the body, not just those being stretched.

You can now see how a Close-Loop Control system operating at hundreds of milliseconds is much slower than the response times above. Here's why. The M1 and M2 response is involuntary. You have no choice. Although the triggered response has some flexibility or adaptability only the voluntary reaction – time response allows you a choice. The amount of choices available can also slow the reaction time.

How to obtain faster reflexes? In 1979, John Shea and Robyn Morgan conducted a groundbreaking experiment to determine how different practice schedules affected learning. One group practiced three movements in a blocked order; that is they completed all attempts for task A before moving to task B and then task C. The second group practiced the three tasks in random order. Both groups performed the three movements the same number of times during the practice phase. The researchers discovered that the first group was far faster at completing the tasks in the practice phase, however, when tested 10 minutes later and again 10 days later in what they called the retention phase, the random group had a large advantage over the blocked group.

This is very important for a fighter. For example, if a fighter were to practice the same punch, kick or block over and over in a blocked fashion, he or she might be more efficient immediately. However, for long-term retention to progress to the motor stage of learning (the second stage of learning, in which motor programs are developed and the individual's performance becomes more consistent), a fighter should avoid repetitious blocked practice as much as possible. Remember, a fighter rarely will throw the same punch, kick or block exactly the same way under the same conditions in a fight. **MS&F**

BUILDING REFLEXES
PART II

Response Time is the time it takes to make your move

- When playing dodge ball, close your eyes and have the thrower cue when to open them
- Color the balls; blue you catch, red you dodge, green you strike
- Have someone cue randomly with different auditory commands that require a specific response
- Practice responding to random punches, kick or grappling moves
- Blow up a balloon or balloons in a room with numerous obstacles such as chairs, stools, desks, cones and try and keep the balloon in the air only using your feet. This is mostly a coordination builder. See how many balloons you can keep in the air at the same time