Choking

"Elite level shooting is best performed without conscious control."

Stories of great athletes suddenly performing poorly and failing to win a major competition are legendary. Examples include the golfer who gets the "yips" while putting and blows the lead on the last day of the British Open, the speed skater who falls for no reason in Olympic medal races, and the shooter who throws a wild shot in the finals competition. Intuitively, we understand that these athletes have "choked" under pressure.

What is choking, how does it work, and can anything be done to prevent it? Research performed at Michigan State University, and published by the American Psychological Association, sheds significant light on this question. [Beilock, 2001] Selected key findings of the research and how they may be applied on a practical basis will be explored in this article.

First, a few terms need to be defined. Then foundational concepts and major findings will be discussed. Finally, very specific application of the results to shooting training will be presented in the next article.

"Performance (outcome) pressure" is the anxious desire to perform at a high level. It is thought to vary as a function of the importance of the outcome that the performer feels. For example, an athlete will generally feel more pressure to perform well in the Olympics than at a local match on their home range.

"Choking" is performing more poorly than expected given the athlete's level of skill. This tends to occur in situations "fraught with peril". That is, those situations where the athlete feels significant performance (outcome) pressure. This is particularly noticed in tasks that utilize sensorimotor or action-based skills, such as in golf or target shooting.

There are two predominant theories attempting to explain the failure mechanism in choking:

The "distraction" theory holds that the performer shifts their focus to task-irrelevant areas, thus creating what is called a dual-task environment. This has great effect on tasks requiring decision-making and or attention to task details that are held in short term memory.

The "explicit monitoring theory" holds that the performer's attention is fixed on process details and step-by-step control of the process. This has greatest effect on tasks that are compiled as mental or motor programs (or procedures) that are best performed without conscious control.

As part of the research, two well known characteristics of a performer's ability to recall a procedural or motor-based task were used to determine a test subject's level of "automation" of their performance of the skill.

"Generic memory" is the ability to generically describe the steps required to perform a complex task. Experts are typically very good at this, having learned the task quite well, while beginners are not very good at this, having not memorized, or even learned, all of the requisite steps in great detail. Experts also spend much more time (i.e. describe more steps) on evaluation and preparation than the novices, who tend to start their descriptions with actual performance of the task. Experts also tend to use much more imagery.

"Episodic memory" is the ability to specifically describe the step-by-step unfolding of the steps of a particular performance (episode – or shot) of the task. Beginners are very good at this because they have to think through the steps of the task in order to perform it at all. Experts have very poor recall of how a particular performance unfolded because they do not think about the steps involved; they "just do it" because the task has become automatic.

As one part of the research, the equipment used by the performers was changed such that all test subjects had to partially relearn their task. This had little effect on the novices, as their performances were at a lower skill level and based on attentional step-by-step control. Experts showed a large negative effect initially, as they, too, had to revert to step-by-step control in order to learn the new procedure. As soon as they had mastered (automated) the new version of the task and no longer had to pay attention to the specific steps of the procedure, their performances returned to a very high level.

The experts had heightened episodic memory while relearning, at higher levels than even the novices, and then reverted to significantly diminished levels of episodic recall as the task became automated again. This shows that attentional control of a step-by-step procedural process, though required to initially learn a process, causes a reduction in performance of the process itself for accomplished athletes.

Three training strategies were then explored to determine if one could "inoculate" the performer from choking.

In ordinary "single-task" training, there were no distractions and no outcome pressure. This is typical of the training environment when a skill is being learned or evaluated. Even for elite athletes, a significant amount of training in the shooting sports is done under these conditions. This is the control group for the testing.

In "dual-task" training, a task-irrelevant activity requiring working memory was added to the training. This prepares for testing the distraction theory of choking.

In "attentional control" or "self-conscious" training, attention to the process and outcome was placed on the activity. This caused self-conscious attention within the performer in order to induce attentional control of the process. This prepares for testing the explicit monitoring theory of choking.

Test subjects who trained in the "single-task" and "dual-task" training environments were found to be highly susceptible to choking. Those who trained in the "attentional control" environment performed at similar or even higher levels under stress than they did in training.

With complex, sensorimotor tasks, the failure mechanism that manifests itself as choking is thus quite clear:

...performance disruption occurs when an integrated or compiled real-time control structure that can run as an uninterrupted unit is broken back down into a sequence of smaller, separate, independent units-similar to how the performance was organized early in learning. Once broken down, each unit must be activated and run separately, which slows performance and, at each transition between units, creates an opportunity for error that was not present in the integrated control structure. [Beilock, 2001]

In simple terms, the athlete does not trust their process, training, or even their own self. The athlete attempts to "take control" of the performance to monitor, manage, and "check" the process at key points. This slows the process and destroys the timing and rhythm of the performance. It actually introduces many opportunities for additional errors that would otherwise not have occurred. The resultant outcome is at a much lower level than it would have been if the athlete had just allowed the action to unfold on its own.

Thus, the "explicit monitoring theory" explains choking for complex, sensorimotor tasks such as target shooting. Accordingly, elite level shooting is best performed without conscious control of the actual shot process. Full details of the research methods and results may be found in the referenced paper.

Experienced athletes and coaches alike will already perceive the implications of these results and be able to imagine training strategies based on them. The next installment of this series will present additional findings and then describe specific, practical application of the results in training, which will help to "inoculate" the athlete from the choking syndrome.