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What Can the Great Traditions of Mankind Teach to Sports Scientists?

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Abstract

The ontology of Sports Science is well-defined with its various themes and subjects being studied and presented in various works such as journal articles and textbooks, as well as by being in the curriculum of the various university departments. However, there is much to discover when turning our gaze somewhere else, to Traditions and Great Schools that have been dealing for many centuries with the development of many aspects of what we now call “expertise”. On the spiritual side, the Traditions included in this study extend from Yoga to Taoism and from the various Tantras to Kabbalah. On the artistic side, Schools such as Iwama Aikido, Wing Tsun, and Russian piano School have been considered. Classic Epistemology is also taken into account. Be it out of ignorance or out of hesitance, seldom do we turn our gaze to discover the richness such Traditions have in so many aspects, no less in matters pertaining to Sports Science. This paper is a first effort to map some of the most important findings several such Traditions treasure and keep for their practitioners. The results of this exploration consist of insights about overlooked performance parameters such as breathing, slow practice, visualizations, sleep practices, basics, relaxation and psychotherapy.

Keywords: methodology, sports science, schools, Taoism, Tantra, martial arts, distal method.

“Yes, he said, I know.

- And do you not also know that although they make use of the visible forms and do reason about them, they are thinking not of these, but of the ideals which they resemble; not of the figures which they draw, but of the absolute square and the absolute diameter, and so on – the forms which they draw or make, and which have shadows and reflections in water of their own, are converted by them into images, but they are really seeking to behold the things themselves, which can only be seen with the eye of the mind?

- That is true.”

Plato, The Republic, Book IV.

1. Introduction

I was invited by the editors to produce an article for this issue of European Journal of Physical Education and Sport. At this stage of my research, after having finished developing the Distal Method, and after having extensively published about all the parts that make up this system, but also after producing several papers on Epistemology, I chose a subject that combines all of my interests, focusing on something that is not so popular despite its potential immense impact;

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something more personal also that presents a part of what I have been exploring in depth for the last decade: Spiritual Traditions and their relations to mainstream science (e.g. Sports Science).

Consider Bodhidharma (or Dámó) who spread Buddhism in China. He spent his last years in a Chinese monastery meditating, where he noticed that the monks there were of very poor physical condition, prone to all kinds of diseases. He taught them a specific Chi-Kung (exercises for the cultivation of energy). How effective was it? Fast-forward many centuries into the future, we may identify this monastery as no other than the infamous Shaolin Monastery with the spectacular Shaolin Monks whose mastery of physical skills almost defy the laws of physics and biology. It doesn't get more effective than this! Doesn't Sports Science have to learn a great deal from this great Tradition? That is, taboos and the difficulty to penetrate through the thick mist of mysticism of such Traditions apart.

Laymen, even scientists themselves, oftentimes fail to recognize that science is neither settled nor finalized. Science is to be viewed as a net catching a very isolated and small portion from the ocean of the world-phenomena. Even this catch is only too often problematic, as various research has demonstrated over the years – take for example the various occasions where “scientific facts” were reconsidered:

- Ioannides showed that an overwhelmingly high percentage of medical research is false (Ioannidis, 2005);

- Lamarckian epigenetics do apply after all (Jablonka, Lamb, 2008);

- “Hard scientific facts” are not so “hard” (Latour, Woolgar, 1986).

Even major theories in physics are not “safe”, such as the Standard Model and the Theory of Relativity (Kroupa et al., 2012; Thomas, 2022). On the other hand, even though we do *not* have definite and final answers about most of the occult phenomena, current research comes to identify mechanisms which were thought to be “supernatural” and “unscientific”. Examples include tummo, meridians, Distant Intentionality Therapies, Reiki, telepathy and more (Achterberg et al., 2005; Demir Doğan, 2018; Watts, 2011; Konkoly et al., 2021; Kozhevnikov et al., 2013; Longhurst, 2010; Radin et al., 2018; Robinson, 2009; Schlitz, Braud, 1997; Shaw, 2013; Shaw et al., 2022; Sheldrake, Beehree, 2016; Wiseman, Schlitz, 1997). We are merely scratching the surface of what is to be discovered in these fields of study.

Major Schools, such as those existing in martial arts, music and various practices (yoga, chi kung, tummo, etc.) already implement methodologies and methods that are noteworthy if only by judging from the amazing performers and results they produce – but what are the (shared?) mechanisms for producing such results? Since other (sports-related) disciplines would greatly benefit from the implementation of the insights of such Schools, this paper aspires to serve as a first step in a long and complex path of transferring know-how from Schools* to what we consider as the basic core of Sports Science.

This section will include many anecdotal reports. This does not mean that these reports are arbitrarily chosen or biased. Many of the notions in this paper have been partly presented in existing literature as results of various research studies. However, the closer examination of great traditional School practices will provide some more insights. A more complete and final synthesis of such insights is the outcome of the Distal Method, a system incorporating insights from all fields that are relevant to what is known as “motor expertise” (Papageorgiou, 2019; Papageorgiou, 2020c; Papageorgiou, 2020a).

One may argue that the very examination of School teachings is against the author's epistemological views (Papageorgiou, Lekkas, 2018; Papageorgiou, Lekkas, 2020; Papageorgiou, Lekkas, 2021). More specifically, judging from the outcome (School teachings) it is not sufficient to infer the cause (a mechanism). Because literature is largely based on this way of conducting research (affirming the consequent, i.e. statistical models and not deterministic ones), one would be better off deferring until a better epistemology be applied, or, even better, until *not* the wrong one is applied; until such time, the author considers the approach expressed here a step forward in the right direction: recent findings are consistent enough so that i. practitioners (trainers,

* Schools may be defined as systems of ideas, practices and studies that require dedicated practice for many years under an accomplished Teacher aiming at enlightenment of some sort – or being able to transcend reality and reach some kind of deeper knowledge, as the one described in the Platonic text presented above.

educators) may benefit from such insights and ii. scientists may focus more on discovering potential mechanisms without the fear of being labelled as “fringe”.

Next, we shall look at some examples of Schools/Traditions the author himself has been a part of.

2. Schools examined

2.1. Martial Arts

As it has already been mentioned, martial arts are a fine example of a traditional School’s training, and the author had many of the teachings of his Aikido, Ju-Jutsu (Goshin Ryu) and Wing-Chun Teachers in mind when conceiving this paper.

The minds that conceived and founded the various martial-art Schools had a clear view of the determinants of motor development – when of course no such scientific field even existed. Now, through a more exact – in terms of science – approach the teaching protocol may be decoded. This has multiple benefits:

- Apart from the inspired Teachers, it would be beneficial for anyone else teaching or learning a martial art to have this theoretical background.

- The fact that many martial arts are nowadays separated into traditional and competitive ones (thus becoming mere sports), means that a traditional methodology available to the competitive edition of the martial art may be of some value.

- Other fields would greatly benefit by examining the Paradigm of (traditional) martial arts.

2.2. Music

The practice of musicians swirls around a group of basic exercises which include scales, arpeggios, legatos, or some more instrument-specific exercises, such as octaves (piano) and specific breathing exercises (wind instruments). There is another level of study which includes what we could call “progressive studies”, pieces that sound more attractive in terms of musicality and address a specific technical aspect. Another type of study addresses an even higher understanding of music. It is *études* which have been written from great composers like F. Chopin, works that we very reluctantly even call “exercises” in any narrow sense, as they sound so much like music, and one could arguably say that they indeed are. Still, they are composed in order to address technical or interpretational aspects of playing a specific instrument.

In this context, the Teacher chooses the appropriate combination of basic exercises, progressive studies, *études* and musical pieces for the student. This choice is made through a *curriculum* that corresponds to the tradition and beliefs of the School the Teacher comes from. However, even though some Schools address the distal causes of performance (Papageorgiou, 2019) better than others, there is a definite need for a more detailed and structured approach in order to answer the question “How exactly should one practice to improve”.

The author has attended two such Schools being himself a musician. The author is also a direct student and collaborator of D.E. Lekkas who is a musician, a composer and mathematician (the only full representative of pure reason and theoretical epistemology).

2.3. Great Spiritual Traditions

Spirituality is not just about believing to some form of higher power and praying. For thousands of years the great Spiritual Traditions of our times have developed an unbelievably wide array of tools and methods addressing every aspect of the life of practitioners: from the cultivation of energy and healing methods, to activating “locked” capacities of our bodies and minds. Needless to say that there are practices that require years of dedicated practice to yield fruits. Yoga and Chi-Kung are one of the most physical types of practice and meditation as well as several types of visualizations represent the esoteric practices. When writing these lines, the author had in mind Traditions such as Taoism, Yoga, Tantra, Vajrayana, Trika Shaivism, Dzogchen, Kabbalah. The author has extensively practiced in these (and others) such Traditions.

Next, we shall explore some shared characteristics of the aforementioned Schools and Traditions trying to link them back to what we know from Sports Science. No particular order will be used; the following is just a list of various insights.

3. Specific insights

3.1. Deliberate Practice

Deliberate and well-structured practice is the mode of practice of all expert performers regardless of expertise domain (Ericsson, 2006; Ericsson et al., 1993; Hambrick et al., 2014). Generally speaking, it is not a playful activity but rather it involves learning tasks that are just beyond the learner’s capacity

but can be successfully completed with the help of teachers or trainers. Slow Deliberate Practice is central in practicing technique in various musical instruments. To the novice student's dissatisfaction, it is requested to invest the majority of practice in such activities.

In some rare footage ([Cziffra practicing](#)), one can listen to G. Cziffra, one of the world's greatest and highly virtuoso pianists ever, deliberately practicing even musical pieces that were regularly included in his repertoire. His practice seems to be at a speed predicted by the attacking attractor model ([Papageorgiou, 2016](#)).

3.2. Relaxation

Relaxed performance is a hallmark of all the major School's performers. Science has not emphasized that much this aspect of performance; however, in various Schools it is a prerequisite for any further development of the student. Breathing exercises, body posture, biomechanics – all are recruited to help the performer eliminate even the slightest tension that can nowadays be detected with modern biofeedback devices.

Cziffra, Pletnev, Richter, and many other pianists and Schools had, and still have, an intuitive understanding of the violation of Fitts' law (sometimes faster movements are more accurate), and when performing they let their limbs move freely and forcefully without restrictions even if this method leads to some mistakes. However, they seem to recognize that there is no other way to achieve "relaxed speed". Valery Sagaidachny's School recommends the same. The same applies to the way martial artists in Aikido and Jeet Kune Do alternate between complete relaxation and intense tightening when performing a specific exercise. In yoga, full muscle relaxation is achieved even during the most demanding stances (asanas) especially using breathing techniques.

Relaxation of the musculature in dynamic movements is not at all the same as being relaxed during sleep. It means to use only the necessary muscle groups, keep other muscle groups relaxed and also to be able to rapidly and fully relax any muscle that has just been activated but is no longer needed – even if it will be activated again within tenths of a second. Slow study is the key to achieving relaxed high performance.

3.3. Feedback & Self Discovery

The role of feedback in learning has been extensively studied ([Amirault, Branson, 2006](#); [Halsband, Lange, 2006](#); [Simon et al., 2008](#)). Each form of feedback is more appropriate for specific instances – for example a type of summative feedback is more appropriate for more experienced performers ([Schmidt, Lee, 2014](#)). What is the preferable type of teaching for advanced performers in the various Schools? In Iwama Aikido, the Sensei (Teacher) demonstrates the technique once or twice and then lets the practitioners repeat on their own. This happens in a highly structured environment, where the sequence of actions (who performs first, how many repetitions etc.) is predetermined and the very name of the technique includes already a significant amount of information in a coded way. It is expected that the practitioner has consistently done his/her homework and is – to the best of her abilities – well-intended to improve on technique and not just to fool around needing someone to thoroughly explain things to them or to even force compliance. Whoever is not dedicated when in practice, he/she is not welcome (it may even be dangerous to not be concentrated in martial arts). If needed, Teachers will usually provide summative feedback by demonstrating the whole technique again, by explaining some critical parts of the technique, or take a pair of students and correct them so that all can see. Personal feedback is also utilized especially when the number of the students is small enough. For extremely advanced students, a form of feed-forward is used: Sensei just demonstrates once even an extremely complicated sequence of techniques and then lets the students repeat on their own expecting proficiency without any further feedback.

During practice the concept of "optimal feedback delay" is also employed. Optimal feedback delay refers to the idea that simultaneous feedback leaves no room for self-reflection and may not be optimal for learning; waiting too long to provide feedback is equally detrimental to learning since learners could forget what they were doing in the first place ([Schmidt, Lee, 2014](#)). Optimal feedback delay is utilized in order to address the whole class in a general manner after the Teacher has permitted the class to go on for some time.

Each practice session has a goal. A Teacher utilizes many strategies to achieve this goal. Many Teachers line up their students at the end of every practice and expect a brief comment on behalf of everyone about what they have learned, noticed or want to comment on. This is a form of peer-learning. This benefits everyone in multiple ways: by being more self-conscious, by listening to

other people's problems and solutions – for everyone has encountered the same problems more or less – and by incorporating notions in broader concepts. A part of the knowledge was (is) embedded in fellow competitors. A more direct form of peer-learning happens when Sensei asks students to correct their teammates: students may alternatively be granted the role of the instructor helping each other in pairs, providing immediate feedback. For example, an “instructor-student” stands in front of the other student and has the duty to instruct “STOP!” as soon as they spot a mistake in the succession of a technique or a “kata”. An example of self-learning is when students correct themselves by executing the technique in front of a mirror or by pausing at predefined checkpoints of the technique to assess their current situation. This is in line with the conclusion that for optimal motor learning, many forms of feedback should be mixed.

The end of self-discovery is called enlightenment by many spiritual paths, and for Dzogchen transpersonal therapy, this state, also called “discovery of our True Nature” is considered the end of psychotherapy, the “Definitive True Sanity” (Capriles-Arias, 2020) – a process referred to by Carl Jung as the unconscious becoming conscious. Maybe there is a lesson here also for Sports Psychologists.

Sports Psychologists should also consider a fact that is unknown to western scientists: all great Spiritual Traditions have special systems for psychotherapy which have existed for hundreds and thousands of years before we have applied the first psychotherapeutic technique in the west. Such systems include the various forms of Chöd and Jioti as well as Rasa Tantra, all leading also to the *unconcealment* of our True Nature. True, western psychology has since evolved far beyond such practices, but the lesson here is that hard-working practitioners, such as monks, athletes and even coaches do need psychotherapy to create a complete experience. Especially the latter, coaches, usually do not consider doing any form of psychotherapy hence counter-transferring and projecting their neurotic mindset to athletes and children, which is unacceptable.

3.4. Striving for Perfection

“Demand a perfect repetition, as slow as necessary to avoid confusion and haste”. This seems to be the *modus operanti* of several Schools.

Great martial art and music Teachers are renowned for their austerity. To the general public they seem to have some kind of obsession for performing everything perfectly and they never seem happy, despite the impressive skills their students demonstrate. It seems that the Teachers understand very well what is proposed here: a skill that is not perfect will not improve on its own merely because it gets repeated. Students more often than not have what a great Teacher doesn't: magical thinking (Papageorgiou, 2018). They seem to wishfully think that just playing around – even while doing that successfully by some standards – is enough for improvement to come. This seems to contradict Lee & Simon who argue that (Lee, Simon 2004: 29):

“In this chapter, we describe the effect of a practice variable called contextual interference that contradicts the wisdom of this saying [‘Perfect Practice makes Perfect’]. Moreover, in our discussion of the reasons for this effect, we explain why attempts to optimize performance and learning in practice are generally doomed to failure”.

Lee, Simon, 2004: 29

However, one needs to distinguish between constricting study to simple and easy exercises to avoid making mistakes and constantly challenging his/her skills, *trying to* (but not necessarily always achieving to) remain flawless. Mistakes are central in learning activities. That is why, in martial arts, instead of real swords they practice with wooden ones (*bokkens*), and when training involves real weapons in high levels, the protocol becomes extremely strict.

For technical perfection, slow practice is an essential element. Tai chi and yoga might base their training almost entirely on slow practice, but every single other martial art has its fair share of it. Granted, some Schools stress it more than others but masters have a unique obsession with it either way. In one occasion the author recollects of having been advised: “practice so slow that you feel your bones as they turn in your flesh”.

This answers the basic question “how slow is slow enough?” The better the practitioners the slower they can practice – and for longer periods, because practicing slow is much more difficult than speeding. A better practice than slow study is to go even slower study!

Another example comes from *kihon* (basic) practice in aikido which is basically the full technique performed slow (and segmented) with the major stress being in a) *form* of final positions, b) *transition* between positions and c) *preparation* of subsequent transitions in relation to the subsequent final positions (*prehensiveness practice*). This brings us to the perfection part. *Form* is very important in martial arts. Without proper form a technique loses its essence. *Katas*, *Taos* and many other special exercises are used to develop – among other things – a perfect form. Perfect in this context means biomechanically and stylistically sound movement. All this is reminiscent of the approach we take in Classic Epistemology where there is a fully abstract archetype (an idea) and we always try to assign “imperfect” observatory data to those perfect models.

One advantage of slow practice is that it allows time to approach movement in an exploratory manner, and to put a great deal of attention on the subtle details of the movement. The practitioners will make natural adjustments to correct their technique. Thus, slow practice enhances the kinaesthetic feeling of the movement and permits to troubleshoot one’s own technique. In essence, slow practice, even if it can be conceptually separated from “perfect practice”, is the other side of the same coin.

Another point several Schools stress is the *detrimental effects of daydreaming*. From what the author understands, there is a deliberate conscious mind, and an automatic, lower-order thought process. The more one lets the lower automatic processes to take over, the less one uses their conscious mind, thus becoming less conscious and more mechanical. This is somewhat similar to the discussion about the automatization of motor skills – *cf.* the bottleneck theory of processing information (Schmidt, Wrisberg, 2008). This requirement about explicating every aspect of movements is also present in Classic Epistemology where nothing is to be taken for granted when discussing the various sciences. Classic or Theoretical epistemology also forwarded a different type of scientific methodology, one that has degenerated into what is currently known as “The Scientific Method” (Papageorgiou, Lekkas, 2021). Many of the problems of structuring complete theoretical systems and also of accommodating many of the insights presented here are due to the methodological limitation of the current Scientific Method, e.g. the Scientific Method’s obsession to go backwards from the result (e.g. an experiment) to the cause (e.g. a mechanism), which is a logical error. Sports scientists, if they want to be considered scientists and not merely “scientific workers” should pay extra attention to this situation.

Finally, an important consideration is about the weighting factors of each exercise. Indeed, not all exercises have the same importance on the long run. This has not been particularly addressed in western literature. A special case of exercises with increased weighting factor are the “basics”, discussed next.

3.5. Segmentation/Simplification & Basics

Segmentation of techniques, as a means of simplification, has been extensively discussed by various authors (Magill, 2007; Schmidt, Lee, 2014). Why is it that all too often we fail to perform a skill and behave like much less-skilled individuals? Why is it that even very well-trained performers fail, leaving us to wonder how could they fail in something a mediocre performer would not?

Quite often, by acquiring too many and too complex skills, we tend to forger, well, basics! So, when the time comes for us to just do that basic movement that schoolchildren already perform well, we are in trouble. Choking apart, this is due to us becoming too automated – and too much automaticity leads to failure. It is too common then, that in martial arts one is expected to study basics forever.

As already mentioned, in Aikido practice, the various armed and unarmed techniques are trained in the *kihon* way, which is a slow segmented way. In previous chapters it has been explained how efficient this way is, despite the slow-fast paradox: one only gets to be effective in high speeds through slow practice.

Chunking is another means of simplification related to segmentation. Chunks are perceptual or memory structures that bond more elementary units into larger organizations (Feltovich et al., 2006). Chunking is a very familiar way to practice rapid sequences and can be combined very well with slow deliberate practice. Chunking is a basic strategy which musicians (e.g. pianists) take advantage of to improve. To the author’s experience, chunking techniques are included and applied in a very broad spectrum of instrumental practice. For example, musicians study fast passages as separate chunks of two, three or four notes (according to tempo).

The kihon way (Iwama aikido) or basic way is fundamental to high performance. Every traditional art has fundamentals, that is, simple movement segments that address the core and the essence of the skill and are equally practiced by both early beginners and top performers. Oftentimes, these “basics” might appear to have little relation to the target-skill in the eyes of non-experts, but it is the basics that the knowledgeable Teacher sees as the key to success. For example, the “wax-in wax-out” movement the Karate Kid did in the homonymous movie was such a simple and basic movement that seemed irrelevant, yet was soon to be translated to a very effective fighting skill. In reality however, basics are beneficial in the long term. Morihiro Saito (Iwama Aikido founder) when asked about his seemingly impossibly high level of performance replied that he trained “the basics” for more than fifty years, this answer being equivalent in the context of this presentation to the acknowledgment of the value of this notion. Sviatoslav Richter said something similar when replying to the question “how can you play the piano so incredibly well” by saying the almost cliché answer: “I study the difficult parts more”!

In martial arts and in music, basics in the “very long-run”, appear to be beneficial. It is not a monotonous practice program that corresponds to the blocked and part practice as it is performed in various research protocols. It consists of some basic “core” movements that are repeated in every practice session, such as *tai no henko* and kihon exercises, scales in music. Therefore, it may be of value to develop and implement such basics in practice, when long term development is the goal.

3.6. Duration of practice: insist, insist, insist

Deliberate practice literature predicts that learners should engage with this type of study for a considerable amount of time, spanning from 2.000 hours (in about two years) for simple activities such as memorization skills, to even as much as 25.000 hours (in periods surpassing that of a decade but a lot) for complex activities such as piano playing at world-class level (Ericsson, 2012). In the movie Karate Kid, Daniel had to “wax-in – wax-out” all day long – hundreds of identical repetitions. In reality, that is not quite as effective for learning (massed practice). Many more repetitions are needed, maybe hundreds of thousands, but extending in a period of years to a lifetime, and scheduled more randomly. The legendary fighter, Musashi, in the Book of the Five Rings constantly urges practitioners to study hard using phrases such as (Musashi, 1974):

- You ought to think deeply about this.
- You must do sufficient research.
- You must study hard.
- Men must polish their particular Way.
- These are things you must learn thoroughly.
- You must train constantly.
- You must train repetitively accumulate practice day by day, and hour by hour.

This seemingly endless practice is the “bad” news. The good news is that one following the steps and practicing for long enough, *can't go wrong*. There is no such thing as talent or anything else between any individual and high performance that cannot be overcome with *proper* practice – even if this means (and it usually does) a lifetime-long dedication (Papageorgiou, 2015). In Taoism there are practices that require from the practitioner to spend around ten years in darkness and solitude. Iwama founder, Morihiro Saito, when asked how he can be so good at aikido replied that it was due to practicing the basics for 40 years.

As an anecdote goes, a man heard a famous pianist playing a concerto. He then went to congratulate him and said “Maestro, you are so brilliant, I would give my life to play like you!” and the pianist replied “well, that is exactly what I did”. Another famous pianist, Franz Liszt is said to have noted: “If I don't study one day, I notice, If I don't study for two days my friends also notice and if I don't study for three (consecutive) days, the whole world notices”.

3.7. Preparation-Readiness

“*Check the ground around you*”. These were the first words of Ueshiba, Aikido's founder when he explained how to start a confrontation. He did not ask to prepare to attack, choose a strategy or check the defense. His prioritized the accumulation of the maximum amount of information from the environment before someone even *thinks* to do something. This is very similar to *Zanshin*, a state of awareness and relaxed alertness.

This idea of “be prepared” (the boy-scout's motto) is heavily stressed in the processes of all Schools. The idea is that nothing at all is left to chance. From the preparations a shaman does before a ceremony to the unimaginably complex and multi-aspect practices of advanced monks in

Traditions such as Taoism and to the exhausting study of all logically possible cases in Classic Epistemology, one sees the same repeating motif: take into consideration everything, care for all parameters but do that within a long term horizon; a never-ending effort, which, exactly because it takes so much time (a lifetime) is done in a relaxed and steady pace. There is no need to hurry; nothing will be completed in a lifetime anyway – there is no reason to give up practice; there may be no end, but the important thing is to be better today than yesterday.

Preparation also refers to the concept of *prehension*, i.e., preparing our body's posture and our limbs' placement for the upcoming motor task. In 3.6 it was mentioned how important kihon practice is. Kihon practice is important as it trains preparatory skills as well. In piano schools, the proper preparation of the fingers before they strike the keyboard is separately trained as well.

3.8. Creativity

Creativity is considered a concept very close to expertise but with important differences. For example, if an expert specialist is expected to demonstrate consistency in his/her repetitiveness, a creative expert is expected to do the exact opposite: produce original and novel work each time (Simonton, 2013). The exceptional basketball player is expected to repeat successfully the same task (shooting) whereas a painter producing the exact same painting each time is considered at best a mediocre artist.

In Russian School, creativity is expected from the learners: imagine the feelings of a violin or piano student in a Russian conservatory who has flawlessly prepared a demanding musical piece, only to hear comments like: "Richter played it like this too. Please don't bring it again unless you have something better to present". Of course, someone would imagine that having reached the level of world-class musicians such as Richter or Heifetz is a feat by itself. Such expectations to exceed even the great masters put things in perspective and force students to "think outside the box", demystifying high performance.

Exactly the same goes for Classic Epistemology, where researchers within this School are asked to evaluate established scientific fields, fix them, and present new approaches to improve them.

3.9. Grouping of similar techniques, skill transfer and variable practice

This relates to varied practice, but also to the phenomenon of skill transfer (Issurin, 2013; Kerr, Booth, 1978). Grouping of techniques may be related to functional or contextual relevance. In martial arts both ways are used. Anyone having taken some judo classes is familiar with the grouping of techniques into e.g. *te waza* (hand techniques), *ashi waza* (leg techniques) or *koshi waza* (hip techniques) etc. In aikido or in any other system, the writer is familiar with a similar grouping of techniques that takes place as well. Techniques are categorized based on a movement pattern which repeats on the background and may or may not be visible at first glance. The study in this way makes more sense both conceptually and physically to the extent that the students are presented the skill from various perspectives, thus enabling them to create a better proprioceptive map (*cf.* variable practice). This might help both transfer and contextual interference strategies, as it will be an easier task to select different groups to mix.

Training a technique with a counter technique or just in combination with other techniques that work complementary in a certain situation is also usual. The students learn this way the contextual relevance of their actions. In music the grouping of techniques is very usual: scales, arpeggios, trills etc. are common groupings of exercises.

In aikido and the rest of the martial arts, as well as in music, there is always a multitude of variations of one basic technique. Some variations (e.g. *ai-hanmi katate dori nikkio: omote & ura*) seem so different, that one has to broaden her/his thinking to understand how and why one technique stems from the other. Or, similar movements (in the eye of the non-expert) are presented as completely different techniques. The variability (*cf.* perturbations) increases with the addition of weapons to perform the same techniques and other additions (mixing of weapons) or constraints (blindfolded or lights-out training to induce visual occlusion variations).

Another practice that is used in both aikido and ju-jutsu (and many other systems of course) is that pairs change constantly, after every technique. There is no distinction between novices and advanced performers in that respect: everyone will benefit by practicing with everyone, no matter what level, age, weight, etc. each is at. A striking exception is in weapons practice: there, the tradition is *not* to change pairs throughout the practice. Maybe the cost for potential injury due to the introduction of greater unpredictability outweighs the benefit of increased contextual interference.

3.10. Prompting techniques and rhythms

Prompting is the faster activation/reaction due to previously presented stimuli (prompts) either external or internal (self-prompting) (MacLeod, 1991). Rhythm is one of the most important parameters in all sports (Papageorgiou, 2020d). Good rhythmic sense is not developed if not consciously practiced. In martial arts, rhythm development is mainly achieved by the utilization of breath as a reference point for many techniques and group-exercises where the teacher acts as an external metronome, in the sense that students are trying to synchronize their movements to an external source (a *Zeitgeber*), in this case the teacher who performs the exercise – usually in a segmented way. This is also a part of the many types of feedback learners receive.

In exercises involving the training of a specific technique, on its own or in a more complex combination (like a counter technique) a definite rhythmic pattern is always evident:

“one, two aaaand three!”

“ke-bap!”

...most usually trying to denote the intonation – the climax of the technique (a throw in judo, a strike in karate etc. – see also *motowords* (Papageorgiou, 2020b)).

Self-prompting or self-priming is practiced in major piano schools as well. It is called *perspective playing* and includes the visualization – while performing – of the immediately following parts (i.e. notes) of the piece. It requires, among other things, perfect automatization.

3.11. Testing effect & motivation

Ueshiba might have never said a good word to Morihiro Saito, his most beloved student, but apart from the internal reward of good performance, both martial arts and music have incorporated methods to motivate and at the same time to improve learners. This is accomplished through examinations for levels, “Belt”/“Kyu-Dan” lifetime system etc.

While examinations for the attainment of the next level in martial arts are a testing protocol as well, they would take place only once or twice a year. Testing new skills is something done in every lesson: the *randory* in the end of the session is for this purpose – cf. the testing effect (Roediger, Karpicke, 2006). In this special type of fight, the competition is absent. Both parties try freely the newly obtained (or older) techniques and their couple brings no resistance when they see that their teammate is in a position to effectively apply a technique. In a playful but still meaningful manner students “use” the bodies of their teammates to try their techniques. Flow, cooperation, safety and an exploratory mood are promoted. The same applies in Capoeira.

In traditional practices, such as in Aikido, competition is excluded altogether. In other martial arts, there are several levels of competition (from *randory* to full submission) but there always exists a form of “*non-competitive competition*” for the purpose of testing what has been learned. It is only natural that this testing will employ means that are relevant to the practitioners’ level, such as more competitive forms of fight, but in the end, everybody, irrespective of their level, will devote a fair amount of time in non-threatening – or mildly threatening – testing activities.

The value of a belt is only symbolic. Note that the system for levels in the form of belts – or other similar concepts – is *equally important and prestigious for both the 10-year-old child and the 60-year-old teacher*.

Other advantages of a system rewarding the obtainment of a certain level are that it helps to develop a certain form of respect, hierarchy and structure between the participants that is critical for the development of a value (or even a virtue) system among the participants. Moreover, it is much more realistic: if ten people have a university degree or a certification, this by itself reveals nothing about the level of each individual in that specific discipline. Still, their real difference could be something like someone having a black belt with someone who is 8 Dans. One could compare that in relation to the downward discrimination notion of Collins & Evans (2007) about how lesser experts cannot judge their superiors (Collins, Evans, 2007). This is formalized in martial arts, and indeed, protocol forbids such criticisms of superiors from inferiors – much like what is the case in the army.

Now, about the testing effect, this can take many forms. For example, in judo, exhausted students take part in *randories* being (unavoidably) relaxed, thus testing the real effectiveness of their skills without using force. This of course is by no means advisable as it has inherent health risks, but the point is that advanced students take pleasure and add to their experience by occasionally taking their training to the extreme.

Exhibitions, more aggressive fighting games and exhaustive repetitions in a fast rhythm are ways to perform this testing of the stability of the technique in martial arts. Naturally, one will reap maximum benefits when one applies some form of periodization. No matter how beneficial testing is, some modern training systems (e.g. in tennis) stress the testing part too much (only fast drills and competition), leaving no room for other kinds of practice.

There should always be discrimination between beginners and advanced students when it comes to dangerous practices. Some practices are almost exclusively meant for advanced students. More inexperienced practitioners in traditional martial arts systems are protected by default from strenuous activities until they overcome a critical threshold of performance (while they are permitted to participate in simplified forms of such practices).

A method to detect errors: after mastering a musical piece, the performer is instructed not to play the specific piece for a long period of time – a month maybe – after which she is called to play the piece in full speed one-out. The weak technical parts of the piece that were masked under somewhat massed practice are revealed and the performer may now identify the mistakes and plan her practice better according to their real needs (*cf.* delayed retention tests).

3.12. The sources matter

To the big disappointment of young piano students who expected to hear some exotic technical tips from the distinguished soloist in his master class, the latter went on to present the sources (for musical scores) throughout the day: which scores were better and why, which publishers were more reliable or had distinct characteristics in relation to others, which editions were better for distinct works, which editions were preferred by top performers etc. As the soloist explained, only the correct sources make any further discussion meaningful. And anyway, the soloist noted, one cannot actually make any technical modification in the short term, no matter how much students are impressed from such interventions. So why bother explaining technicalities to students for just one afternoon?

Aikido and jujutsu also depend heavily on sources. In aikido and jujutsu lessons we had to refer to the sources on our own and practice according to the traditional *curriculum* of the School. In aikido every discipline has its own unique sources; for Iwama Aikido for example an important part of our sources are the five volumes of M. Saito *Traditional Aikido* (1973–1976).

The source is not always tangible. In axiomatic method, the source is the conventions used as the starting point. These axioms are arbitrary, however they have been selected for consistency, lack of contradictions, systemic productivity and elegance.

3.13. Teachers-gurus

Gu-ru means the one who dissolves darkness. A Teacher in a great traditional School, apart from a guide to the various sources, is a source by himself/herself. A rare source indeed one may add, with experiences and information that are nowhere else to be found. Maybe great Teachers have not always been great leaders in the westernized sense of the word (enthusiastic people who motivate others); however, a great Teacher is definitely a good and unique source of knowledge, experience and grace. Another similar role of Teachers is to “save” students from the vast ocean of useless information which is oftentimes mixed with useful pieces of information. The learner cannot find and discriminate in time (within a lifetime) all the important parts of what she has to learn on her own.

D.E. Lekkas argues that mathematical knowledge, in striking contrast to the knowledge of the initiates of eastern (etc.) systems, can be derived – in its entirety – from anyone, using nothing but logic. This is considered to be one of the most important teachings of Classic Athens: a move away from mysticism. Even in this case, I cannot overlook the importance, at least initially, of a great Teacher (one may be able to resynthesize all mathematical knowledge on his own, but that could take centuries!). By the way, the development of dialectics does not mean that eastern mysticism is invalid; it is a specific tool even Spiritual Traditions have used and cannot live without (whereas dialectics have never used mysticism, and let that be their only difference, the priority of dialectics).

3.14. Education & Practice

In aikido and in music there is a vast variety of extra-curricular activities, i.e., activities that take place when one is not practicing the technique. From meditative practices to the study of sources, relevant literature and even community work (in aikido in the context of working for your Sensei, loving your neighbor etc.).

The educational activities as well as the training activities are structured in such a way that they lead to expertise only after many years of continuous everyday practice. Indeed, as Teachers of various disciplines say, from Zen to violin, it is important to study daily, even just a fraction of the usual time when there is a serious restriction of time. The notion of sudden massed practice is absent, in stark contrast to what movies claim where people get motivated or angry, try really-really hard for some weeks, and become world-class experts: wishful thinking at its best!

The progression of the individual to the highest level of expertise is described in several Schools. For example, in karate there is the concept of *suhari* ([International Karate-Do Federation](#)):

- SU indicates that a beginner must correctly copy all karate techniques from her instructor.
- HA means that after a number of years of training, when the karateka has attained a high degree black belt, he is allowed to develop new techniques provided they are improvements. This applies to all movements with the exception of basic techniques.
- RI is the highest form. It means that after an even longer period of training than for HA, the Karateka must be able to perform all forms of karate automatically, not stopping to think about her moves.

3.15. Mental imagery

The positive effects of mental imagery have been well-demonstrated ([Lotze, 2013](#); [Weinberg, Daniel, 2015](#)). Sports imagery consists of visualizing ourselves (either externally or internally) to execute the target-skill. All major spiritual traditions have as their central practice various forms of imagery, visualization, body-sensations, sensing and feeling various internal parts of the body (either the parts themselves or various kinds of e.g. energy movements among and among them). The higher Tantras employ the power of transformation (doing several types of meditations while being “transformed” into e.g. a specific Buddha. Contemplation (self-observing, or observing our so-called “True Nature”) is also central.

A form of practice that is central in all Traditions but completely unheard of in sports science is anything related to dream yoga, lucid dreaming, astral projection and being aware while sleeping. A huge amount of knowledge has been accumulated through millennia about how to enter such states and what to do when there. Endless practices presuppose lucid-dreaming states (or are simply done more effectively when into those states). All these practices may offer a unique know-how and a novel perspective to sports scientists about the comparatively simple forms of sports imagery employed nowadays. Indeed, they could open new fields of research and change “training” as we know it today.

This is an unusual place to refer to breathing, however it is extremely rare to practice breathing techniques without any form of visualization. Even in yoga, breathing is usually coupled with various forms of visualization about projections of energy in the practitioner’s body. Many practices in shamanism include breathing in any form imaginable and even in paths as high and esoteric as Kabbalah is, breathing practices are central. Remember that according to Christian Tradition, it was by breath that God created Man out of dust and the Historic Buddha Shakyamuni gave a breathing exercise as an enlightenment practice when he was first asked by his followers to provide a way to become Awake and realize their True Nature.

4. Conclusion

A selection of insights was presented here for the purpose of contributing to the model for expertise attainment called the Distal Method. Hopefully, sports scientists will appreciate the hidden treasures in systems such as the ones presented here.

All in all:

- Relaxation is a characteristic of performance that is central in School teachings and helps performers to not only avoid strain, but additionally, to reach high levels of virtuosity.
- Weighting factors should be attributed to exercises.
- Kihon/segmented study of techniques and the development of basic techniques is a prerequisite for every successful performer.
- Daydreaming (magical thinking) is highly unwanted, contrary to what people outside of Schools think about it. Instead, a good, i.e., unbiased, contact with reality is promoted.
- Dreaming, on the other hand, is a powerful tool, completely unknown to sports scientists.
- Creativity is fostered through the demand for innovation.

- Various feedback methods are to be used interchangeably.
- Contextual interference effect is to be utilized through the continuous change of the environment (change of training partners, variations, etc.).
- Perspective playing is a traditional way for self-priming/prompting.
- Motivation-rewards (symbolic and “internal”) are central in Schools throughout the lifetime of individuals. Rewards are in the form of levels that acknowledge the progress of individuals and categorize them in a military-like hierarchy.
- Imagery and visualization techniques possibly have an even greater potential than the one currently practiced in sports. So does breathing.
- Sports psychology interventions do not suffice to address athletes’ every need; Practitioners, trainers, all need to seriously self-develop, do psychotherapy.

The basic restriction of this study is that most of the practices that have been mentioned here require a Teacher; Tantra is not something taught or discussed at your local university. And while there are variations from tradition to tradition, there is a central core one can locate after years of practice with several Teachers, but as is the case with geometry (“there is no royal path to geometry”), here too, one needs to invest far more time to sufficiently understand these Traditions than what is required even for an undergraduate degree in Sports Science. As far as Classic Epistemology is concerned, westerners usually have access (in English) to the Roman interpretation of Classical Antiquity which simply is not good enough for someone to understand the original approach. The author and his team have tried to qualify Classic Epistemology in an ongoing series of papers in the Epistēmēs Metron Logos Journal as well as elsewhere.

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