

The Science of Combat

PART TWO:
Motivation affects technique



Australian amateur team boxer Jeffrey Horn (in red) battling Ukraine's Denys Berinchyk in the light-welterweight (64 kg) quarterfinals at the London 2012 Olympic Games

PHOTO BY SCOTT HEAVEY/GETTY IMAGES

Harsh or helpful? Direct or diplomatic? If you're a sensei, sifu or coach, knowing how to talk to your students or athletes to get the best out of them is not always easy, and whatever teaching style you choose may be ideal for some but not others. Never fear: the scientific minds at the Australian Institute of Sport Combat Centre have been hard at work to find the best way forward for Aussie coaches, and you. Here in part two of this series looking at groundbreaking research into martial arts and combat sports, PhD scholar, kickboxer and strength and conditioning coach Israel Halperin joins the University of Nevada's Professor Gabriele Wulf to explain how specific words used by coaches can motivate us to perform better.

STORY BY ISRAEL HALPERIN & GABRIELE WULF

Coaching feedback is the cornerstone of learning and advancement in martial arts and combat sports. In our previous instalment we introduced the concept of 'attentional focus' and what type of instructions bring out our best technique, and in this article we will discuss the types of feedback frequently employed in combat sports. Generally speaking, there are two kinds: positive and negative. Positive feedback essentially refers to any advice or commentary concerning performance that is complimentary in nature — for example, "You are looking sharp, keep up the great work", "That boxing combination you just delivered looked very powerful", "You significantly improved your technique compared to last week", and so on. Conversely, negative feedback is critical in nature, for example, "You are looking sluggish out there, wake up", "That boxing combination you just delivered was too slow, you have got to turn your hips", "You can do better than that", and so on. As a result of recent studies into the effect of both kinds, we at the AIS argue that positive feedback should be favoured as much as possible because it has advantageous effects on learning and performance.

GET POSITIVE

The beneficial effects of positive feedback statements have been demonstrated in a number of recent experimental studies. Results indicate that training conditions where positive feedback is the norm tend to enhance the trainees' expectancies of future performance and this mental effect in turn offers a physical pay-off, resulting in improved motor learning and performance. In some studies, for example, feedback was provided after relatively successful performances for one group of participants and less successful performances for another group. While one might expect feedback to be more useful if it is given after flawed attempts, findings consistently showed that feedback about good performances produces more effective learning. Positive feedback not only facilitates learning in the longer term, but often has an immediate beneficial influence on motor performance. In fact, it has been demonstrated to increase movement accuracy, timing and balance. Moreover, individuals were able to sustain effort for longer in a muscular endurance task compared with when they received neutral or negative feedback on the same task.

Interestingly, positive feedback enhances movement economy (defined as the amount of energy utilised to perform a given movement task). In one experiment, trained runners ran on a treadmill for 20 minutes at a constant speed under two regimes: in one no feedback



Halperin has some positive words with ISKA world champ Josh Tonna

"self-confidence is strongly associated with superior performance in sports"

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was provided, and in the other participants were told that they are very efficient runners. Simply providing the runners with this positive feedback led to reduced oxygen consumption. While none of these studies directly investigated martial arts, the results have important implications for martial artists because the ability to sustain effort, move efficiently and accurately, and maintain balance are all key attributes of successful practitioners. Positive outcomes are generally seen when performers feel competent and successful, whereas feedback that is mostly corrective and/or prescriptive tends to undermine the performer's sense of competence, with negative consequences for performance and learning.

MOTIVATION, CONFIDENCE & PERCEPTION

The beneficial effects of positive feedback on motor learning and performance are mediated by motivational factors. Positive feedback leads to enhanced self-efficacy or confidence, satisfaction with one's performance, increased interest in the task, reduced concerns about one's performance or abilities, and more positive

emotions. These factors allow students and athletes to shorten the acquisition time in mastering new techniques. Providing positive feedback increases what's known as 'intrinsic motivation', defined as the degree to which behaviours are driven by internal rewards. Intrinsic motivation is associated with feelings of joy and pleasure during training/competitions instead of the feeling that one has to train or compete to please the coach or family. Intrinsic motivation contributes to the long-term success of martial artists and combat athletes because, aside from its effects on task interest, motivation to practise and the like, feedback suggesting that one is doing well often has an immediate desirable influence on coordination. Reducing performers' concerns or nervousness while also increasing their confidence through positive feedback leads to greater movement effectiveness and efficiency — in fact, several studies showed that participants felt greater confidence in their abilities and in their future performance under pressure after receiving positive feedback.

Not surprisingly, self-confidence is strongly associated

with superior performance in sports. Of special relevance to combat sports is the observation that winners of karate and taekwondo competitions reported higher self-confidence compared to the losers of the bouts.

PUNCHING FOR POSITIVES

During the 2015 Australian National Amateur Boxing Championship, we recorded, transcribed and analysed the verbal feedback boxing coaches provided between rounds of competition. In addition to other types of feedback such as external and internal focus instructions, which we discussed in the previous instalment, we investigated the frequency of positive and negative feedback. The good news is that as a whole, boxing coaches implemented positive feedback nearly twice as much as negative feedback. Interestingly, however, a different picture emerged when we separately analysed the results of winning and losing bouts: whereas coaches in both winning and losing bouts provided a similar amount of negative feedback, in winning bouts coaches provided twice as much positive feedback as compared to coaches in losing bouts. This is an intriguing result that points to a possible relationship between the type and frequency of feedback provided, and the match outcomes — but, with that being said, it isn't possible to draw a conclusion of cause and effect from these results. That is, there are at least as two possibilities that can explain the results: (1) when athletes perform well, coaches reward them with positive feedback, and (2) the positive feedback enhanced the athletes' performance. This issue remains to be resolved but we believe that the two scenarios are not mutually exclusive. In view of its important implications, this topic requires further investigation, and we are now undertaking a project aimed to shed more light on it.

ADVICE FOR COACHES

As illustrated in this article, the choice of feedback can considerably affect a student or athlete's motor performance as a result of its motivational impact. Confidence, perceptions of task difficulty, muscular endurance, movement accuracy and efficiency play a key role in martial arts and combat sports, so when given choice, positive feedback should be preferred over negative feedback. In training and competitive environments, AIS's best practice is to resist the urge to immediately provide (negative) feedback when students do not execute a technique in a proper manner or perform it without adequate intensity. In fact, such feedback is often redundant as athletes are aware of their less-than-perfect performance. Instead, highlighting positive aspects of performances and then offering a potential solution for the issue at hand will likely go a long way. This approach will lead to a favourable state of mind, faster learning and better performance.

Former combat-sports athlete Israel Halperin is a kickboxing and strength and conditioning coach, and a PhD scholar with Edith Cowan University in conjunction with the Australian Institute of Sport (AIS). Halperin works at the AIS Combat Centre, testing and monitoring athletes, conducting research and providing overall support for the four Olympic combat sports of judo, boxing, wrestling and taekwondo.

Gabriele Wulf is a professor in the Department of Kinesiology and Nutrition Sciences at University of Nevada, Las Vegas, USA. Dr Wulf studies factors that influence motor skill performance and learning, such as athletes' focus of attention and motivational variables. Her research has resulted in 175 journal articles and book chapters, as well as two books. ■

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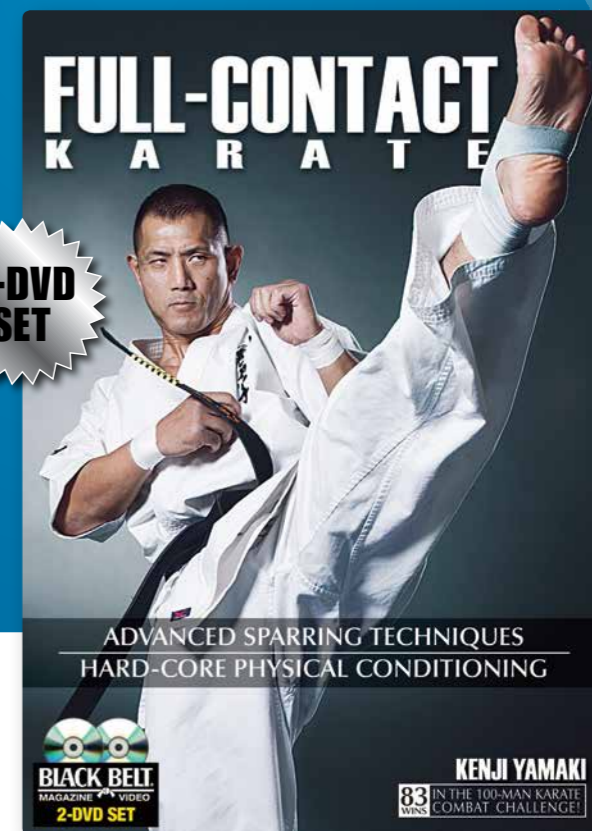
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