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DISTRESS TOLERANCE IMAGERY TRAINING

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ABSTRACT

Martial artists often use imagery training, both for technical skill development and for managing the self and others in conflict situations. There appears, however, to be no consistent method of imaging work employed to help develop such skills.

We therefore present the PETTLEP approach – Physical, Environment, Task, Timing, Learning, Emotion, Perspective – drawn from the field of sports psychology, as a unifying theoretical framework for dynamic imagery interventions and propose a novel protocol for distress tolerance imagery work to help train martial artists in coping with stressful/conflict events. Such tools have a range of values and may be particularly important during periods when face to face, hands-on, or simulation drill training as part of martial arts practise may be impractical, such as during the COVID-19 crisis.

INTRODUCTION

Martial artists train for a variety of reasons. Attempts to delineate these have led to recent debate. Principal within this is whether it is necessary to define the martial arts or their purpose in order to practise them or conduct related studies into their nature and function. Wetzler's polysystem theory [2015] and Bowman's [2017] response to this expand on such issues in greater detail. In our experience, however, and for the purposes of this article, we refer to the tendency of many to cite their interest in practice as including the need to physically protect themselves and others in stressful/threatening encounters. Indeed, *pre*, *peri* and *post* self and other conflict management is well recognised as vital in ensuring physical and psychological safety outside of the training hall when facing the realities of street violence [Thompson 1997]. Ensuring a favourable outcome in such situations can be practised to a high level to increase the simulation fidelity, or transfer to the intended environment, of combat training [Morrison 2015] and typically involves the presence of others.

Such training is important as the defensive cascade most animals face in the presence of increasing threat has been described as successive phases of Freeze-Flight-Fight-Fright-Flag-Faint [Schauer and Elbert 2010], the latter of which are associated with a reduced capacity to defend oneself. Such emotionally driven states therefore need successfully managing to ensure a competent holistic response to any significant conflict situation. Central to this will be the need to manage the self during such times, which we explore below in relation to affording an appropriate and proportionate, ideally non-violent/peaceful, response to an aggressor.

Indeed, as Porges [2017] has noted, to respond compassionately (i.e. to reduce suffering) through de-escalating or halting the distress/aggression of another, one needs to feel sufficiently safe and grounded. This can be achieved through simultaneously encompassing the feeling of one's own bodily responses while acknowledging those of the other. Such a balanced internal state, we believe, can be cultivated so that we remain functional/responsive in the face of conflict. In doing so, we can perhaps better embody the ideals of peaceful living, mindful responding, and applying only reasonable force when threatened [Ueshiba and Stevens 1992], as enshrined in many martial arts traditions.

Although forms/kata work allow martial arts to be practised without the need for partners, many elements require the dynamic interplay between multiple parties. Restrictions on access to partners, as a result of the COVID-19 crisis, has limited our ability to train in this way. As a result, the recent global context has prompted us to consider and review the ways in which we train conflict management and specifically

whether it is possible to practise dynamic interpersonal elements of this as a solo practice.

We therefore explore the relevant literature on mental imagery training and consider the extent to which it might allow a bridge between multiple partner simulation/role play training and solo practice in the service of balanced emotional responding to conflict.

MENTAL IMAGERY

Mental imagery typically refers to internal representations and the attendant experience of sensory information without an external stimulus [Pearson, Naselaris, Holmes, and Kosslyn 2015]. Experimental research with healthy participants has shown that mental imagery has a stronger impact on subjectively experienced emotions than verbal processing alone [Hackmann, Bennett-Levy and Holmes 2011]. Similarly, participants instructed to imagine themselves in scenarios show greater changes in mood state than peers instructed to think about them verbally [e.g. Holmes, Lang, and Shah 2009]. Imagined scenes can be visualised as if through one's own eyes (known as a 'field' perspective), or from a third-party view (an 'observer' perspective). Typically, field-perspective imagery tends to have a more emotional impact than its observer-perspective counterpart. Importantly, the sense of realness of mental imagery may be enhanced through repeated rehearsal, increasing the experienced plausibility of an imagined event [Szpunar and Schacter 2013].

Imagery may allow successive practice of our responses to conflict, building up an increasingly veridical impression of this over time. This is consistent with Imagined Interaction Conflict-Linkage Theory [Honeycutt 2003], which operationalises imagined interactions (IIs) as a type of social cognition and mental imagery that serves a number of functions including rehearsal for social relating, increasing self-understanding, managing conflict and relational maintenance [Honeycutt and Ford 2001]. II conflict-linkage theory proposes that conflicts are kept alive through retroactive and proactive imagined interactions in the form of mental imagery, and that constructive conflict resolution is likely enhanced by vividly imagining more positive interactions and outcomes [Honeycutt 2003] that is best achieved through visual rather than verbal imagery [Zagacki, Edwards and Honeycutt 1992].

USES IN SPORT

Athletes regularly use imagery for both cognitive and motivational purposes, although the latter has been identified as the more common [Cumming and Hall 2002]. An important function of this can be to increase self-confidence and by extension self-efficacy. Williams and Cumming [2012] considered the relationship among athletes' sport imagery ability, their trait confidence, and their tendency to appraise situations as challenging and threatening. They measured ability to generate five differing types of imagery content: skill (e.g. correcting/adapting physical skills), strategy (devising or updating game/event plans), goal (imagining oneself winning/achieving), affect (the anticipation and excitement associated with an event) and mastery (staying confident in a difficult situation). While both skill and strategy imagery represent the ease of imaging cognitive elements of an activity, goal, affect and mastery images are related to the ease of imaging motivational elements.

Mastery and goal imagery ability positively predicted self-confidence ratings, which in turn both negatively predicted threat appraisal tendency and positively predicted challenge appraisal tendency. Moreover, challenge appraisal tendency was directly predicted (positive direction) by imaging mastery and affect imagery and threat appraisal tendency (negative direction) was directly predicted by ease of imaging mastery imagery. Such work illustrates the relevance of motivational imagery ability in self-belief and its impact on appraisal processes, thereby underscoring the need to fully assess users' abilities to image different elements and content.

Another study by the same authors [2015] then investigated whether imagery ability among athletes predicted the direction (negative/debilitative versus positive/facilitative) and intensity of their trait anxiety, and the role of trait confidence in mediating this relationship. Only mastery and goal imagery ability positively predicted confidence and in turn this negatively predicted both somatic and cognitive anxiety intensities and positively predicted somatic and cognitive anxiety direction. Put another way, mastery and goal imagery ability indirectly influenced cognitive and somatic anxiety intensity and direction via their relationship with self-confidence. To a lesser extent, mastery was also found to directly (negatively) predict cognitive anxiety intensity, as was affect (positively).

These findings underscore the importance of mastery and goal imagery ability in regulating confidence and by extension the intensity and direction of anxiety symptoms. Athletes who have the most skill in fully *seeing* themselves achieving goals and performing well in difficult situations seem most able to reduce the effects of negative images

by substituting these with more helpful, positive ones. Motivational imagery ability may then be a factor in performance and its various component skills can be targets for practice.

While athletic sports involve performance anxiety and the excitement of participation and success, the field of martial arts offers us a further context with which to consider the role of imagery, as it more closely maps onto embodied experiences of interpersonal conflict.

USES IN MARTIAL ARTS

Martial artists have been shown to use both mental imagery and self-talk as a part of their training [Devonport 2006]. In an attempt to consider the impact of these elements on the response times of trained practitioners when delivering back leg round kicks, Hanshaw and Sukal [2016] divided participants into control, cognitive-specific (CS) mental imagery, motivational self-talk (ST) and mixed CS and ST groups. They found that motivational ST, CS imagery and the combination of the two significantly reduced response times, with large effect sizes regardless of strategy.

Such findings are broadly typical and have been demonstrated by others in terms of imagery practice helping karate practitioners learning a new striking technique [Fontani et al. 2007] or specialising in forms/kata [Piepiora et al. 2017] and is also seen in the acquisition of judo techniques [Chalghaf et al. 2013]. Other work on imagery, in conjunction with muscular relaxation training, has improved the emotional intelligence of karate practitioners [Reza et al. 2020] which is felt to translate to superior technical performance in competition. However, this assertion was not explored by the study in question and so remains an untested assumption. This seems important and appears to capture the notion common in much related research, that a more general level of improved imagery skill will directly translate to practice.

Technique-based imagery work does not, however, seem to focus on the dynamic and interpersonal elements of martial arts/conflict. In contrast, a case study by Sato and Jensen [2018] is therefore helpful in this regard. It offers a reflection on mental preparation for a national kendo competition and included a focus on educating and assessing the practitioner's imagery training needs, teaching mental skills and applying them in context (importantly this applied to specific kendo drills as practised with the sports trainer) and evaluating both mental skills ability and kendo technical improvements. Performance, development and improvements were noted through observations by others, by the imager's own proprioceptive feedback, by exploring

video playback of his performances and via comments from peers who had trained with the practitioner over a long period. He also did well in competition, believing his mental imagery and preparatory training to be important in this, recognising the interlinked nature of the physical, technical, and mental aspects that had been imaged and practised.

At a group level, however, it has recently been shown that taekwondo fighting in training does not successfully simulate the emotional and cognitive demands of competition. In a novel study aimed at enhancing practice design to facilitate transfer to its intended environment [Maloney et al. 2018] explored the representativeness of cognitions, affect, actions and interpersonal behaviour of practitioners fighting in training and fighting in competition. Using a complex series of quantitative and qualitative measurements, fighters in training demonstrated fewer attacks, initiated attacks from greater distance and were more predictable in their movements than when fighting in competition. They also exhibited lower anxiety, arousal and mental effort and in self-confrontation interviews of video replays of fights reported less pressure, arousal and sense of mental challenge. Such findings underscore the complexity of matching training to the demands of live competition, leading the authors to suggest that to be representative practice outside of its intended arena needs to include fully modelling the cognitions and emotions of competition to better enhance transfer.

Sparring in traditional forms of combat (such karate, taekwondo, kung fu) typically involves a restrictive series of movements and attendant rules to encompass each respective styles' agreed in-fight manner of engagement. In contrast, mixed martial arts (MMA) has been the subject of increasing research over recent years and arguably simulates a more intense, multi-range, comprehensive experience of fighting. Of course, neither can claim to fully simulate the experience of a non-consensual real-world violent encounter [Miller 2008].

Jensen et al. [2013] explored the experiences of MMA practitioners and noted the most important element of the descriptions they obtained seemed to point to the chaotic nature of MMA fights. Characterising this as 'cage reality' the authors cite fighters' beliefs that their arousal (see physiological and emotional) regulation skills are *at least* as important as their technical ability for success. Participants also noted that 'cage reality' differs markedly from typical training. However, as Bowman [2014] points out, 'reality' in terms of martial arts practice is experientially driven and therefore highly a subjective/perspectival term [see also Downey 2007].

Others, [e.g. Staller, Zaiser and Körner 2017] suggest we should abandon the use of imprecise multidimensional terms such as 'realism'

and 'reality-based' as their use may inadvertently confound the design of relevant training procedures and environments. They argue for a shift in emphasis from realistic to representatively designed testing environments, which might provide instructors/trainers with more precise tools to consider the inevitable trade-off between representativeness and practitioner health and safety when training, for example, self-defence skills. Staller et al.'s [2017] Trade-Off Model of Simulation Design is one attempt to bridge this gap. In keeping with such a position, adaptations to training environments and training kit continue to evolve over time to reduce the gap between ethically impossible and viable simulation training [Miller 2008; Morrison 2015].

Practical implications of Jensen et al's [2013] work seem to be that simulating the intensity of competition-based fight conditions may be difficult during training. However, any procedures or activities that provide practitioners with the chance to enhance the rapidity with which they are able to adapt their in-fight strategies and actions to the situation at hand, in keeping with the chaotic MMA arena, could be helpful. Jensen et al. [2013] suggest that the use of a random practice scheduling, to challenge a practitioner's ability to read others and react to a variety of scenarios and possible situations may help in this regard but as yet this assertion remains to be empirically tested.

Those training practitioners in such circumstances might focus on attention to changes in experienced arousal during training sessions and develop various strategies for heightening or reducing this in response to the evolving requirements of the encounter. All of this might be trained using both actual and imaged sessions. Trainers are also advised to help increase practitioners' awareness to the physical elements of a competition (e.g. blows landing), their perceptions of their opponents, and the pre-competition impact of their connection to the audience, all of which might be expected to affect levels of arousal and so performance, so that effective preparation can be fully imaged and successively practised.

MMA fighters, however, develop different strategies with which to manage or renegotiate the physical force and violence they experience [Andreasson and Johansson 2018]. Many seem to involve avoidance, a downplaying of, or the re-negotiation of violence to something understood as part of an entertainment spectacle and competitive sport. Practitioners know the damage they might deliver or sustain is real with the potential to have a considerable impact upon life, body and self. The emotional management of their fear, to stay physically safe but also perform well for an audience as part of an embodied [see Spencer 2013] form of global sport and physical culture, seems to mean that managing emotions within this unique arena may play a central role in MMA.

Imagery therefore does seem to be ubiquitous in various forms of martial arts practice. However, there seems to be no consistency as to the specific mode used or methodology employed. As a result, we turn to a model which has been developed to overcome such issues across sporting arenas.

THE PETTLEP APPROACH AND LAYERED STIMULUS RESPONSE TRAINING

Holmes and Collins [2001] developed the Physical, Environment, Task, Timing, Learning, Emotion, Perspective (PETTLEP) approach as a theoretical framework for the effective execution of imagery interventions. It was conceived of as an alternative to the relatively inert (e.g. laying down or seated) manner in which imagery work among sportspeople was typically carried out. It features the seven elements the authors argue are minimum requirements needed so that imagery work substantially maps onto (i.e. is functionally equivalent to) the skills to be honed, in order to maximise the efficacy of an action or performance.

Collins and Carson [2017] have noted that the PETTLEP approach has gained support in a wide range of sporting endeavours such as golf [Bernier and Fournier 2010], gymnastics [Battaglia, et al. 2014], volleyball [Afrouzeh, et al. 2013] and football penalty taking [Bjorkstrand and Jern, 2013] as well as in musical instrument practise [Wright, Wakefield and Smith 2014] and upper limb rehabilitation [Harris and Herbert 2010]. In terms of its application, Wakefield and Smith [2012] emphasise the importance of trainers developing a strong working relationship with an athlete when using imagery work and that such practices are introduced and rehearsed thoroughly prior to independent use. They suggest that PETTLEP imagery may be a viable alternative to the performance of a skill in situations where further physical practice or the real-time experience is not possible or indeed advisable (for instance, during COVID-19 social distancing restrictions). They helpfully go on to summarise a series of key recommendations of how to apply the PETTLEP model, which we have adapted for use in terms of distress tolerance and the successful management of interpersonal conflict below.

Although skill in imaging develops with practice, more recent advancements in applied imagery work come from Cumming et al. [2016] who have developed a practical guide to layered stimulus response (LSRT) training. They note that while natural imagery ability is variable in the population, poor imagery skill can potentially hamper an athlete's development and progression in their chosen sport. They cite that those who struggle usually report either being unable to

generate and maintain their desired/favourable image and/or they seem to struggle to either *eliminate* or control undesirable content. Identifying those who may need help in either area may be important, as such athletes may be either less likely to use the imagery methods or simply use them ineffectively. LSRT can therefore be an adjunct to PETTLEP training.

LSRT aims to help users better generate and control their experience of imagery by adding three components in successive layers of information. Stimulus information features sensory components of the image, response information contains the imager's associated emotional and physiological reaction to the image and meaning information represents how the image is interpreted (e.g. as anxiety or energy-provoking, challenging or threatening, or helpful versus unhelpful). Images are grouped according to these differing components before being slowly brought together in layers with increasing detail and richness. Each successive layer involves a cycle of image generation, rating and active reflection on the contents and characteristics of the image, and then reiteration or subsequent development (whereby further content is added as needed). In-practice image development targets both the content and manner in which the imagery is performed (i.e., the process of imaging) and layers evolve over time. Greater control over imagery is felt to occur by explicitly bringing attention to four processes of image generation, inspection, transformation and maintenance [Kosslyn 1995] over time.

DISTRESS TOLERANCE IMAGERY PRACTISE FOR MARTIAL ARTISTS

Given the above, we have developed a PETTLEP-informed imagery protocol to enhance distress tolerance and skilful responding for martial artists (see Table 1 overleaf). Its application can be further enhanced with attention to the LSRT method outlined above, to ensure that the vividness and clarity of the image can be maintained (given the potential introduction of so many elements at once) through the use of appropriate layering. Note – the protocol is conducted with a focus on compassionate conflict resolution for both student and aggressor throughout.

For example, a student might image (or remember) a perceived threat or confrontation and layer increasing levels of their emotional distress, their visceral reaction to this and their in-vivo appraisal of the meaning of the event, as they practice tolerating and then compassionately and authoritatively de-escalating the situation.

	How can this be achieved?	Examples
Physical	The practitioner/student should adopt the correct stance, wearing the same clothes and holding any implements that would be present.	They could image standing or sitting in a typical posture, dressed in the clothes they would usually wear. They could image their positional response to the threat/emerging conflict.
Environment	The practitioner/student should complete the imagery in the same environment where the conflict could take place. Where this is not possible, videos, photographs, or a similar environment can be used as a substitute.	They could image while in the dojo/training hall/street, from the first-person or an observer perspective.
Task	The threat/conflict being imaged should be identical in nature to the practice actually being performed, and this should be altered as the skill level of the practitioner improves.	They would mimic their desired peaceful/resolution-focused response during the encounter, in keeping with the specific nature of the conflict (e.g. maintain distance, verbal defence, posturing up, etc.).
Timing	The imagery should be completed in 'real time' and should take the same length of time to complete as the event.	They would image a conflict in real time, rather than in slow motion. Research has shown that real-time imagery is aided by holding implements associated with such events (e.g. a bag or phone) to include shifts in use.
Learning	As the practitioner/student becomes proficient and autonomous at the task, the imagery should be updated in order to reflect this learning and remain equivalent to the complexity level of the practice.	They would update the imagery to reflect the specific conflict that they were working on. Also, they might focus on more refined elements of their response when becoming increasingly competent.
Emotion	Any emotions associated with conflict should be incorporated into the imagery. This can be aided by the use of layered stimulus and response training (LSRT, as outlined above).	They would include all emotions, specific to the experience of conflict and their ongoing response to it (for example, fear, anger, embarrassment, shame, etc.).
Perspective	The imagery should usually be completed from an internal perspective (i.e. through the practitioner/student's own eyes). This can be aided by the use of video. However, external imagery may be useful for some events and personal preference should also be taken into account.	They would image from a field perspective when responding to a conflict. They may also image their response to the event from an observer perspective, as how this looks to the aggressor is important and it would allow the practitioner/student to image the dynamic more fully.

Table 1:
Protocol for implementing a PETTLEP informed distress tolerance imagery intervention (based on Wakefield and Smith [2012])

Particular attention might be paid to the facial expression, vocal tone and active listening one might employ during conflict as all of these skills seem implicated and affected by one's experience of safety [Porges 2017]. This can be undertaken by imagining, embodying and enacting one's ideal response to specific levels of threat/conflict events, as it has been shown that even relatively short compassionate imagery inductions can increase one's abilities to be empathic, insightful and feel better able to cope in the face of difficulties [Gilbert and Basran 2018].

Please note, however, that imaging work should *not* be used in relation to a previous encounter which is linked to current intrusive re-experiencing (e.g. repeated disturbing unwanted memories, dreams, flashbacks or marked reliving of the event), considerable avoidance behaviour (e.g. attempts to consciously avoid reminders or discussing what happened), altered thoughts and beliefs (e.g. unrealistic of global evaluations of threat that others would not share, considerable self-blame) or hyperarousal (e.g. super-alert, watchful or on guard, jumpy or easily startled). In such cases there should be a consultation with a general practitioner (i.e. family doctor) and as needed a referral for screening/a suitable assessment of mental health needs [see NICE. Post-traumatic stress disorder Guideline 116, 2018]. The imaging work we propose in this article is in the service of heightening resilience and responses to threat cues in the absence of a posttraumatic response, rather than a replication of exposure based psychological therapy/reliving as part of a clinical treatment/plan of care.

DISCUSSION

Our exploration of the related literature suggests that imagery work may have much to offer those needing to skilfully respond during a threatening/conflictual encounter. We present a distress tolerance imagery protocol as an applied form of internal representation development, to help this process. We believe its use can help entrain the self to respond compassionately to reduce conflict, when we are able to avoid violence, during situations that provoke relational/physical threat. The work we have explored suggests practising mastery (i.e. confidence) and goal-based (i.e. achieving a specific aim) imagery can help with both threat appraisal and anxiety intensity. As such, seeing oneself doing well is helpful in terms of self-management under duress and can be practised as a solo drill in the absence of suitable training partners.

In terms of next steps, future development work might first establish the lived experience of implementing the intervention and whether it is felt to be both feasible and acceptable within martial arts practice. For

example, it may be possible to practise an entirely peaceful resolution to an imaged conflict, a difficult but managed peaceful resolution to the same conflict or a necessary physical but minimally harmful resolution following escalation to the conflict. In this way the PETTLEP approach has the potential to be highly flexible. It can also allow the teacher to work with the student at a personalised level, taking into consideration the student's existing imagery ability (by conducting a baseline visualisation) and fine-tuning those areas most in need of development (i.e. whether skill, strategy, affect or mastery elements need preferencing)

Assuming the approach is felt to have merit, then further research would be needed to explore its effectiveness from the perspective of both student and teacher. Within this might be the need to examine teachers' abilities to employ imagery work themselves and whether specific training in this regard, to teach others, would be needed. Finally, we feel it important to state that imagery work as presented here is intended as an adjunct to competent, aligned, ongoing martial arts instruction within the context of an existing supportive student/teacher relationship. We know that who teaches what has an impact on the experience of martial arts training [Barnfield 2003]. As a result, if managed appropriately we believe the PETTLEP approach has the potential to serve as an important tool through which to better tolerate the distress of relational conflict in both oneself and the other.

Ethical Statement

The authors have abided by the Ethical Principles of Psychologists and Code of Conduct as set out by the British Psychological Society. No ethical approval was needed in preparing this article.

Competing interests

The authors have no competing interests to declare.

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