Searching for the Flow Zone

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'Being in the zone' or 'with the flow', is associated with high achievement in many fields of human endeavour including athletic performance such as target shooting. The originator of the concept of 'flow' identified the heightened and energised focus experienced when in this state (Csikzenthmikaly, 2004).

According to Katwala, (2016), being in the 'flow zone' is 'just positive energy, a good feeling, your whole body is involved, nothing else seems to matter, mood can be elevated, movement seems to be automatic, outside conscious control and very fast. Since 'flow' has the potential to enhance performance outcomes, possibly at the required time (peaking) it has attracted scientific interest. The question posed here is could an understanding of the attributes of the 'flow zone' be used to refine an approach to competitive shooting? Triple Olympian David Moore, speaking of the 'flow zone', said: 'You cannot switch it on at will and if you think about it, it's gone' (2018). That 'flow' cannot be switched on is supported by Katwala (2016). Sue Guy described being in the 'flow zone': 'you shoot a ten, then another, then several more and it seems effortless' but she added 'it does not last' (2018). While winning a State Championship, Dick Willis reported feeling beside himself; a spectator (2018). My experience of the 'flow zone' reflected a number of the attributes of the 'flow'. There was a challenge; it was a shoot-off for the Rapid fire Bronze Medal in a National Championship. I was under pressure; it was the final four second series. I was pushing the boundaries of my ability and remember urging myself to concentrate; all these are requirements for 'flow' according to (Katwala, 2016). There was a sense of calm as I shot the series. Time seemed suspended. It was like watching a movie of a perfect four second series being completed without conscious effort. I put the gun down thinking there was nothing I could have done to improve the sequence; a possible.

Research interest in 'flow'

'Flow' results from facing a challenge with clear goals; a challenge which requires pushing the boundaries of existing skills, with an achievable gap between the two. A condition for 'flow' is that the required skills must be able to performed automatically (Katwala, 2016). Driven by total energised immersion in the task, 'flow' moves concentration to its highest level, pulling attention into the 'now'. This deep concentration shifts neuro control of the task to an automatic level, clearing away conscious control. The shift to automatic control results in increased speed of movement (Katwala, 2016). 'Flow' causes the brain's processing system to kick up a gear giving you a kind of hypersensitivity (Katwala, 2016). Among other things, this will heighten visual attention and speed up the processing of information and pattern recognition (Katwala, 2016), These will improve aiming and timing. 'Flow' is said to

involve creative problem solving. There is a sense of control over the situation. Factors that increase the likelihood of entering the flow state include motivation to perform well; a strong focus, an optimal psychological arousal state which includes controlling the heart rate; having done the training; experienced competition; and having confidence (Cotterill, 2018:68). Katwala (2016:174) describes the four stage chemical basis for 'flow'. In Stage One the body prepares to boost mental focus, alertness, and to raise the heart rate. The chemical basis here involves release of stress hormones; cortisol, adrenaline and norepinephrine which increases arousal, emotional control and attention in the brain and the neurotransmitter Cont. The brain has a 'hundred billion neurones, each with a thousand or more synaptic connections (to pass messages along neurone pathways) (Sacks, 2017:173). Bringing the astonishing powers of the human brain to bear on a challenging task with a narrow focus has consequences. The conscious level which operates during 'flow', can fashion a perception of time which is elastic and can be compressed or expanded. Sacks (2017) gives an example of the brain manipulating time by capturing a moment of perception as a slice of time: a baseball pitch can be perceived to be 'almost immobile in the air'. Since time moves on and the registration of it in the brain is always after the fact, trying to pick the perfect moment to fire the shot is risky. For precision shooting, it is better, after committing to the shot to have it occur within a half to two seconds. This has to be faster in rapid fire. When concentration on the task reaches virtually total, energised

immersion, the inner voice of doubt can become switched off due to insufficient attention being available to be conscious of the sense of self; so that the body disappears (Katwala, 2016). For a skill to become automatic it is processed by the conscious parts of the brain before progressing to automatic control and carried out without conscious decision (Katwala, 2016:154). However, when someone who can perform the skills automatically, starts to think consciously about doing them, the pre-frontal cortex of the brain, important in learning new skills, seizes control, making movements slow and less fluent. This can unravel skills already possessed (Cotterill, 2017). Overthinking is suspected as causing choking or 'paralysis by analysis'. 'Get your head out of it' says (Katwala. 2016:149). He suggests that overthinking can be reduced by squeezing a rubber ball in the non-shooting left hand. I would add, alternatively, give yourself less time to think by working out how to fire earlier. The dangers of overthinking should not be taken to weaken the power of 'self talk' to focus training and match performance on what counts. Nor does it weaken the use of mental practice and the power of visualisation which is a characteristic of successful performers (Cotterial, 2018). These serve the important functions of building and focussing awareness and, probably, the release of the same neurotransmitters in the brain which stimulate 'flow'. The brain can initiate muscle movement several hundred milliseconds before it registers in the conscious mind. (1 second = 1000 milliseconds). A sprinter in the 'flow zone' could be three metres down the track before becoming aware that the race has started (Sacks, 2017:38). This means that the feedback loop mechanism can be activated automatically (Ramachandran, 2011). This mechanism describes the brain's process when sending signals to the muscles. Cont. creativity (Kotler, 2014:66). In 'flow', dopamine, along with norepinephrine boosts the brain's ability to recognise patterns, heightens the senses and helps to stay focussed on a task (Katwala, 2016: 175). Also Alpha waves, favourable to 'flow' due to their calming influence, need to be present (Katwala, 2016). These chemicals may be present anyway during good shooting. The second stage of the flow cycle is the shift 'out of conscious awareness and into automatic processing', although conscious awareness remains (Sacks (2017). Cotterill (2018) suggests that conscious awareness addresses strategic aspects of performance while the automatic mode covers movement. The end of the second phase, according to (Katwala, 2016), is accompanied by a body wide release of nitric oxide that rids the body of stress hormones and begins a calming state 'to signal the start of flow'. The third stage is 'flow' a tranquil feeling created by endorphins. The final stage sees the release of serotonin associated with a "happy afterglow (Katwala, 2016:175).

The signals go out from the spinal cord but simultaneously, the brain retains a copy of these instructions. In other words, the brain prepares to readapt, if needed (Sigman, 2015:116). It is possible, in the heightened state of 'flow' that when, say, a set of instructions to move the arm and hand are correctly executed -- no error signals detected - the brain remains in a conscious monitoring role but not a controlling one. Sigman (2017), argues that consciousness 'has the ability to edit, modify or censure actions'; a somewhat limited view of consciousness. If there is no need to edit, modify or censure actions, then response time should be faster. The brain takes error seriously 'as an involuntary response (outside consciousness) which occurs about 50 milliseconds after we make a mistake' and our awareness of it 'comes between 100 and 500 milliseconds later' (Katwala, 2016:296). This suggests that training should seek to systematically remove errors in the performance of the skills critical for success; since errors disturb 'flow'. Since the brain can detect the optimal time to make the shot before we know it, training should give the capability to capitalise on that moment. To achieve that, the Commonwealth Games Gold Medallist, Pat Murray (2013), trained to start to fire the shot before the sights settled in the aiming area and to know, from pressure already applied to the trigger, when the shot was ready to go. What do you see when you see the sights? Research has found that expert basketballers looked at the target of their throw, the rim of the basket, far longer than did novices. Borrowing from this, one way to increase concentration before the shot or sequence, could be to gaze intently at the target while mentally running through what you are about to do. Visualising the perfect outcome has been found to be a valuable tool in improving athletic performance (Katwala, 2016) and should include mental rehearsal of the feel of a perfect trigger release. The technique of merging mental practise of the shot seamlessly into the actual shot, a conscious process, should move from conscious to automatic control of the process of sighting, trigger release and follow-through. Visualisation can shorten reaction time by focussing on what is essential to a successful outcome. Building anticipation, based on correct technique, can shorten reaction time through muscular positioning (Katwala, 2016:10). Experts spend more time than novices looking at what counts for a successful outcome, a phenomenon referred to as "quiet eye" a quiet phase observed just before trigger action of expert shooters compared to novices. It reflects a 'drop in neural activity as experts are about to activate the trigger and is believed to result from different regions of the brain stopping communicating with each other (Katwala, 2016: 170).

The finding that the brain can initiate muscle move-ment several hundred milliseconds before it regis-ters in the conscious mind, mentioned previously, is a possible reason why it is difficult to consciously enter the 'flow zone'. The first step could be outside our conscious control.

Training The importance of training for the actual perfor-mance, not just for the acquisition of skills alone was stressed by Cotterill (2018). Kotler, (2016:116) suggests practising for a situation requiring high level output by using a challenge set just above our existing skill levels so as to be achievable but not disturbing,

such as, by making the challenge four percent greater than current skill levels. The other criterion for 'flow' attaining total immersion in the task, highlights the importance of learning to con-centrate deeply and calmly, e.g. using relaxation and breathing techniques. Deciding to begin con-centrating as sights are settling into the aiming area is too late. There have been attempts to shorten the time need-ed for skills mastery by using computers and simu-lations to train the brain. Katwala (2016:64) advis-es, correctly, that brain training should zero in on the key mental attributes required for the sport and, could be added, fitting yourself to them and training to perform the event, not just to acquire skills. At the end of a training session, Katwala, (2016) advis-es performing the complete sequence of actions be-ing learned, making the actions as similar to the ac-tual event as possible and done in the same time frame. This is to capitalise on the boost (neural plasticity) given by training to changing the brain's neurone pathways. Exclusion can be used consciously to remove dis-tractions before the match. Have a routine to engage such as seeing the sights in the aiming area and re-coiling as a perfect shot is released or use 'self-talk' to substitute positive thoughts for negative ones, or practice wrapping yourself in a kind of mental co-coon as you load and prepare for the shot or series. Cotterill (2018) suggests that 'self-talk improves the execution of movement. Having clear goals are said to be essential for entry into the 'flow zone'. Effec-tive goals are specific, measurable, action-related, realistic and timetabled (Cotterill, 2018). Goals which are based on a skills analysis of what is critical for you to succeed in a particular task, enable the brain to learn how a successful outcome looks and feels by reading the messages received from thousands of proprioceptors; body sensors. Conclusion 'Flow' is defined by achieving successful outcomes. However, with target shooting, statistical fluctuation is always present. The bullet could have been fired with the aim in the nine ring but due to the grouping capability of the pistol, the shot might land in the ten ring.

Also, the wobble pattern of the shooter could have been flicking into and out of the ten ring but, over several shots, by chance, thy landed favourably. It is not necessary to be in the 'flow zone' to shoot well but concentrating on the task is essential. Evidence shows that characteristics of the 'flow zone' linked to high level athletic performance, match those associated with high achievement in target shooting. The approach to competition shooting, given below, is based on research into the 'flow zone'. First, it is suggested, begin the process of making key skills automatic by doing a skills analysis of how best to fit yourself to the skills required to successfully compete in the match. Then encapsulate this in a checklist, written or held in the mind, to help build awareness and focus concentration when setting up for the shot or series. Strip the checklist down to the minimum, necessary elements so as to avoid the danger of overthinking the shot or series. Practice until you can flow through it almost without thinking. Train to shoot in a relaxed state but with heightened concentration and visual awareness; aiming to achieve total immersion in the task as you would be if in the 'flow zone'. Train against a challenge either real, as in competition, or manufactured during practice. Train to make key actions automatic, selectively in the beginning, e.g. linking trigger action to aiming to follow-through, in a smooth flowing process. Get your conscious brain out of it. The overall training and preparation strategy is to make as many of the actions of preparation and shot production as automatic as possible. Leave the bulk of conscious brain work to post match evaluation but correct technical errors during the match, as they emerge, revealed by calling the shots.

References Books consulted: Csikzenthmikaly. www.tedtalks.com)., personal communication). Cotterill. S., (2018). The psy-chology of performance. Routledge. Oxon. Katwala, A. (2016). The athletic brain. Simon and Schuster, UK. Ko-tler, S., (2014) The rise of superman, Amazon Publish-ing, NY. Ramachandran, V.S., The tell tail brain. W.W.Norton & Co, NY. Sacks, O. (2017) The river of consciousness. Alfred Knopf. NY. Sigman, M. (2015) The secret life of the mind. William Collins. G.B. The remaining references relate to personal communications. Sub-note on FLOW (courtesy of Wikipedia) In positive psychology, flow, also known colloquially as being in the zone, is the mental state of operation in which a person performing an activity is fully immersed in a feeling of energized focus, full involvement, and enjoyment in the process of the activity. In essence, flow is characterized by complete absorption in what one does, and a resulting loss in one's sense of space and time.