Developing and Psychometrically Testing the 'Student Experience of Martial Arts Inventory'.

Thesis submitted in fulfilment of the requirements for the degree of Master of Applied Research.

Institute for Health and Sport

HREC Project number: HRE 18-203

Glenn Timothy Sandford

2020

Abstract

In this thesis an argument is made that there is a need for a method to describe and measure a student's experience of martial arts (MA) training that is psychometrically sound. Such a measure does not currently exist, and would allow researchers to drill down on the specific components of the experience which relate to beneficial outcomes from training. To this end, the aim of the current study was to create and psychometrically evaluate a Martial Arts Inventory (MAI) (*Appendix A*).A starting inventory of 100 questions were written based on previous research and the author's MA expertise, then evaluated for face and construct validity in a preliminary study. The items were then subjected to an exploratory factor analysis (n=328) where, after parallel analysis, eight distinct factors, represented by the final 48 items, were extracted (meditative training, respectful discipline, positive training environment, streaming, training behaviour, heavy training, goal orientation, physical challenge). A post hoc analysis of the data collected, with related demographics, showed that many of the existing descriptors for martial arts experiences, such as *hard vs soft* or *internal vs external*, failed to provide discrimination between experiences. An exception to this was that those who felt their training was traditional, had significantly higher MAI scores (p<.01) to other respondents (large effect, f=.208). In a subsequent study (n=159), the new MAI was tested for convergent validity with both self-regulation and mindfulness. These tests both showed significant, positive relationships with medium to large effect sizes. It was concluded that the MAI appears valid and fit for use, and that future research which incorporates this instrument will add to the validation and norming of the MAI. As a first of its kind instrument, the MAI may be effective in measuring consistency of student experience across MA schools, and has research utility in exploring the efficacy of MA training.

Declaration

"I, Glenn Timothy Sandford, declare that the Master by Research thesis entitled, Developing and Psychometrically Testing the 'Student Experience of Martial Arts Inventory'. is no more than 60,000 words in length including quotes and exclusive of tables, figures, appendices, bibliography, references and footnotes. This thesis contains no material that has been submitted previously, in whole or in part, for the award of any other academic degree or diploma. Except where otherwise indicated, this thesis is my own work".

Signature  Date 9th January 2020

Acknowledgements

It is always a surprise, and a pleasure when another has faith in your project. Without the support and gentle coercion of Dr Gill I would never have partaken of this journey nor have gained the understanding which it has brought me. Thankyou Peter for your supervision and friendship throughout this project.

Thank you also Dr Morda (Romana) for stepping up when I needed extra support and providing me with insights and thoughtful commentary which have helped me to achieve research of which I am truly proud.

A final thankyou to Andrew Jago for expressing an on-going interest in my project and for providing a sounding board for the analysis of the statistical techniques employed throughout.

This work would not have been possible without the involvement of hundreds of unknown and unnamed martial artists who gave of their time and experience to provide us with the data required to complete this research. To all of you my heartfelt thanks and respect.

Osu!

Table of contents

List of Tables and Figures

Overview

Currently, there is no valid way to describe and measure what a student actually experiences in Martial Arts (MA) training. While MAs are widely purported to be beneficial to psychosocial wellbeing, the research evidence of how this beneficence occurs, and under what type of training and in what training conditions, is under-developed. I argue that our evidence base is significantly hampered by our current classification of MA, and our inability to measure student experiences. The fundamental aim of this research is to produce an improved classification and measurement system for Martial Arts training experiences. The current system is problematic as it relies on descriptors such as a style name or cultural background that are far too removed from the actual student experience. For example, students studying Karate may have different experiences depending on the teacher, the school, and the particular type of Karate. This is problematic for researchers and practitioners, as whilst it is possible to see stylistic differences, there is no metric to determine differences in student experiences of martial arts training. Instead I propose a system of classification and measurement that captures the actual student experience. This classification would sit apart from the existing nomenclature to provide a holistic metric of the student experience. Examples of this new classification system will include training facets or aspects such as breathing, discipline, and level of physical contact. By quantifying what a student actually experiences during MA training, we can determine through research, which facets of MA training are more beneficial, less beneficial, or even harmful, for a range of potential behavioural and psychosocial outcomes. The objective of this research is to create an instrument (questionnaire) which can be used to measure and differentiate student experiences of martial arts training.

Using current terminology we might differentiate student experiences of martial arts by style or culture. An example of a cultural difference would be between Tae Kwon Do (Korean) and Karate (Japanese), but an example of a stylistic difference would be between the Gojo Karate of Chojun Miyagi (1888-1953) and the Shorin Ryu Karate of Funakoshi Gichin (1869-1957). Further, martial arts may be described through dichotomies such as *traditional* karate vs *modern* karate, though the differences in training experiences are not always apparent. All of these descriptive notations provide us with little information about the actual student training experience. Indeed, given two schools of the same cultural and style, each run by a different instructor, the experiences are likely to vary. The proposed martial arts inventory is an opportunity to bring nuance to these descriptions of a student's experience of Martial Arts. A detailed metric quantifying a student's experience of martial arts does not currently exist, and will be a valuable tool for measuring actual experience, experience consistency, and in research use, assessing the effects of different martial arts training experiences.

There are a number of examples in literature which relate martial arts training with self-regulation and behaviour change. There are also some studies which relate martial arts with aggression and anti-social behaviour. These studies will be explored in detail in Chapter two: The Martial Arts in Research, but the more pressing question is: What was different in the student experience that led to psychological benefits as compared to the negative effects? This thesis and research follows on from a study which interviewed senior martial arts teachers about what their students actually experience in a class (Sandford & Gill, 2018). A number of themes or facets of training were extracted from these interviews (see Chapter 3: The Martial Arts Facets) and they suggested a complex set of interactions between social and physical experiences. Using these themes as a template, it was proposed that an inventory of questions could be used

to gather information regarding a martial arts student's experience of each facet. These facets are however, conceptual only, and as such this thesis expands on this classification system and aims to produce a questionnaire that can measure student experiences. A questionnaire which addresses each of the martial arts themes proposed by the senior teachers will be psychometrically analysed to produce a number of key factors which represent the building blocks of a student experience of MA.

The following research will create an inventory of martial arts experience and evaluate it psychometrically. The resultant instrument will be a valuable research tool to help determine the efficacy of martial arts. It can also be used to determine what a particular MA form or school or teacher is actually teaching students. Specifically, this thesis aims to

1. Provide a historical review of classification systems in MA
2. Review current research on the efficacy of MA
3. Compose a questionnaire that asks students about what they experience at their MA training/ school. This will start with approximately 100 questions which will be scored on a Likert scale for quantification of frequency of experience, and will be based around the 10 facets of student experience derived from Sandford and Gill (2018).
4. Explore the factor structure of this new questionnaire, and revise the questionnaire accordingly
5. Explore the validity and usefulness of the new questionnaire of students' MA experiences

Chapter 1: The Martial Arts

The premise that training in the martial arts (MA) could have a measurable effect on behaviours such as *self-regulation* and *aggression*, is one which has received considerable attention from researchers and has been well reported in literature (see Chapter 2. The martial arts in research). A review of literature pertaining to MA shows that predominantly positive psychological benefits were related to MA training (Vertonghen & Theeboom, 2010), though whether these benefits exceed or differ from those of other physical activities (sports) is a matter for future study (Super, Hermens, Verkooijen, & Koelen, 2014). Of concern however is the suggestion that some martial training may lead to an increase in the display of negative behaviours such as aggression (Endresen & Olweus, 2005). The complexity inherent in establishing the potential effects of MA training on behaviour is compounded by factors such as the lack of a universal measure and the potential inconsistencies in student experience between schools that purport to teach the same style. Published research often uses disparate designs whose results cannot be compared to one another and the establishment of cause and effect relationships is confounded, not least by the number of extraneous variables which are not always controlled for (Vertonghen & Theeboom, 2010). Finally, the lack of a consistent and comprehensive definition of what activities are considered to be MAs means that results of research are generalised across the industry with little regard to the circumstances in which the research was conducted. This can be seen in the advertising claims often published in industry magazines such as ‘Blitz’ and ‘Black Belt’.

A holistic view of the term MA would suggest that all things combative could be included under this umbrella term. The gamut of techniques including those used for military, security, self-defence, sport, and self-development all overlap to a certain

extent (Kusnierz & Cynarski, 2017). However, martial arts per se is a relatively new term in English (c. 1909; www.etymonline.com) and referred in this early usage to specific fighting techniques from Asia. The philosophical elements of these Asian practices, including both Zen and Tao, served to establish a point of difference from other martial pursuits which could be found around the world (Draeger & Smith, 1980). This does not however preclude the use of similar honour codes and training practices within the martial schools of other nations and continents, and historical record shows that such practices did and do exist (Cynarski, Sieber, & Szajna, 2014). A brief discussion of the history of combat training and its associated practises is required to ensure that the holistic scope of MA in its modern context is clearly defined.

It has been suggested that combat techniques have grown from the hunting skills passed down through generations in pre-history (Draeger & Smith, 1980). Human interactions as both predator and prey have generated a unique set of skills which relate specifically to within species violence. Martial techniques can be considered direct responses to the habitual acts of physical violence (McCarthy, 1999) which have continued to be relevant over time. This violence relates both to agonistic and predatory behaviours related to fear, establishing social dominance, and defence against such threats (Scott, 1975). Whilst group dynamics and social complexity have evolved over time (Reyes-Garcia et al., 2016), the human body has not fundamentally changed in recorded human existence. Indeed, evolutionary theory suggests that the modern human (*homo-sapiens*) emerged between 200,000 and 300,000 years ago. The vulnerabilities of human structure and biology have been identified and exploited systematically and it is these exploits which make up the body of techniques associated with the MA (McCarthy, 1999).

The exact point in history when our ancestors began to systemise their MA skills cannot be determined due to the intangible nature of word of mouth and performance transmission techniques (Ruggles & Silverman, 2009). We do however, have very early examples in archaeology, such as the tombs at Beni Hasan c. 2000 B.C.E. (Figure 1.)

Figure 1. Wresting figures painted onto a wall, in the Tombs of Beni Hasan, Egypt.

which clearly show wrestling techniques which are still relevant today. This shows that four thousand years ago combat techniques were not just in practise but had been formalised in a fashion where distinct, recognisable scenarios were being transmitted across generations. Martial training is also recorded in early written records. References to Pyrrichia (Homer), a Greek war dance used to develop skills associated with battle, can be seen to mirror the formulaic patterns of solo training for which Asian martial training is so famous (Draeger & Smith, 1980). These dance moves and wall inscriptions represent a transmission which undoubtedly pre-dates the written record. Some written records imply the transmission of martial technique through references to specific teachers and schools, such as the many gladiator Ludi of the Roman republic. Schools of combat training are still visible in Europe in later periods, notably as schools of fencing, which developed from schools of knighthood, through the medieval and into the renaissance period. Printed manuals from these schools show a variety of techniques which include not just the manipulation of weapons, but techniques of self-defence (Petter & Steenput, 2000), and instructions on courtesy and appropriate behaviour (Llull, 1847). These examples of systemisation and recording of martial training are

visible but not necessarily well known even within the parent cultures (Cynarski, 2012). Wrestling however, appears to be the universal martial behaviour which is known and continues to be practised throughout the world. Whilst building skills for combat, most cultures present wrestling as a contest which is both a public spectacle and an acknowledgement of contestant worth. Folk examples from cultures from every continent (Examples: Coreeda–Australia, Inbuan-India, Khuresh-Siberia, Mongolian-Asia, Turkish-Middle East, Schwingen-Europe, Laamb-Africa) show the universality of wrestling as both a martial endeavour but also as perhaps the earliest example of a martial sport.

The necessity to respond to violence (McCarthy, 1999) suggests that MA combat techniques must pre-date the use of these techniques for sporting endeavour. Sports however provide the potential to hone martial skills in an environment where injury and or death are not the intentional outcome. Whilst skills of running, jumping and throwing can clearly benefit both the warrior and the hunter, skills such as wrestling, boxing, fencing or jousting are purely combat related. At some point sport may diverge from the original combat to such a degree that it no longer holds relevance to the original threat . For example, little can be seen of the martial intent in a modern Olympic javelin or discus throw, and the acrobatic jump-kicks in a Taekwondo tournament could be disastrous if attempted in a self-defence situation (by intentionally risking footing and balance). The involvement of sport in MA leads to the generation of techniques which relate more to the rule sets of the competition than to the determination of a martial confrontation (Prof. J. Fethers (1928-2010), personal instruction, 1988; Prof. J. Will, personal instruction, 2017). Martial sports then, can be seen to overlap with the original combat concepts. Sport, whilst originally a tool to practise combat, will emphasise some techniques and impose restrictions on others to

ensure compliance with the rule set adopted. These technical decisions may be made for safety reasons or to enhance the public spectacle.

It might be expected that a person trained in military combat techniques would be better able to defend themselves from assault. A sports person who practises martial techniques might also be in a more prepared condition for self-defence. At what point however, does training specifically for self-defence enter the martial paradigm? In an Asian context there is evidence that pilgrims were trained to modify martial techniques to respond to the specific acts of violence that felons were likely to utilise against them (McCarthy, 1999). Specific techniques for defence against assault have also been recorded in European combat manuals such as the Petter manuscript (Petter & Steenput, 2000). These concepts of self-defence pre-date the term ‘martial arts’ by centuries, but the introduction of Asian combat training to Europe, closely relates to the start of the twentieth century C.E. Indeed, the efforts of Edmund Barton, a widely travelled engineer, to promote Japanese Jui Jitsu as a self-defence system (Barton-Wright, 1899) appears to be the catalyst for interest in Asian martial arts in the west. Whilst this suggests a direct link between the term *Martial Arts* and Asian influenced combat techniques, the matter is somewhat muddied by Barton’s eclectic incorporation of European Savate and stick fighting into his MAs syllabus (Barton-Wright, 1899). From this it may be concluded that a robust tradition of self-defence techniques existed in a pan-continental context, but that the term martial arts was applied to these myriad traditions in response to the introduction of Asian techniques into the European mix (Cynarski, 2012).

One of the most intriguing aspects of Asian martial arts in the West is the adoption of unique cultural affectations and philosophies to support the training. Cynarski (2012) suggests that the promulgation of martial arts is in part the presentation

and protection of cultural traditions. This serves to ensure that traditions are maintained and, in some contexts, revived as part of a group's self-definition. It also allows the tradition to be presented to others as a defining characteristic of the culture (Cynarski, 2012). A characteristic which has cultural value to its people but also value to those who would pursue self-defence training. This has led to the revival of many European martial traditions as an alternative to Asian traditions. In Australia we see the revival of indigenous games which often relate to combat and hunting (Commission, 2000). Also, in Africa, traditional games and martial training practises are gaining importance through the interest of locals and foreigners (Green, 2005). This may be inspired by the introduction of techniques from other places which mirror local practise or remind local groups of alternatives available which have cultural value. Cynarski's studies (Cynarski, 2012; Cynarski et al., 2014) suggest that martial training is an important and possibly defining characteristic of a given culture. The sharing of those techniques in a cultural context, with the use of language, dress and etiquette becomes an important way of maintaining traditions and showcasing the culture to interested others.

In summary, the martial arts could consist of military techniques, sporting techniques and or self-defence techniques. These techniques could be taught in a cultural context or could be purely physical, or somewhere in the spectrum between. As such, from an historical viewpoint the MA are a broad church, encapsulating multiple and diverse elements. This history has resulted in current classification systems such as style names, cultures and dichotomies such as *traditional* and *modern*. I argue that the next phase in the development and classification of MA is to move away from cultural or stylistic classificatory terms, and towards terms that more closely and accurately describe the student experience in and around their training. In the next chapter I will examine the research into MA, and its role in promoting beneficial psychological,

social, and behaviour outcomes. The combination of factors that will lead to positive psychological benefits warrants further examination and it is the purpose of this study to produce an instrument to help researchers determine this. Ultimately, being able to correlate the results obtained in literature with the specific MA scenario responsible for those results will clarify past research and help in the design of future MA related research.

Chapter 2: The Martial Arts in Research

Martial arts (MA) related practises have been the focus of research from the mid twentieth century (Kroll & Carlson, 1967). In recent decades the increased attention on MA has led to the development of journals with a specific focus on the publication of MA related research. These journals include: Journal of Combat Sports and Martial Arts, Journal of Martial Arts Anthropology, Journal of Asian Martial Arts, and the Journal of Western Martial Arts. An examination of research regarding the MA reveals particular foci such as the psychology of MA students (Aleksovska-Velickovska & Kostovski,2008; Fuller, 1988; Vertonghen & Theeboom, 2010), anthropological considerations relating to culture and identity (Cynarski et al., 2014; Kusnierz, Cynarski, & Gorner, 2017), and the physiology of training and injuries (Buse, 2006). The growth of martial arts as a sporting or recreation pursuit (Cynarski et al., 2014; Vertonghen & Theeboom, 2010) has led to increased interest in the physiology of training techniques for maximising success and reducing the risk of injury. The literature regarding physiology falls outside the focus of this research project and as such will not be further addressed in this paper. The literature available regarding behaviour and psychology will however be examined as the primary focus of this study.

A recent review of published MAs related research was completed by Vertonghen and Theeboom (2010). They identified literature related to many aspects of MA training, but they limited their review to papers concerned with psychology, sociology, pedagogy, and philosophy. They were specifically interested in research conducted after the mid 1990's, which explored the socio-psychological outcomes of training. From a pool exceeding 350 papers they restricted their review to just 27 which fit their criteria. Papers were excluded if they were found to have methodological concerns or had considerable limitations as reported by the relevant authors. In addition,

papers in which MA was just part of a larger intervention, or where the participant group was targeted upon a limited population, were excluded as were papers specifically associated with self-defence interventions. Finally, papers were limited to those written in English, Dutch or French. An argument can be made that had a single classification system been used in all of this research much more of the data would have been available for review. The value of a universal metric in defining the student experience would not just allow data to be compared same for same but would also quickly identify differences in experience that might be responsible for variations in results.

Vertongen and Theeboom (2010) made several important observations regarding shifts in the direction of research in the period reviewed compared to papers prior to the mid 1990's. Firstly, they observed that the focus had moved from martial artists in general to youth involvement in MA training. Before the 1990's approximately 20% of articles referred to youth, post the 1990's that percentage had increased to 60%. Secondly, prior to the 1990's much of the research explored correlations between personality traits and MA involvement whereas more modern research has focused on the relationship between MA training, behaviour and aggression. Finally, most of the older research had referenced arts considered to be traditional Asian constructs such as Karate, Judo and Tae kwon do, where more recent research has been far more interested in modern derivations such as kick-boxing, boxing and mixed martial arts.

Dichotic naming conventions

The dichotomy in describing MA as being either *traditional* or *modern* is one which has been promulgated across a number of decades. Based on their review, Vertonghen and Theeboom (2010) conclude that a traditional art is one which includes "meditative aspects, (the) stressing (of) self-control, conflict avoidance, respect for

others, kata training and the study of philosophy" (p. 530). Kata here is a Japanese word which relates to a formal pattern of techniques executed as a solo exercise, or as a single member of synchronised group (Draeger & Smith, 1980) . The Chinese equivalent often used is 'Chuan', which more literally means 'fist' (Kim, Kogan, Kontogiannis & Wong, 1996). A well-known example would be the synchronised practice of Tai Chi Chuan (sometimes written as Taiji) as practised for relaxation and exercise in public parks (Yang, 1982). Modern MA by comparison was found to be sport and competition based with a "focus on physical aspects only" (Vertonghen & Theeboom, 2010, p. 530). Some martial arts can trace their heritage back centuries and consider themselves to be very traditional but are essentially sporting activities. Examples would include the art of Kendo in which participants compete against each other with bamboo swords and Judo where exponents attempt to throw and pin each other. Other arts consider themselves to be modern or modern interpretations of traditional arts but are essentially meditative, non-confrontational and generally have no competitive aspect. An example would be Aikido (Saito, 1999; Uyeshiba, 1978) which is derived from Aiki-jiu-jitsu. The terms modern and traditional appear to self-applied labels which do not relate to the actual training differences which appear to have considerable impact on student behaviour. Several studies have compared the outcomes of modern MA versus traditional MA including Trulson (1986) who provided a comprehensive analysis of the different training outcomes.

Trulson (1986) set out to determine the effect of MA training as an intervention for youth who had been clinically diagnosed as delinquent in their attitudes and behaviours towards society. The research design controlled for the influence that an instructor's attitude might have on students by having the same instructor provide supervision for three separate groups of youth. The groups consisted of a control group

who played sports games, a traditional Tae Kwon Do group and a modern MA group. Tae Kwon Do is a relatively new MA instigated in Korea post world war two. It is now known for its inclusion as an Olympic sport but was originally a local (to Korea) interpretation of Japanese and to some extent Chinese MA systems. The traditional training for Trulson's study consisted of breathing meditations and philosophy lectures as well as structured classes of MA technique and interactive practise or 'sparring'. The modern group training by comparison consisted only of sparring and self-defence techniques. The third group took part in no MA training and provided a control for the instructors influence and also for the natural maturation of the youth over the course of the six-month study. The youth were tested at the conclusion of the study with the same instruments that had originally been used for their diagnosis, in particular the Minnesota Multiphasic Personality Inventory (MMPI). The results indicated that there were clear group differences in outcomes. The control group were unchanged and showed no indication of improved behaviour or attitudes. The modern MA group had deteriorated and the traditional group had improved.

The modern MA group were classified as more delinquent than at the outset of the study with particular increases in psychopathic deviation and hypomania (Trulson, 1986). Psychopathic deviation refers to antisocial behaviour which at a lower level would include immature or self-centred behaviour. As the deviation increases, the individual may exhibit anger and impulsive or rebellious behaviour culminating in activities which lead to legal troubles. Hypomania refers to excessive demonstrations of energy which may be impulsive and rebellious in nature. Often activities lack direction or are unrealistic and may culminate in hallucinations, confusion and delusions of grandeur (University of Minnesota, 2015). That these factors increased shows that a MA intervention is not guaranteed to produce beneficial behavioural outcomes.

The group training in traditional MA showed considerable positive change and at the completion of the study rated normative in their MMPI test results and as such were no longer considered delinquent. These results clearly show that MA training can have either a positive or a negative behavioural effect. Both the modern and the traditional MA experienced in Trulson's study were based on the MA Tae kwon do. As the results achieved from the two intervention strategies were so diverse, we can conclude that the name of a MA style, in this instance Tae Kwon Do, is not necessarily indicative of the training that will be experienced. The MA Tae Kwon Do evolved within living memory and is in essence 'modern'. To use the distinction modern versus traditional fails to adequately describe the differences inherent in the two training experiences Trulson provided. The actual difference between the two MA experiences was the inclusion of meditation, etiquette and philosophy to the training regime. This provides further evidence that these more nuanced descriptors have greater research and practical utility than traditional dichotomous distinctions

Meditation, etiquette, and philosophy training are not unique to a single culture, style or school. The degree to which these aspects of training are practised may vary widely however. A school calling itself *traditional* may have these things, but is not guaranteed to have these things. In Trulson's (1986) case the *modern* training did not have them, but that does not preclude some modern schools from practising one or all of these aspects of training. To drill down onto each specific training case the need for a tool which captures the details of a training experience is essential to being able to evaluate data collected in research related to the MA. The use of the dichotic *traditional* vs *modern* simply does not provide sufficient details of the training experience.

There are two other dichotic descriptors used to define martial arts which should be described here before further review of published works. The first of these is the

distinction between MA whose method is considered hard or soft. Hard martial arts are generally those which are focussed on impacting and blocking impacts, whereas soft MA are those which exemplify evasion, grappling and throwing (Draeger & Smith, 1980; Vertonghen & Theeboom, 2010). While a MA such as boxing is predominantly hard many other MA teach a range of techniques which are both soft and hard. For example, the sport mixed martial arts (MMA) combines striking (hard) with throwing and wrestling (soft). The relevance of the distinction hard/soft is more suitable perhaps to a specific technique rather than to a whole style. It should be noted that there are some styles which actively pursue a reputation for a softer set of techniques over the alternatives. The Japanese MA style Jiu Jitsu is one such and its name literally means 'Soft techniques' (Kim et. al., 1996).

Beyond *hard* and *soft* or *modern* and *traditional* a final dichotic of 'internal and external' is sometimes used when a MA school describes its training. External MA are those who are technique based whilst internal arts focus on meditation and the philosophy of ki or qi energy (Draeger & Smith, 1980). Ki energy is an Eastern concept which is associated with Traditional Chinese Medicine and a person's internal balance related to both physical and psychological health (Wong, 1997). Tai Chi and Aikido could be considered examples of internal arts (Uyeshiba, 1978;Yang, 1982). Within the MA community MA have been described in terms of these three dichotic juxtapositions, *hard* and *soft*, *internal* and *external* or *traditional* and *modern* over the course of the last century (Draeger & Smith, 1980). Current practise and the promulgation of new styles has made these broad stroke descriptive terms unsuitable in the context of psychological study and vulnerable to misinterpretation when describing a student's MA training experience. It is essential to capture both the components of the MA experience and the degree of exposure to those components. Having critically examined the terms currently

in use to describe MA training we may now explore the reported psychosocial effects of training.

Martial Arts Interventions

The study by Trulson (1986) was essentially a behavioural intervention with socio-clinical importance. The benefits gained were attributed to ‘traditional’ training which included the defining features of philosophical lectures, meditation and kata practise. A systematic literature search suggested that this research has never been replicated and whilst it may have informed other social programs, no specific clinical uptake for this method has been introduced to deal with delinquency. There have however been many other MA activities which have been monitored for their potential as social behaviour development exercises. One such intervention was documented by Lakes and Hoyt (2004) who again described the intervention used as a ‘traditional’ MA and identify a number of beneficial outcomes over a control group. The basic assumption proposed by Lakes and Hoyt is that MA training develops participants’ self-regulation. The pro-social nature of increased regulatory abilities was seen as a positive and desirable outcome. To test their hypothesis school children from a public school were separated into two groups. A control group undertook traditional physical education classes and the intervention group undertook a program of Tae Kwon Do. Classes were conducted two to three times per week over the course of three months and a range of teacher, observer, parent and assessment tools were used to compare results both before the intervention and directly after the intervention. The children involved were attending classes from kindergarten to grade five and attended sessions within their peer group, home room class. The program of Tae Kwon Do was re-branded as Leadership education through athletic development (LEAD) to avoid perceived negative connotations regarding the MA (Kusnierz et al., 2017; Lakes &

Hoyt, 2004). The results showed a small but significant improvement across a broad range of metrics. In support of their hypothesis, increases in both cognitive and affective self-regulation were recorded. In addition, improvements in pro-social and classroom behaviour supported the positive social benefits to be gained through the intervention. As an aside, it was also noticed that classroom performance improved and scores on a mental math test increased significantly compared to the control group. These results support Trulson's (1986) findings and add to a growing body of evidence that the right type of MA training can lead to both personal and social benefits. In a final word on the Lakes and Hoyt (2004) research, it is notable that the research design employed recruited the youth of an entire school population to the intervention and was able to obtain significant results. It would appear from this data that the benefits from MA training can be achieved by anyone exposed to training, and as such the concern that perceived MA benefits are an artefact of self-selection bias is questioned. Given the positive results gained, it would seem valuable to replicate and confirm these results with other sample and populations. Unfortunately, without a suitable metric, we cannot be sure that the experience in one intervention is equal to the experience in another. This is particularly important because we do not know what the effective ingredients in the training experience are, which have given beneficial results. A tool such as I am proposing would allow parity to be established across replication studies providing a superior evidence base for interpreting the results of studies.

Milligan, Badali, and Spiroiu (2013) undertook a more recent intervention, designed to assist youth who exhibit learning difficulties to develop self-regulation through engagement in the modern martial sport MMA. MMA consists of the hybridisation of impacting skills with grappling skills to achieve a sporting scenario which maximises the spectator experience, with the gladiator like combat restrained

with a caged ring. Most commonly the skills of Kick-Boxing and Brazilian Jiu Jitsu are displayed, though the possibilities are by no means limited to this. Made famous by the Ultimate Fight Championship (UFC) the first recorded MMA fight was in 1993, and as such this is one of the most modern martial arts currently practised. Milligan et al. (2013) gathered information from participants and their parents through feedback surveys and interviews. This intervention differed from other interventions discussed in this paper in that the program incorporated MMA with specific mindfulness practises and cognitive therapy techniques added to the experience. As mentioned previously, the participants in Milligan et al. (2013) study were experiencing learning difficulties. Learning difficulties occur in students who are often of average or above average cognitive ability (Milligan et al., 2013) but who are challenged by academic settings. These students may exhibit additional behavioural issues such as Attention Deficit Hyperactivity Disorder, and as such the learning difficulty often extends beyond the classroom setting and into daily life. The study used a qualitative framework and found a consistent belief from students, teachers, and parents in the benefit of the training and an emphasis on the value of the mindfulness exercises was noted. The MMA component of the study however, appears to have been fundamental in maintaining the participants interest in the study as progression in the MA (attaining the first or second belt) was directly linked to participation in the mindfulness practises. This study provides a unique insight into the deconstruction of a MA experience into component pieces. Modern concepts of mindfulness and the most modern of MA styles are combined to create an experience which has many of the components described in the so called traditional MA in the studies of Trulson (1986) and Lakes and Hoyt (2004).

Self-regulation

The intervention studies described above suggest a link between MA training and the development of self-regulation. The concept of self-regulation or self-control relates to the trait ability to alter an immediate response in favour of a longer-term goal (Baumeister, Gailliot, DeWall, & Oaten, 2006). The strength model of self-regulation has considerable empirical support and posits that the trait of self-regulation works in a similar manner to a muscle (Baumeister, Vohs, & Tice, 2007). The amount of power that an individual has to enact regulation is termed willpower and can change dependent upon circumstance. Thus the use of self-regulation depletes reserves of will power but leads to greater potential will power, just as the use of a physical muscle leads to fatigue but ultimately to a stronger muscle (Baumeister et al., 2006). MA training may exercise self-regulation in multiple contexts and this in turn, according to the strength theory, should lead to greater self-regulation potential. Importantly, this potential extends beyond the MA arena, as willpower, once developed, is available for use in any context (Tangney, Baumeister, & Boone, 2004).

The value of self-regulation appears to be not about resisting a single impulse event but rather in creating habits (Cellar et al., 2010; de Ridder, Lensvelt-Mulders, Finkenauer, Stok, & Baumeister, 2012) which are proactive and both personally and socially beneficial. Habits of this sort allow an individual to maintain normative behavioural expectations of the in-group (Hogg & Rinella, 2017), and in the case of MAs, potentially exhibit exemplar or prototypical behaviour which brings both esteem and social acceptance (Van Kleef, Steinel, van Knippenberg, Hogg, & Svensson, 2007).

The MA research conducted by Lakes and Hoyt (2004), Milligan et al. (2013), and Trulson (1986) all suggest a link between certain MA experiences and increased self-regulation. The potential of MA training to facilitate increased self-regulation is a

benefit widely advertised by MAs programs. Unfortunately, the research in this area is scarce, has methodological limitations, and is hindered by the inability to acutely describe, measure, and replicate the MA student experience. One recent study by Nakonechnyi and Galan (2017) performed a specific intervention to increase behavioural self-regulation. In this instance a control group of adolescents trained in the 'traditional' MA of Pankration (a form of wrestling), whilst an experimental group trained in the same art with a number of interventions. The interventions included lectures and discussions regarding the history of the art, mental states, self-control and moral education. In addition to this, special training was provided to the MA coaches to improve their communication strategies with the students and to create a more positive learning environment. In this instance, whilst the control group of martial artists did improve in measurements of self-regulation, the experimental group improved by a significantly greater amount. The research is unclear on exactly how the measurements were conducted and this must be seen as a limitation for interpreting the results. However, we see in this research a clear need for the proposed MA inventory. The inventory would allow us to see clearly the differences in student experience between the control and experimental group, and may well have helped those constructing the experimental intervention in defining how the student experience had changed. Regardless, this research provides further, and recent evidence for the links between MA and self-regulation, and for the need of the MA inventory this thesis will provide. While self-regulation is a key concept in MA efficacy, it is not the only reported psychological outcome of MA training.

The relationship between martial arts and student psychology

Beyond the benefits of MA training already reported (Lakes & Hoyt, 2004; Milligan et al., 2013; Trulson, 1986), Vertonghen and Theeboom (2010) identify in

their review a number of reported relationships between positive personality or behaviour traits, and involvement in MA training. A higher level of a trait referred to as either autonomy (Duthie, Hope & Barker, 1978), independence (Kurian, Caterino, & Kulhavy, 1993) or self-reliance (Kurian, Verdi, Caterino, & Kulhavy, 1994) was reported compared to control groups. This effect was noticed across both adult MA groups and also specific youth studies. The amount of time spent in training was a significant factor in these results with more advanced students showing greater differences from the normative population or control groups (Kurian et al., 1994). In two studies it was noted that a higher level of optimism or 'level of hope' was present. One study attributed this optimism to advanced students (Kurian et al., 1994) but in the other the relationship was made to students training in a 'traditional' art. This optimism is not necessarily related to a life view but appears to be focused on the ability to be able to overcome their immediate training challenges and as such shows a relationship with the self-reliance related finding. Other findings reviewed suggested that experienced martial artists had a positive internal state, reporting greater self-confidence and self-esteem, with less feelings of anxiety (Kurian et al., 1994; Layton, 1990). A final finding of note was the level of humility correlated to practitioners of 'traditional' MA. Vertonghen and Theeboom (2010) note that in these studies, unlike that in the work by Trulson (1986) and Lakes and Hoyt (2004), the self-selection bias has not been controlled for. This bias relates to the fact that individuals may be drawn to a place which suits or mirrors their natural inclination. Random selection is a requirement of experimental design and in all of these other studies students have self-selected their status as martial artists thus influencing the validity of the research findings (Stangor, 2011).

Unlike many of the other studies reviewed by Vertonghen and Theeboom (2010), the study by Wargo et al. (2007) found no evidence to suggest that there were benefits to be attained through MA training. The participants in this study were Karate and Tae kwon do students who had either just received their first belt level or were of sufficient experience to have achieved a black belt level. The MMPI-2 was used to assess the students, and a subscale related to hostility was added. With one exception the results were all clinically normative. The one exception was the higher results for black belt women on the subscale for anger. These advanced female practitioners also showed increased levels of family problems but a reduced level of social discomfort compared to other females in the study. It should be noted that within the overall cohorts employed for this study the black belt women's group consisted of a population of just three, and as such no real conclusions should be drawn. That the martial arts group as a whole, both new students and experienced practitioners should be normative and show no elevated positive socio-behavioural outcomes once again raises the question, to what MA experience were these students actually being subjected? What can be drawn from this study is that whilst positive results may be associated with MA training, they are by no means assured.

Whilst the research by Wargo et. al. (2007) found no benefits associated with MA training, another study by Endresen and Olweus (2005) found a relationship between MA training and anti-social behaviours. This study has come under some criticism (Vertonghen & Theeboom, 2010) for the association of MA training with a number of other sports which were collectively termed 'power sports'. Based on the definitions previously accepted in this paper however, the only non-martial art included was weight lifting. The other activities examined were wrestling, boxing and Asian martial arts (Karate, Tae kwon do and Judo). The self-report questionnaires used,

gathered both frequency of exposure to power sports, and a rating on both a violence scale and a scale of anti-social thought. The relationships between power sport and both violence and anti-social behaviour were significant across all time periods. The smallest relationships visible were for those involved only in Asian martial arts. Those youth who combined two or more power sports exhibited the strongest relationship between power sports training and negative social thoughts. Whilst this research has several procedural limitations related to the sports included as power sports, and the instruments used to gather data, sufficient evidence is presented to raise questions over the impact that MA training has on an individual's behaviour. Combining the concerns raised by Endresen and Olweus (2005), with the results of Trulson (1986), and the negative effects he associated with *modern* martial arts training, it becomes apparent that not all MA experiences are the same, and that not all experiences will have positive outcomes. It is vital then to develop a classification and measurement system that accurately captures the student experience of MA. As noted previously, there is currently no such universal system and measurement tool.

Martial arts experiences

In an attempt to gather more information regarding the MA student's training experience Sandford and Gill (2018) conducted interviews with senior MA masters (for the full article see appendix B). These masters had multiple styles of training to their credit, international teaching experience and in excess of thirty years teaching experience. In response to a number of open-ended questions the MA masters were encouraged to explore their experiences with regards to student behaviour and behaviour changes. In particular, the participants were encouraged to consider what experiences students might have which could have been catalysts for positive behavioural changes. Thematic analysis was conducted on the resultant interviews and

ten distinct themes were extracted which appeared to have both majority support from the participants and a degree of face validity. These ten themes or facets (which will each be examined in detail in the next chapter) together form a structure to define a specific student's experience of martial arts training. Whether a sport, power sport, hobby, or fitness regime, the martial arts experience could potentially be quantified through the level of student exposure to each of the facets. The facets involved are named; *streaming*, *physical contact*, *challenge*, *etiquette*, *respect*, *exemplars*, *discipline*, *breathing*, and, *goals and rewards*. One might consider that through these facets a differentiation between traditional and modern, or between Karate and Tae kwon do might be possible. This however disregards all we have learnt from the analysis of currently published research. The true value of the MA facets could be the ability to differentiate between two schools who claim to both teach a single art (e.g. Jujitsu) but are having very different behavioural outcomes from their students. The potential complexity in the interaction of the facets could also prove instructive in the deconstruction of a student's experience to discover the true value of MA training.

The body of evidence which has been published both in support of MA training, and questioning the possible negative effects of training, fails to provide a single clear definition of a positive MA experience. An experience which has the potential to garner positive behavioural changes in areas such as self-regulation is inherently valuable to both an individual and to the social group to which they belong (Nakonechnyi & Galan, 2017). This thesis follows on from this work by constructing of an instrument to quantify the MA experience based on the themes or facets derived from this research (Sandford & Gill, 2018). This tool will be designed to examine the relative importance of these facets individually and in concert. It is not unreasonable to suspect that some of these facets may act in concert to provide a gestalt effect upon behaviour and this may

prove true both for positive and for negative behaviour change (Endresen & Olweus, 2005). Alternatively, it may prove that only certain facets are of importance to the overall development of the MA student. None of this can be examined however until a valid instrument is created to capture the relevant data. It is the purpose of this research to develop and commence validation of such an instrument to facilitate future studies regarding MA and behaviour.

The next chapter will describe in detail the facets derived from the study by Sandford and Gill (2018) as these facets are the basis or starting point for the development of the Martial Arts Inventory (MAI).

Chapter 3: Describing the Martial Arts Facets

Research conducted by Sandford and Gill (2018) used a semi-structured interview process to garner theories and opinions from senior martial arts (MA) masters. These masters were asked to consider what they believed were the training experiences which led to behaviour changes in MA practitioners. A thematic analysis of the interview transcripts resulted in ten distinct themes being identified. These themes were consistent across a majority of the interviews and were recorded as facets of a MA experience. This qualitative research is not definitive but does provide face validity for the use of the facets as a starting point in any future studies of MA and student behaviour change. For this reason, the facets will form the basis from which questions will be derived for a questionnaire which will quantify a student's experience of MA. It is acknowledged that this may not include every important element in a student's experience of MA, but it is currently the best available source linking MA experience to student behaviour from which to start this investigation

In considering the ten facets of MA as possible ingredients to achieve behaviour change it is worth examining each separately. Existing socio-psychological theories may provide insights and additional validity to a specific facets potential influence. Sandford and Gill (2018) broadly grouped the facets into the following categories: physical experience (*streaming*, *physical contact* and *challenge*), social expectations (*etiquette*, *respect* and *exemplars*), mindful training (*introspection*, *discipline* and *breathing*) and *goals and rewards* (Sandford & Gill, 2018). The questionnaire to be developed will utilise questions which relate to each of the ten facets, though it is not yet known what the relative importance of each is. Whether a significant role is played by an individual facet or whether it must be found in combination with other facets to be effective is a matter for future research which may build upon the current study.

Indeed, an instrument capable of recording the student experience of MA is essential to answering such questions. The discussion which follows will explore each of the facets of MA training identified by Sandford and Gill (2018).

Streaming

Streaming, also known as tracking, is a term borrowed from educational pedagogy (Loveless, 1998). In the educational context there has been much debate over the value of grouping students according to ability levels. However, there are certain groupings, such as year levels, which continue to be a staple of education systems. This is not always the case, as some small schools may group several year levels together into a single grade through the sheer necessity of having just one teacher allocated to teach all of these students. MA schools are no different in the financial necessity of using a teacher's time in a cost-effective manner. There was some suggestion from the MA masters however (Sandford & Gill, 2018), that certain efforts to stream were of particular benefit to students and more likely to improve their student experience. The *streaming* concept being referred to in the paper by Sandford and Gill, should be further defined to ensure that the term 'streaming' is not misconstrued for that of a more general educational application.

The first element of *streaming* to be considered is the concept of modifying training to suit developmental life stages, health state and technical ability. The learning requirements for children, teenagers and adults can be quite distinct. By creating unique training environments for each group, learning can be enhanced, and the lessons tailored to the developmental state of the individuals involved. Examples may include slightly shorter classes and a reduced level of physical contact with training partners for smaller children.

The ability of teachers to modify training techniques to fit with injuries or other disabilities is included in this facet. This does not mean segregation from peers, rather the active review of physical technique or class content by the teacher to match with the abilities of the practitioners in attendance. This may lead to the provision of alternative techniques for those unable to participate in the primary activity.

Martial arts *streaming* also consists of training with peers of a similar technical level who are developing the same skills. This does not exclude the concept of scaffolded learning (see facet: *exemplars*) but rather focuses on developing core skills and abilities which are the foundations for more advanced techniques. This is considered of greatest importance where the pre-requisite ability level of the participant is required for their safety in advanced training.

It is important to note that *streaming* may also help to focus a students' resources on the attainment of the immediate goal, which is to develop skills sufficient to enter the next level of training. As such there is a suggested relationship between streaming and the facet '*goals and rewards*'.

Physical Contact

Physical contact as a facet of the MA includes both the training benefit to be gained through negotiating contact and the interactions *physical contact* may have with other training facets. The most obvious training benefits relate to the development of physical skills for combat and fitness, and the development of self-regulation through the negotiation of discomfort. Potential interactions with facets such as *challenge*, *respect*, *discipline* and *goals and rewards* are complementary and may facilitate positive behaviour change.

One of the potential objectives for MA training is to develop a set of skills which can be used in a self-defence context. During a real self-defence event, such as an

assault, a high state of arousal will occur which will activate the sympathetic nervous system and would normally lead to a fight/ flight/ freeze response(FFFr) (Gray & McNaughton, 2003). Training which achieves arousal but stops short of activating the FFFr has been found to be most conducive to skill development. If the FFFr system activates, the student will experience emotional reactivity and cognitive impairment (Kestly, 2016) which may inhibit learning but not necessarily performance. The alternative level of arousal which does not activate the FFFr, leads to an enhanced response to the situation and concentration on the immediate skill being developed (Bastian, Jetten, Hornsey, & Leknes, 2014; Kestly, 2016). It should be noted that the development of skills under pressure has been found to relate directly to a students' feelings of self-efficacy in relation to their self-defence capacity and may extend to greater confidence in other areas of their life (Ball & Martin, 2012; Weitlauf, Smith, & Cervone, 2000). This is one potential relationship between the physical contact facet and behaviour change through development of self-confidence.

Discomfort or pain is an effective catalyst for arousal of the sympathetic nervous system and as such is a useful environmental factor in MA training. Training in a state of arousal allows a student to practice and exhibit self-regulation through cognitive control of behaviour (Bastian et al., 2014). This toleration of discomfort benefits a student socially and implies the development of resilience. As one instructor put it "At first you might think you are dying, but you're not, you're just uncomfortable …it goes from huge discomfort, to mild discomfort to I don't even notice it" (Sandford & Gill, 2018, p. 36). A level of respect and camaraderie may also develop through mutual experience and transcendence of training discomfort (Bastian et al., 2014). This social benefit may be a factor in a student's willingness to face physical contact. According to Vine, Freeman, Moore, Chandra-Ramanan, and Wilson (2013), for a student to

approach rather than avoid pain, the resultant skill acquisition, social gain or self-regulation development must be perceived as greater than the costs involved. The balancing of the level of physical contact with the perceived objective is the province of the *Challenge* facet.

There are two implications for MA training which does not include physical contact. Firstly, a state of arousal which approaches the FFFr may not be achieved and as such skill developed may be overrated and not applicable to an adrenal situation (Slimani et al., 2018). Secondly the opportunity to develop self-regulation by transcending the emotional and cognitive challenges presented by discomfort will be missed (Baumeister et al., 2006; Hennecke, Bleidorn, Denissen, & Wood, 2014).

Challenge

The facet of *challenge* refers to activities which seem to perform as rites of passage. They relate both to the social acknowledgement of suitable behaviour in adversity and to the internal assessment of ability to negotiate a stressful situation. One interpretation of how this facet of MA training functions may be discovered through reference to the Challenge and Threat theory (Blascovitch, 2008).

As part of the body of knowledge on approach and avoidance behaviours the biopsychosocial model of challenge and threat identifies physiological markers which differentiate between a challenge and a threat. Challenges are circumstances in which an individual believes themselves to have sufficient resources to achieve a positive outcome. Threats on the other hand are situations which are perceived as beyond the available resources. A complex interaction of innate and conscious assessment leads to a physiological state which may be that of challenged or threatened (Blascovitch, 2008). It would seem that the facet *challenge* relates to a state that is capable of passing from challenge into threat and back again. For example, a student practicing combat may be

working with multiple partners across the course of a single class, going through a range of circumstances from challenged to threatened. As one instructor explained, "…Do you cower? Do you get angry? Does it make you volatile? If you get volatile or you cower it's not good, you know, we have to work on that (Sandford & Gill, 2018, p. 36). This provides the opportunity for active learning during challenge (Kestly, 2016; Vine et al., 2013) and testing of limits during threat. A threat which is negotiated may provide new information for the next self -assessment and may in turn change the parameters under which future challenge turns to threat.

Etiquette

Etiquette refers to a code of behaviour which is expected from members of a specific social group. Rules of etiquette change over time but the underlying principles of behaviour which involve tolerance, respect and disciplined response to the actions of others remain (Battistella, 2009). There is an ongoing academic debate regarding rules of etiquette and whether they promote an equal social context or whether they enforce conformity with the desires of an established hierarchy (Battistella, 2009). Contextually each of these statements and concerns can be true.

Social identity theory suggests that being part of a group can reduce feelings of uncertainty and as such is a desirable situation (Hogg & Rinella, 2017). Individuals relate themselves to the normative behaviours of the group, and the closer their actions coincide to group expectations, the less feeling of self-uncertainty will be experienced. These benefits are most prevalent when there are strict codes of conduct, a clear hierarchy and common objectives (Hogg & Rinella, 2017), and etiquette within the MA can provides a clear expectation for desirable behaviour.

Etiquette within a student's experience of MA may then influence their sense of identity in association with the group and provide underlying improvement in self-

esteem through reduced uncertainty (Hogg, 2007). The specific rules of etiquette may serve to maintain the structure of the group and this in itself gives additional clarity to group definition and the advantages to be gained from this (Anderson & Brown, 2010). A final consideration with group behaviour is the value etiquette has in providing protocols when violent training leads to injury or emotional response. Etiquette can provide clear definitions of the behaviour to be adopted in such a scenario and adherence to etiquette during such duress will be highly appreciated as *exemplar* behaviour within the group (Van Kleef et al., 2007).

Respect

General dictionary definitions of the word respect infer that respectful behaviour is that which is considerate of others needs and feelings, for example “avoid interfering with, harming, degrading, insulting, injuring or interrupting ("Respect," 1990). To be treated with respect is then to be treated such that your own needs and feelings are considered. This social interaction occurs both inter-group and intra-group. In the MA context respectful behaviour serves to acknowledge the rules of etiquette within the group and also to acknowledge individual differences in training partners. This process has two sides in combat training. Firstly, the more capable person must be aware of the limits of their opponent and not push them beyond their capacity to cope. Secondly the lesser skilled proponent must push themselves to be a worthy opponent ensuring that the more capable students’ training experience is positive and provides as much *challenge* as is possible under the circumstances (Sandford & Gill, 2018).

Whilst respectful behaviour directly relates to adherence to group norms it is also related to acknowledgement of individual differences and changing of behaviour to suit circumstance. To be respected is to feel part of the group and respecting others leads to group acknowledgement and confirmed status within the group. Failure to give

respect may lead to censure for not complying with the group norms and in a MA context this is dangerous to the wellbeing of others and can lead to expulsion from the group (Sandford & Gill, 2018).

Exemplars

The concept of scaffolding learning onto the behaviour and achievements of exemplars has a long tradition which dates back to the scholars of ancient times (Kristjánsson, 2017). Whilst there is some debate regarding the underlying emotional processes at work, there is evidence to suggest that admiration for the behaviour of an exemplar may lead to a desire to emulate that behaviour. The instructors interviewed by Sandford and Gill (2018) expressed an expectation that senior students would mentor newer students as part of the senior students' continued growth. Exemplars within a MA context exhibit prototypical behaviour which sets a standard for group membership (Hogg & Rinella, 2017) and as such interacts with the facets *respect* and *etiquette*. New students see how the rules of conduct (*etiquette*) are actioned and learn how to treat others in the MA context (*respect*) through the examples set by the senior students. Where the examples set are inappropriate, it has been suggested that "…they will push off the students who are not into that so what they will be left with is a group of people who are overly aggressive sort of feeding off each other (Sandford & Gill, 2018, p. 38) and this may relate to some of the negative behaviours suggested in literature (Endresen & Olweus, 2005).

The exemplar also provides context for a given level of achievement within the MA. The nature of goal setting will be discussed with the facet *goals and rewards,* but it is worth noting here that an exemplar does not have to be the best at a given skill or behaviour they need only present a level which is higher than the state currently

achieved by the newer student. This exemplar may be seen to embody an achievable goal which the MA student is currently working towards.

Introspection

The MA facet introspection revolves around self-awareness and evaluation of current states of skill, reactions and behaviour by the MA student. Indeed, the interviews by Sandford and Gill (2018) found that not only were students expected to introspect about their current training but to take the skills of introspection and apply them to an awareness of their behaviour outside the training environment. In the words of one instructor, “I am asking people to continually examine what is going on in their training… if you are able to do that in your training how about entertaining the possibility that you could do it off the mat in other areas of your life to even greater effect” (Sandford & Gill, 2018, p. 38). There was also an implied association with the *challenge* facet, “Well I think they’re learning to not accept what they think their limits are” (p. 38). The introspection being suggested is associated with psychological constructs such as self-awareness and cognitive dissonance (Vaughan & Hogg, 2010) and these are acknowledged tools for the modification of attitude and behaviour (Cowden & Meyer-Weitz, 2016; Vaughan & Hogg, 2010).

Self-awareness has been correlated to a number of positive behavioural outcomes not the least of which is resilience (Cowden & Meyer-Weitz, 2016). The psychological construct for self-awareness is made up of two parts self-insight and self-reflection. Whilst self-reflection can be a positive tool for identifying cognitive dissonance it should be noted that when self-reflection leads to rumination, consequent negative outcomes in the form of anxiety are likely (Vaughan & Hogg, 2010). Self-reflection is however, just the process of looking inwards and it is self-insight, the accurate and clear understanding of one’s emotional, cognitive and behavioural state,

which has the potential to assist in behaviour change. The process of looking inwards (reflection) is insufficient unless it is supported by a clear understanding of what is seen and behaviour change is then dependent upon how much value the individual places on achieving that change (Vaughan & Hogg, 2010). The literature suggests that self-insight is the stronger predictor for positive behaviour and may be considered a worthwhile tool in behaviour change (Cowden & Meyer-Weitz, 2016).

Discipline

Discipline can be described as the individual's adherence to group norms or to one's personal ethics (Wayson, 2001). A failure of self-discipline is seen as problematic behaviour and censure may occur should the rules be continually breached (Combs, 2001; Sandford & Gill, 2018). The external motivation of punishment however, is less likely to lead to disciplined behaviour compared to an internal locus of control (Rogus, 2001) where the perceived benefits of group acceptance outweigh the effort required to be disciplined (Wayson, 2001). A key predictor of self-discipline is the individuals sense of self-worth and this is reinforced through achievement of meaningful goals (Zimmerman & Kitsantas, 2014) (see facet *Goals and rewards*). A combination of *etiquette* and *respect* provide a template for what disciplined behaviour in the MA school should be (Sandford & Gill, 2018) and the cognitive muscle self-regulation is the force through which discipline is developed (Baumeister et al., 2007).

We have seen in the discussion of *etiquette* that there is an importance placed on having a set of rules and procedures for conduct in the training place (Sandford & Gill, 2018). Where *respect* is the interpretation of these rules to ensure the well-being of other individuals *discipline* is the adherence to these rules out of respect for the group (Wayson, 2001). Combs (2001) identifies that an individual's self-discipline will be based upon their understanding of peoples' perceptions of them, how positively they

view themselves, their experiences of success and their feeling of belonging to their group. This suggests that it is insufficient for a MA school to expect discipline by imposing external punishments for failure but rather discipline must be acknowledged and rewarded through social acclaim which is desirable and may engender an internal motivation (Rogus, 2001).

Social acclaim for appropriate behaviour along with the successful completion of worthwhile goals (see *goals and rewards*) may be a source for an improved self-image and sense of self-worth. This then becomes a catalyst for improved discipline as a relationship to the self-concept (Combs, 2001; Zimmerman & Kitsantas, 2014). Where self-concept is an important predictor of self-discipline (Zimmerman & Kitsantas, 2014) we might conclude that the MA has a role to play in the development of a positive self-impression and this is supported by literature (Kostorz, Gniezinka, & Nawrocka, 2017). Self-efficacy may also be a factor, with self-esteem being boosted by a belief in one's capacity to negotiate violence (Ball & Martin, 2012).

The relationship between a disciplined or undisciplined action may be seen as the success of failure of the self-regulatory system, specifically self-control. As we have discussed, the self-regulatory muscle (Baumeister et al., 2007) is strengthened through use, though the ability to self-regulate may be exhausted with over-use (Baumeister et al., 2006). The practise of self-discipline then activates self-regulation and may lead to greater self-regulatory strength. Where the discipline of the MA school may be very specific to that environment, self-regulation may be actively applied to any situation so long as sufficient strength remains available (Baumeister et al., 2006). This then suggests that the inclusion of expectations of discipline within the MA environment may well have beneficial outcomes for self-regulatory behaviour in general life.

Breathing

Regulating the breath and the use of breathing techniques are well known components of physical activity. From active sports such as swimming (Havriluk, 2017), archery and shooting, through vocal activities such as singing (Salomoni, van den Hoorn, & Hodges, 2016) and acting, and on to meditative techniques such as yoga and zazen (Nakamura, 1992). The use of the breath has a number of different outcomes which can be physical such as how long a note can be held vocally, or how many strokes a swimmer takes before their next breath or they can be emotional as part of a process of mindfulness. To gain behavioural benefits we must look more towards mindful activities and seek links between the breath and the experience of MA.

It has been noted during the discussion of the facet *challenge* that students training in the MA may be exposed to experiences which will trigger the Fight Flight Freeze response and subsequently place stress upon their system. One physiological function of breathing exercises is to reduce stress in the system (Perciavalle et al., 2017). This raises the possibility that the breathing techniques employed during training will be adopted in the event of other stress inducing circumstances with consequent benefits. The activity of a brief breathing meditation at the end of class (Nakamura, 1992; Sandford & Gill, 2018) may have importance in ensuring stress from training is not carried into later social interactions thus reducing the possibilities for aggressive behaviour, though this is speculation only. Breathing focus during training however, may perform the function of reducing anxiety whilst in uncomfortable circumstances (Sandford & Gill, 2018)(*challenge*, *physical contac*t) or resetting the stress response between activities of varied intensity or purpose (Vine et al., 2013).

Breathing may then be seen as a regulatory technique that enables cognitive processes to be active in times of stress. Combined with other facets such as *challenge*

and *physical contact* which we hypothesise lead to stress, *respect* and *discipline* which require self-control while under stress, and we see that breathing may be an important technique which can be applied to stressful life situations and consequentially lead to more positive behaviour (Wisner, Jones, & Gwin, 2010).

Goals and rewards

A MA student may have personal goals related to their technical attainment within the art. These personal goals are usually augmented by a set of levels often depicted by belts which provide suitable shorter term goals (Sandford & Gill, 2018). Whilst these goals are physical and or technical in nature, *etiquette*, *discipline* and *respect* may also be elements of an assessment which suggests that deliberate behaviour change may be a part of attainment within the MA. This process is only possible however if the goal has sufficient personal meaning for the individual student to work towards its completion.

Goal setting theory suggests that to achieve behaviour change a goal must be both specific and sufficiently difficult to be worthy of effort (Epton, Currie, & Armitage, 2017). Personal goals may be as short term as learning a new technique, mid-term such as attainment of a coloured belt, or long term such as the black belt (Fried & Slowik, 2004). The value a student places upon a MA goal is likely to be established based upon how they perceive the technique and attitude of the exemplar group members at the level the student wishes to attain (Van Kleef et al., 2007). The rewards for achieving a MA goal include the opportunity to attempt more difficult training, social acclaim within the group and enhanced self-esteem.

In addition to the specification for a goal to be a reasonably difficult task, the ensuing reward for achieving the goal must be stable across the group such that expectations of what constitutes completion of a goal are clear and considered just (Park

& Melamed, 2015). Stable, just rewards lead to confidence in the group and justified group commitment. This then reflects upon the social facets of *etiquette*, *respect* and *discipline,* as a just rewards system establishes the value of striving for prototypical behaviours.

Facets in conclusion

The concepts which were discussed by the MA masters in interviews with Sandford and Gill (2018) have strong face validity for involvement in behaviour change. Indeed, as has been noted, some of these techniques have individually already been linked to behaviour change through research. It is unclear whether the removal of one of these facets from the experience will affect the benefits posed by the others. More importantly in what combination of missing facets does the MA move from a positive effect on behaviour, to a negative one such as has been suggested in literature (Endresen & Olweus, 2005; Trulson, 1986).

There are clear similarities between some of the facets both in intent and theoretical basis. Facets such as *etiquette*, *respect* and *discipline* serve to enshrine group normative behaviour under clear and strict guidelines. *Exemplar*s embody *goals* and the *rewards* for completing those goals, and *physical contact* provides a medium for suitable levels of *challenge*. *Streaming*, *introspection* and *breathing* all serve to facilitate the experience of the other facets. Whilst each facet is a distinct entity, factor analysis will show whether these facets remain individual or coalesce into superordinate factors.

Having established the basis upon which an inventory of MA experience can be constructed it is now time to discuss the design and development techniques to be used.

Chapter 4: Overall design

The objective of this study was to create a questionnaire to measure the student experience of martial arts (MA). The steps necessary to create and validate a psychometric instrument are predicated upon the type of data which is to be captured and how it will be used. In this instance it was the intent of the proposed martial arts inventory (MAI) to identify the exposure a student has had to the specific MA facets as identified by Sandford and Gill (2018) (-see previous chapter). The process will be as follows:

1. A preliminary study will be used to develop a set of questions based on the MA facets.
2. These questions will then be subjected to an exploratory factor analysis to determine the presence of a factor structure.
3. A post-hoc examination of the data will be completed to examine relationships between existing descriptions of the MA and the data collected in the factor analysis.
4. The updated MAI will then be examined for convergent validity.

Scale construction

A self-report scale is in essence a number of response items which when combined provide a metric on a specific theoretical construct (Carifio & Perla, 2007). There are many forms that the response item can take, and these include binary response items, multiple choice, Likert items, phrase completion items and many others. The most common of these response items used in the social sciences is styled on the techniques presented by Likert (1932). There is however some controversy regarding the statistical analysis of this data (Bernstein & Teng, 1989; Bishop & Herron, 2015;

Carifio & Perla, 2008; Carifio & Perla, 2007; Muthen & Kaplan, 1985; Wu & Leung, 2017) and a brief discussion of the arguments for and against is warranted.

Using the five response items from Likert's (1932) study, 'strongly approve', 'approve', 'undecided', 'disapprove', and ''strongly disapprove' we can clearly see an ordinal structure to the responses. In this instance we may consider the undecided item to be neutral with approval increasing in the responses to the left and decreasing to the right. These items are then coded and given a numerical score which becomes a component of the scales construct. It has been argued that because the degree of difference between each possible response (for example between approve and strongly approve) cannot be established, the data remains and must be considered ordinal in nature and despite the numerical scoring, only non-parametric statistical analyses may be utilised (Jakobsson, 2004). The alternate argument states that the construct, which is theoretical by nature, is quantified through the responses made to each inventory item. These responses are coded into units of the theoretical construct (Carifio & Perla, 2007). As units of the construct, the scored items now make up a scale which is interval in nature extending from zero to the maximum available within the scale, and it is this interval data which can be usefully analysed through the more powerful and appropriate parametric methods. The main statistical concern in the transformation of responses to an interval scale is the lack of normality in the individual response items (Bernstein & Teng, 1989). However through careful design of a Likert scale, near normality may be achieved (Leung, 2011) and as long as this is within an acceptable range of skewness and kurtosis, a maximum likelihood analysis will remain robust (Muthen & Kaplan, 1985).

The design of a Likert response item must consider the quality of the data which will be collected. Decisions regarding the layout of each question, the number of

possible responses, techniques for reducing biases and improving the parametric quality of the data should be considered. Given that the MAI will seek to capture a magnitude value for each factor (facet) it will also be necessary to evaluate how best to score the data collected (Likert, 1932; Woltz, Gardner, Kircher, & Burrow-Sanchez, 2012). Likert's (1932) original scale items involved a central neutral point with alternate attitudes to the right and left. A frequency scale however ranges from zero frequency to an anchor (such as 'always') which relates to the maximum possible frequency. Maintaining a central point however is important as it ensures respondents do not feel they are being forced into a choice and has the additional benefit of reducing the likelihood of skewed data (Leung, 2011). This suggests an odd number of potential responses for each item. The reliability of Likert scales is not significantly affected by the number of responses available to each item (Jacoby & Matell, 1971), however Leung (2011) notes that an 11-point response item is more likely to produce data approximating normality. Normal data is a key requirement for statistical analysis and in the search for greater validity and normality, variations on Likert's original scale collectively known as Likert-like scales have been explored.

One possible variation of the Likert is the visual analogue item type. This uses a line of determined length with an anchor word at each end such as 'strongly approve' and 'strongly disapprove' (Bishop & Herron, 2015). The participant marks the line at a point between the two anchor extremes to show their response to a question or statement. The response is coded by measuring the distance of the mark from one end of the line. The line represents an infinite continuum but is scored over a finite range such as 0-10 or 0-100. Current survey software applications such as Qualtrics, Survey Monkey and Lime Survey simulate this response item through an on-screen mouse click. The main advantage of the visual analogue item is that it is much more likely to

produce data which approaches normality. There is no research however regarding this item type when additional labels such as a mid-point are included (Bishop & Herron, 2015).

Phrase completion response items are another variation of the likert scale and have been found to have a slightly superior reliability and validity than a standard response item (Hodge & Gillespie, 2007). In this item type the word selected from the response list completes a sentence or phrase rather than being a response to it. Whilst the improved reliability and validity are desirable, the structure of English syntax is such that words of frequency do not naturally fall at the end of a phrase. For example, 'I tie my shoes **always**' should of course be presented as 'I **always** tie my shoes'. Given this restriction the phrase completion technique has been rejected as inappropriate for the purposes of collecting frequency information for the MAI.

Woltz et al. (2012) have made a thorough investigation of frequency terms used in anchors within Likert type scales. They discovered that terms which subjectively evaluate frequency correlate to terms which objectively evaluate frequency. For example, 'seldom' most closely related to once a year and 'often' to half a dozen times per week. These correlations provide clear data to inform the organisation of Likert anchors. An example of an 11-point Likert scale which includes objective anchor words and intermediate points which can be selected but which do not have an anchor can be seen in Figure 4.

Figure 4. *11 point Likert scale and anchors*

Never	*	Once a Year	*	*	Once a Month	*	*	Once a Week	*	Always

The advantages of these tested frequency relationships have been prioritised over the concept of the visual analogue Likert-like item. The suitability of these anchors and spaces has been tested through a preliminary study before a major data collection occurred. The Asterix (*) items included in the scale as intermediate points provide some of the variability in response which is the strength of the visual-analogue technique.

A final point to note in the design of Likert response items is the response bias which occurs when responses are ordered horizontally. The bias leads respondents to answer slightly to the left (Maeda, 2014). A pattern of vertical responses is not affected by this bias but does require more time and processing and as such may lead to respondent fatigue, and progressively less care in answering items (Maeda, 2014). The frequency responses to be captured are logarithmic in nature and as such the bias may have increased influence compared to a subjective response set. A vertical scheme is both achievable and easier to respond to in a tablet or mobile phone scenario and as such shall be adopted for the MAI.

To summarise, the proposed MAI will be presented as a Likert like scale of 11 points, presented in a vertical format with 5 anchor words and 4 intermediate asterix.

Preliminary Study

The preliminary study's purpose was to generate and evaluate the validity of questions which would later be used for the main study. Construct validity refers to the extent to which a variable accurately reflects the concept it is designed to measure (Stangor, 2011). In the MAI the construct being measured is the *student experience of martial ar*ts. This construct is based on the ten facets identified through interviews with

MA masters (Sandford & Gill, 2018), and the response items, in the first instance, related to those facets.

As principal researcher I undertook the initial generation of one hundred response items. Knowledge based on over thirty years of experience in MA training across diverse cultural and technical areas was employed. These cultures include Japanese, Chinese, Indonesian and Indian, as well as Western interpretations of MA from these cultures including interpretations from Australia, England, America and Brazil. In addition, I have studied European arts based from England and France.

The preliminary study was used to determine the suitability of the proposed items to be included in the questionnaire. The proposed survey items were viewed by study participants and research supervisors. In addition, participants were invited to evaluate the wording of each question for clarity and comprehensibility. Feedback was used to evaluate the suitability of items and where necessary, items which lack face validity or clarity were re-worded or removed. For the preliminary study only, statements relating to a single facet were presented in a block of 10 items. After this block the respondent was invited to state what they believe those 10 items relate to. The participants also had the opportunity to suggest concepts which would add to the extent of coverage of a given facet.

The data generated by this study was compiled to generate a list of question items which needed review. A second list of recommendations was also compiled. The information in these lists was then reviewed on an item by item basis. The review incorporated editorial changes to questions, the removal of items which caused concern and the creation of new items where required.

Factor analysis

Once the preliminary study was completed a questionnaire of approximately 100 items was available for further study. Data was to be collected in an online format and once sufficient data had been captured a factor analysis was conducted.

Factor analysis is a mathematical process for examining the relationships between observed variables which also serves to reduce complexity within a data set. In the case of the martial arts inventory questionnaire, each question provides a single observable variable. A factor then, is a number of observed variables whose variance/ covariance can be attributed to a specific matrix vector. This means that the observed variables have values in relationship to one another and we might expect an increase (or decrease) in one observed variable to be visible as a corresponding change in the other variables which make up that factor. A factor can be considered a higher order variable which is unobserved having been manufactured statistically from a number of related observed values. As it is now possible to establish correlations between a factor and outcomes, rather than each individual observed variable and outcomes, the overall complexity of investigating such relationships is greatly reduced.

Each of the facets associated with the Martial arts inventory has approximately 10 questions or observed variables associated with them. It would be ideal if these ten observed variables when extracted through a factor analysis formed of themselves a single factor. This ideal circumstance is however unlikely. Some variables strayed from the group and move independently thus demonstrating that they are not indicative of the facet construct they were intended to represent. Other observed variables clustered with variables associated with facets other than that for which they were constructed. Such variables either lack the power to discriminate between facets or are part of an unexpected factor which has been extracted from observed variables associated with

diverse facets of training. It is a normative process in a factor analysis to find observed values which will be dropped from the inventory for the above reasons. It is also possible that one or more factors which do not match the intended theoretical outcomes, in this case martial arts facets, may be established and recorded as worthwhile measured variables with predictive value.

In broad terms there are two forms of factor analysis. An exploratory factor analysis (EFA) looks at the data to determine if and how many factors exist. A confirmatory factor analysis uses new data to confirm that the factors do indeed exist. To test the hypothesis that questions related to the facets of MA will form a metric of student experience an EFA will be used. This technique identifies how many factors actually exist and beyond the basic factor structure. For example a factor could be the facets of ‘respect’ and ‘etiquette’, which could be expected to have high correlations with each other, forming a single factor.

A Qualtrics survey was generated based on the results of the preliminary study. The included items have established face and construct validity and have been edited for greatest clarity. Invitations to take part in research were posted online with an effort to identify pages which are viewed by martial artists. Snowballing was encouraged in the form of forwarding the invitation to style, school and organisation web notice boards (for example Facebook pages, or instructor blog pages) (Temple & Brown, 2011). To achieve meaningful results which can be analysed statistically, it was envisioned that up to 1000 respondents would be required. This information is based on 10 items per proposed factor, multiplied by 10 respondents per item as a minimum (Atkins, 2014). i.e. 10 facets x 10 questions x 10 respondents =1000.

Of the many extraction methods available the Maximum Likelihood Estimation (MLE) method has been chosen for this study. This decision was made based on the

perceived superiority of this method when there may be correlations between the factors (Gaskin & Happell, 2014; Muthen & Kaplan, 1985). Correlations between factors is a common scenario in psycho-social research and seems likely in the context of the martial arts experience. Statistical research suggests where correlations between factors is expected an oblique rotation method should be employed (Gaskin & Happell, 2014). The exact method within SPSS, either Direct Oblimin or Promax, appears to have minimal impact and both are considered acceptable choices (J. D. Brown, 2009). The Direct Oblimin rotation method was used in this study however, the Promax extraction was also be tested to ensure that the results were consistent.

Once the EFA extraction and rotation were complete it was necessary to determine which of the resultant factors should be retained. A large degree of support has been expressed by researchers for the parallel method to determine the number of factors (Çokluk & Koçak, 2016; Patil, McPherson, & Friesner, 2010). This method can be used in one of two formats. The first format uses random data which has factors extracted and eigenvalues calculated. The second format uses permutations of the research data set to generate a new data set which again has factors extracted and eigenvalues calculated. The mean values of the parallel analysis are then compared with the eigenvalues of the original data set. When superimposed on a scree plot, it becomes evident that the graphed parallel data intersects with the original data. Factors which occur before this intersection are deemed to be valid for retention. SPSS does not have a function for executing a parallel analysis, it is however possible to complete this task through an appropriate script (O'Connor, 2000).

Post-hoc analyses

Throughout the factor analysis project, demographic data was collected from respondents. A post-hoc analysis looked for self-selection bias in choosing a MA experience. This was tested by correlating financial, education and age data against the divisible factors of the MAI. This additional study forms a preliminary test of a research question posed by Vertonghen, Theeboom, and Pieter (2014) regarding MA self-selection and will serve as an example of how the MAI can be best used.

The premise under which this research has been derived relates to the inadequate nature of current descriptive terms used to describe the MA experience. Binary distinctions including *modern/traditional, internal/external,* and *soft/hard* were correlated against the MAI to determine if there was a viable relationship between the two classification methods.

Convergent Validity

It is a common practise in the development of a new questionnaire to have participants complete it at the same time as an existing questionnaire. A high level of correlation between the results serves to suggest that the same constructs are being tested in each of the questionnaires. The MAI however will be unique in that it is the only questionnaire to quantify the MA experience. Under these circumstances it was necessary to examine relationships between the MAI and other related constructs. Two such examinations were proposed.

Self-regulation has been identified in our literature review as an area of personal development which may be affected by MA training. As such we might expect that a relationship between the MAI and an instrument which purports to measure self-regulation would occur. Another construct where we might expect to see a relationship

to the MAI is mindfulness. There appears to be some similarities between mindfulness and the MA facets of *introspection, breathing* and *discipline.*

A final study used the MAI as developed from the EFA, in conjunction with tools to measure self-regulation and mindfulness, with an expectation that a significant relationship would be identified. The nature and extent of that relationship could not be easily predicted, but even a small effect w considered indicative that the MAI has some validity for quantifying MA experience.

Chapter 5: Preliminary Testing

The preliminary testing of the MAI served to test both the face validity and construct validity of the proposed questionnaire items and format. For each of the ten facets of training identified in previous research (Sandford & Gill, 2018), ten item questions perceived to be relevant were generated (*Appendix* B). These questions and the proposed method for dissemination were then presented to the Victoria University Human Research Ethics Committee (VUHREC) and were approved for use. Participants were encouraged to complete the questionnaire and were given opportunities to ensure that questions correctly related to a given facet and to MA experience in general.

Method

The initial questionnaire consisted of one hundred items, ten for each of the proposed facets. In addition, a text entry box to accept an open-ended response or comment to each item was provided. This increased the total number of items to 200. Specific probe questions (Willis, 2005) to ensure certain phrases were being interpreted correctly were then added. The items associated with a given facet were organised as a group and questions were devised to query the relevance of the items to the proposed facet they were to represent.

For example:

> *The previous 10 questions all related to one theme, which we have termed 'physical contact'.*
> *Do all of these questions fit as part of a theme? Y/N*
> *Please identify any that you think are misplaced.*
> *Can you think of other areas pertinent to this theme which have not been covered? Y/N*
> *Please explain the areas you think we should consider as part of this theme.*
> *Final comments/ thoughts for this theme?*

The total number of questions now approached 300 and was deemed to exceed a suitable time requirement and respondent fatigue was considered a concern (Hess, Hensher, & Daly, 2012). In response to this concern the items were broken into four groups each of approximately 100 items (Appendix C), consisting of 25 MAI items and approximately 75 probe questions. The preliminary questions were presented online in the Victoria University Qualtrics portal. Each set of question were made available to participants via a hyperlink which was emailed to them with an ethics approved invitation letter and an attached document outlining 'information to participants involved in research'.

Participants

The participants for the preliminary testing were all martial artists known to me through training and teaching relationships within the scope of the MA. Emails consisting of an approved form letter, an attached information statement and a link to the online questionnaire were sent to individuals from my contacts list. Participants chosen were individuals who I believed to have sufficient experience to provide critical appraisal of the questions presented. Initial invitations were sent to 30 individuals (F =5, M=25), and after two weeks another 5 invitations (M=5) were made. A total of 20 responses were returned. Participants provided demographic details which are included as Table 5.1.

Table 5.1

Demographic profile of preliminary study participants

Gender				
No response	Male		Female	
6	10		4	
Age				
No Response	26-35	36-45	46-55	56-65
6	3	4	5	2
Education				
No Response	Secondary	Certificate	Bachelor	Post Grad
7	1	2	7	3
Income				
No Response	$15000-	$45000-	$75000-	$105000+
8	5	3	1	3

Style	Modern	Traditional	Both	Neither
BJJ	1		5	
Karate	1	2	4	
Muay Thai			1	

	External	Internal	Both	Neither
BJJ	2		4	
Karate			7	
Muay Thai			1	

	Soft	Hard	Both	Neither
BJJ	1		4	1
Karate		1	5	1
Muay Thai			1	

Results

The participants provided a varied level of response to the survey, but the input was sufficiently critical to direct the review of the questions for the MAI. Reviewers were generally supportive of the face reliability of the questions (Table 5.2) and found that each set of ten questions were indicative of the facet being represented (Sandford &

Gill, 2018). However, several areas of concern were raised as problematic for respondents. This included the likert scale chosen with comments such as, “scale labels don’t match the questions”, “probably a yes/no question”, “not sure the once a month, once a week works here”. In addition, some questions were deemed to be double barrelled, “size or skill, should there be a separate question for each”, “could split into two questions” or lacking in context, “perhaps start with, at my school”, “at my training centre”. The clarity of some questions also concerned participants, and this was addressed on a question by question basis with many of the issues potentially resolved by actioning the likert scale and context. In addition, some participants provided anecdotal commentary to certain questions to further support their inclusion, “If I arrive late I watch the class instead as a courtesy to not interrupt those who made it on time”.

Table 5.2

Face validity of questions by facet

Facet	All questions fit facet (% yes)/ comment	All areas covered (% yes)/ comment
Streaming	100%	50% **Important** concepts covered
Physical contact	100%	100%
Challenge	100%	71% More focus on achievement
Etiquette	80% Injury procedure not considered etiquette related	100%
Respect	100%	63% Interruptions, training partners, punctuality, respect
Exemplars	100%	100%
Discipline	100%	60% Regular attendance, responsibility for own training,

		helping others, perseverance
Breathing	100%	100%
Introspection	80%	80%
	Does asking about the instructor reflect introspection	Connect lessons to life, more aware of others
Goals and rewards	100%	80%
		Achieving a school set goal may not be the student's goal

It should be noted that the participants were not made aware of the full ten facets when responding to the 25 MAI questions and their supporting probe questions. For this reason, some participant comments referred to facets other than the facet being examined. The participants drew our attention to the importance of content without being aware that it was covered elsewhere in the inventory. For example, the perceived omissions regarding the facet respect were covered under etiquette and discipline (Table 5.2).

The probe questions asked in concert with specific MAI questions either confirmed that a term or concept was correctly interpreted by the participants or allowed the participants to question the intent of an item. Details of the probe questions to which a response was required are included as Table 5.3.

Table 5.3

Probe questions requiring action.

Question	Authors comment or participants response
What are 'separate classes'?	Participants unsure what this means
Student size is taken into account when matching training partners.	(Clarify), 'sometimes the mismatch is deliberate'!
I get unintentionally bruised during training.	(Clarify), 'which I notice beyond the normal experience'?
Is free-sparring the best term to describe	'Perhaps not as there is no hitting', (in my

this?	art)
I feel that I am in danger of injury when training.	Not exactly what we wanted. More a case of being pushed beyond safety. Revise.
I am expected to persevere no matter how hard I feel a situation has become.	‘Expected by who?’
Before leaving the training space I gain permission from the instructor.	‘Does having a formal end of class count as permission? Or does this mean direct, personal permission to leave class?’ Re-word to clarify this
Is ‘reverence’ the correct word for this?	‘Respect and humility?’
I train with more experienced students.	‘A new student in a school will always be training with more experienced students’, we want to know if they are purposely matched to more experience training partners.
I am more aware of moderating my strength during training.	‘I am not quite sure what this question is asking.’
I am more aware of my weaknesses during training.	‘More aware than when?’

In addition to the clarity of the questions included in the MAI two issues related to the structure of the survey were raised. Firstly, the use of asterisks to denote likert points between labelled points caused confusion to some participants, “What do the asterisks mean?”, and “I could use a less regular frequency option on some of these questions. E.g. it's not always every week, but it's more than once per month.” A second issue related to confusion regarding students who study multiple arts or at multiple venues. The MAI instructed participants to treat these situations ‘as a whole’ taking into account their collective MA experience. This unfortunately proved problematic as

respondents chose different scenario for different questions or found that the wording of a question did not support multiple training scenario.

Discussion

The intention of a preliminary study is to validate as much of the instrument as possible before a large number of participants access the inventory. As the MAI is designed for online usage it was deemed most appropriate to get feedback in the same setting. If participants could navigate the survey by themselves then the survey would be fit for its intended purpose. This was also an opportunity to identify any structural or 'set up' issues that might impede responses to the inventory. In addition, terminology needed to be tested to ensure that the survey was comprehended by participants from diverse backgrounds and training regimes. Assuming the instrument produced is easy to comprehend and navigate the final concern was to determine the authenticity of the questions asked as they relate to the facets of martial arts training (Sandford & Gill, 2018).

The study participants were positive in their analysis of how questions formed themes associated with facets (Table 5.1) and associated commentary either suggested good coverage with some other areas which could be considered or identified areas which were covered by other facets. This points towards the possibility that some superordinate facets may exist which incorporate more than one of the identified facets. Another possibility is that points of overlap occur between facets. This is to be expected as certain behaviours should require, for example, both discipline and respect. The extent to which this is prevalent will be identified through the exploratory factor analysis which follows this study. Whilst the questions were deemed to be representative of facets, the individual questions were found to have structural flaws.

The participants identified context as a missing key to answering many of the questions. Confusion over whether a question related to the individual's opinion, their behaviour, the training school's expectations, the teacher's expectations or other student's expectations conceivably meant one question could have multiple responses. This flaw is an artefact of the researcher's intimacy with the questions and a consistent introduction will be required to improve clarity of the instrument. Contextual confusion was also caused by the likert scale labelling. In design the likert scale was developed using the most appropriate frequency labels. It was however identified by participants that in many of the questions these frequency terms did not represent their preferred answers. In some circumstances participants preferred a simple yes/no response or agree/disagree. A contextual introduction to each question may help with some of these issues, but it would seem prudent to review the likert scale to see if a more appropriate set of labels can be chosen. In a final note regarding the likert scale, some confusion over the intermediate points on the scale were expressed. These points were included to ensure respondents do not feel compelled to choose a label which does not exactly express their desired response. A review of how they are introduced to the participants will be required to ensure their appropriate use is understood. A final point of context which must be clarified related to whether a student was responding based upon their lifetime experience, a current training experience or the sum of current training experiences. A judgement will need to be made regarding this as it will need to be adequately introduced before a student begins the survey and it will inform the wording of the contextual introduction.

Several questions were identified as double barrelled. In most cases this flaw was designed into the questions. A single concept such as 'striking a target' was expressed in a double-barrelled manner, 'striking a bag or focus mitts', as this seemed

more inclusive and explanatory. Some respondents were confused and wondered if these should be two separate questions and when the question list was reviewed additional questions of this sort were identified. All of these questions will need to be addressed and resolved before the instrument is released for data collection for the exploratory factor analysis. Potential resolutions include, rewording the question, breaking the question into two, or using a more general question with a clarifying example. Of these options, breaking the question in two is the least favourable as it will further increase the number of questions and the commensurate time required to finish the survey.

Much of the probe questioning found that respondents who were exposed to just three of the facets were searching for questions related to other facets. This was noticed between the facets respect and etiquette in particular. It is worth noting the definition used to separate these facets. Etiquette is the formalised way we are expected to behave around others. Etiquette based behaviours are defined and are situation specific. Respect is about how we choose to behave in our interactions with others. Respect demonstrates acknowledged value of the other through our interactions. That there should be a crossover here is to be expected and it is only through the factor analysis that we will be able to determine if they are separate facets or components of a superordinate facet. The probe questions identified in Table 5.3 include specific ideas for resolution and it is essential that all of these be addressed before the inventory is next tested.

The MAI is a tool to identify a student's experience of the MA through quantified exposure to the martial arts facets. In previous literature it has been common to identify a MA as being part of a dichotomy, *hard/ soft, internal/external or traditional/ modern* (Vertonghen & Theeboom, 2010). The premise that these labels are insufficient was explored by asking the participants to identify where their art was

located in these dichotomies. The results (Table 5.1) show how inconsistent perception of these labels can be. In the majority of responses, the participant felt that both of the descriptive words were relevant to their training. Further data will be collected during the exploratory factor analysis and it is hypothesised that the dichotomic descriptions will be shown to be inadequate to describe a martial arts experience. However, through the MAI we will be able to examine the relationships between facets and those who self-define their training through these dichotomies to determine if any reliable patterns or profiles emerge.

Chapter 6: Exploratory factor analysis

The purpose of the martial arts inventory is to measure and define an individual's experience of martial arts training. The martial arts inventory gathers self-report data which can be related to a student's experience of ten distinct facets of martial arts training. These facets have been identified through interviews with senior MA teachers (Sandford & Gill, 2018) and each of the identified facets: *streaming, goals and rewards, challenge, etiquette, respect, exemplars, discipline, breathing* and *introspection* are represented by at least 10 questions within the martial arts inventory. The included questions have been refined and validated through a preliminary study (Chapter 5.) where individual questions were examined for clarity of comprehension and face validity in relation to the intended facet. The factor analysis will determine which of these questions group together and form a distinct factor of the MA training experience. The process of factor analysis is discussed in detail in Chapter 4-Overall Design.

A parallel analysis (Monte-Carlo simulation) (Çokluk & Koçak, 2016) will be used in conjunction with a maximum likelihood EFA. This analysis will determine the number of factors visible within the data. It might be expected that with 10 facets of martial arts, each represented by 10 question, we will extract 10 factors that directly relate to each facet. This is possible, but it is more likely that a percentage of the questions will represent each facet, some questions will be unrepresentative and still others will cluster together to form factors which span across facets. Unrepresentative items will be dropped from the inventory whilst new factors will be carefully examined to determine if they represent a training paradigm or are rather a statistical artefact of little relevance. After this analysis it will become apparent whether there are in fact 10 facets or whether superordinate factors represent a multi-facet construct. The questions

which best capture the factors identified by the EFA will then be gathered into a specific inventory.

Method

The revised questions associated with the MAI (Appendix D) were prepared in the Qualtrics application for online distribution. Optional questions relating to demographic information and the interpretation of dichotic labels were included after the main MAI questions. Approval for the revised question set was requested from Victoria University human ethics committee. The approval was given without need for any further modification. The survey was distributed through several online avenues. Direct email invitations were sent to heads of style who were encouraged to share the invitation through their internal communications systems and through their social media. Social media (Facebook) posts were used to distribute an invitation to martial artists within the researcher's network, and champions within this group shared the invitation on to their own networks. At appropriate intervals new posts were made to remind potential participants of the progress of the study. A web page was created at www.research.furneaux-institute.com with survey links to facilitate further dissemination of the invitation to the study. This web page included additional access to ethics approved information sheet and right to withdraw from the study which is included in the Qualtrics survey. The resultant data was processed through the statistics application package SPSS.

Participants

Ethics approval was gained for Australian martial artists of age 18 or older to take part in the study. Participants were asked to confirm their suitability by actively selecting three check boxes pertaining to their age, their comprehension of the ability to withdraw from the study at any time, and the anonymity of the data they provide.

Access to the MAI items occurred only after all three check boxes had been completed. The inventory was conducted online employing the sampling techniques of convenience and snowballing. As the research was conducted online, only martial artists with an online presence were exposed to advertising. The martial arts community makes up a small percentage of an overall population so it was considered important to gain access through the most effective and convenient conduit available and this was deemed to be the internet. Each participant was encouraged to pass on the details of the survey to access as many martial artists as possible and this snow-balling technique proved to be the best way to extend the reach of the posts used to advertise the survey.

Demographic questions followed after the main survey and were optional. Of the total participants (N=328), demographic questions were completed by between 158 to 169 participants dependent upon the question (Table 6.1). The majority of respondents can be described as male, aged 26-45, university educated and of below median Australian income (Australian Bureau of Statistics, 2019).

Table 6.1

Demographic profile of exploratory factor analysis participants

Gender		
No response	Male	Female
159	131	37

Age						
No Response	18-25	26-35	36-45	46-55	56-65	66+
161	32	45	51	23	12	4

Education				
No Response	Secondary	Certificate	Bachelor	Post Grad
160	22	40	59	47

Income						
No Response	>$15000	$15000-	$45000-	$75000-	$105000+	
170	14	42	36	30	36	42

Questionnaire.

The revised MAI item set consisted of 106 questions. The addition of six questions was a result of splitting some questions which were deemed to be 'double-barrelled' into two related questions. The Qualtrics software was set up with an open link so that any prospective participant could reach the information page. The opening information pages were followed by the consent page where the three vetting questions were required to be checked (see Participants above). This was directly followed by the survey items which were presented one to a page in a random order. The decision to randomise the items was made to discourage participants from divining the purpose of the question set and answering to please the researchers (Stangor, 2011). At the completion of the survey items participants were invited to complete the demographic questions which were clearly labelled as optional. Respondent fatigue (Hess et al., 2012) was considered to be a danger and it was felt prudent to place non-essential questions towards the end of the survey and to make them optional to avoid unnecessary pressure on the participants.

Results

To determine the underlying factor structure of the martial arts inventory it was expected that between 530 and 1060 participants (Atkins, 2014) would be required. The actual number of participants (n=328) exceeded the accepted minimum of 100 (Gaskin & Happell, 2014) and whilst less than optimal was considered to be an adequate sample.

The Kaiser-Meyer-Olkin test of sampling adequacy (*KMO=.747*) and significance in Bartlett's test of sphericity (*p<.001*) supported this assessment.

Q-Q plots of each observed variable showed that much of the data approached normality. Traditional tests such as the Shapiro-Wilk and Kolmogorov-Smirnov however were significant and indicated departure from the normal. Maximum likelihood estimation has been found to remain a robust analysis under these circumstances (Muthen & Kaplan, 1985) and as such the lack of normality was not considered problematic, however results under these circumstances are considered less than optimal by some statisticians (Bernstein & Teng, 1989).

A parallel analysis was performed on the data using the O'Connor (2000) script and a randomised data set of 1000 responses. The convergent scree plot suggested ten significant factors (Table 6.2). The parallel analysis was then repeated with

Table 6.2

Parallel analysis – random data

Factor	Raw data	Random data mean
1	16.0132	3.1023
2	7.0915	2.9197
3	5.4323	2.7879
4	4.2399	2.6733
5	3.9613	2.5756
6	3.2638	2.4855
7	2.8339	2.3249
8	2.5303	2.2533
9	2.3405	2.1832
10	2.2363	2.1174
	2.0408	**2.0570**

permutations of the original data set, and this showed convergence after eight factors (Table 6.3). Where data being analysed is not normal the expectation is that too many factors will be extracted (Muthen & Kaplan, 1985). It has also been suggested that the

Table 6.3

Parallel analysis – permutation data

Factor	Raw data	Permutation data mean
1	16.1181	3.3409
2	7.1959	3.1606
3	5.5734	3.0298
4	4.3544	2.9158
5	4.0833	2.8188
6	3.3741	2.7295
7	2.9602	2.6468
8	2.6671	2.5698
	2.4823	**2.4988**

permutations method of parallel analysis is the more accurate method (Courtney, 2013). The factor analysis was performed through SPSS with a maximum likelihood estimation extraction method and direct oblimin rotation. SPSS was directed to extract eight factors based on permutation parallel investigation, and rotation converged after 32 iterations. The resultant solution accounted for less than half (39.211%) of the variance as shown by eigenvalue (Table 6.4). There were 32 factors visible with eigenvalues greater than one, accounting for 72.46% of variance. The eight factors extracted were representative of data from 78 of the 106 items (Table 6.5).

Table 6.4

Factor extraction-total variance explained by initial eigenvalues

Factor	Eigenvalue	% of variance	Cumulative %
1	15.096	14.241	14.241
2	6.244	5.891	20.132
3	4.890	4.613	24.745

4	3.816	3.600	28.345
5	3.557	3.356	31.700
6	2.829	2.669	34.369
7	2.594	2.447	36.817
8	2.538	2.395	39.211

Four of the included items were loaded into two separate factors. Factor loadings of less than 3.2 were supressed. All ten facets (Sandford & Gill, 2018) are represented by relevant items but only factor four was exclusive to a single facet -*streaming*. Factor 2 might be considered to represent the facet *discipline*, though the small number of items make a conclusion difficult to draw. Factors six and eight are both dominated by the facet *challenge*, factor one incorporates *breathing* with *etiquette* and *introspection*, whilst factor five brings *etiquette* together with *respect* and *exemplars*. Factor 7 incorporates goals and rewards with introspection and factor three is unique in that it represents items from eight of the ten different facets.

Table 6.5

Factor loading by item and facet

Loading	Facet	Item (Abbreviated)
Factor 1		
.732	Breathing	In class I spend time in breathing meditation
.716	Breathing	In class we begin with just a few moments of breathing
.705	Breathing	In class I practise breathing techniques
.669	Breathing	At…I am taught to regulate my breath
.635	Breathing	At…class ends with…formal breathing
.594	Breathing	At…the techniques I learn require breathing regulation
.513	Breathing	At…encouraged to attend to my breathing
.453	Breathing	At…specialised meditation classes
.452	Breathing	I regulate my breathing during training
.451	Breathing	At…not coping…relax and breathe through the training

.422*	Etiquette	At…I follow a set protocol before entering…
.364	Etiquette	In class if I injure someone…procedure to follow
.362	Introspection	In class…rehearse techniques in my mind
.355	Exemplar	At…demonstrate techniques in front of class
.341	Introspection	At…spend time thinking about my class
.340	Introspection	In class the teacher gives an anecdote about life
.334*	Etiquette	I use my teachers title when asking for their attention (eg. Sir)
.330	Etiquette	In class if I am injured…procedure to follow
.325	Introspection	In class the teacher links…wider life perspective
	Factor 2	
.930	Discipline	I arrive at my school with training clothes that are clean
.826	Respect	I arrive at class with a clean uniform (training clothes)
.553	Discipline	In class I control my strength to protect other students
.408	Introspection	In class I am careful to moderate my strength…
	Factor 3	
.730	Exemplar	In…senior students set good technical examples
.723	Streaming	In…new techniques are repeated multiple times
.694	Etiquette	In class, at the end of training I thank my training partner
.634	Introspection	In class I am aware of what I need to do to improve…
.625	Respect	I believe my training partners have my well-being at heart…
.574	Streaming	At…training content…builds on…previously learnt
.564	Discipline	I…incorporate…instructions from my teacher…
.517	Goal&Reward	At…hard work…to…achieve the next level of training
.495*	Exemplars	At…senior students model correct behaviour
.410	Goals&Reward	I feel it is worthwhile…attain a new level in my training
.372	Introspection	At…I am made aware of what I must do to improve
.348**	Challenge	In class my fellow students…encourage me to persevere
	Factor 4	
.829	Streaming	In… matched to a training partner of a specific size
.776	Streaming	At…size is considered when matching training partners
.636	Streaming	In…matched to a training partner of a specific ability level
.496	Streaming	At…I can attend classes…specifically for…ability level

	Factor 5	
.690	Etiquette	At…if I need to leave the training space I gain permission…
.684	Respect	I behave in a formal manner when discussing…teacher
.657	Respect	I behave formally within the school
.628	Etiquette	I use my teachers title when asking for their attention (eg. Sir)
.444	Etiquette	At…I follow a set protocol before entering…
.433	Etiquette	At…expected to arrive early to classes
.431	Exemplars	In class senior students behave the way we are told to behave
.412	Respect	I behave with humility within the school environment
.404	Etiquette	At…specific clothing must be worn
.388	Etiquette	At…there is a formal way to greet a new training partner…
.377	Exemplars	At…senior students show me…by example
.377	Respect	At…the students…acknowledge the instructions…
.371	Exemplars	At…senior students model correct behaviour
.332	Physical con.	In class I strike a target …
	Factor 6	
.597	Challenge	In class training is likely to lead to me getting injured
.519	Challenge	In class…I feel I am in danger of injury
.515	Physical con.	How often do you receive an injury during training…
.487	Challenge	In class…additional physical risk
-.392	Respect	…do not place my training partner in undue danger
.385	Challenge	…push my to my psychological limits
-.379	Goal&Reward	At…seems like an achievable goal
-.370	Exemplars	At my school the senior students are courteous even to the newest student
.350	Challenge	In class I get unintentionally bruised from training
.345	Discipline	In class…take it out on my training partner
.323	Challenge	In class…a poor match for me
.320	Challenge	In class…push me to my emotional limits
	Factor 7	
.746	Goal&reward	I spend time…to gain understanding of the newest techniques
.694	Goal&reward	I spend time…working towards the next level…
.398	Goal&Reward	At…fail the test for the next level of training

.382	Introspection	I research the techniques I am training in
.353	Introspection	I record the techniques that I am learning
.347	Discipline	In class we review the basic techniques
.345	Goal&reward	At…the requirements…are clearly defined
	Factor 8	
.589	Challenge	In class my teachers encourage me to persevere…
.497	Challenge	I strive to keep going no matter how hard…training situation
.449	Challenge	In class the training can push me to my physical limits
.443	Challenge	In training I might be expected to perform tasks…difficult
.428	Challenge	At…I am expected to persevere…
.420	Challenge	In class…students encourage me to persevere
.371	Discipline	In class when I get hit…try to do better next time
.370	Physical con.	How often…physical partner work
.338	Physical con.	In class I take part in free fighting
.320	Physical con.	In class I take part in heavy contact training

** also factor 5. ** also factor 8.*

The eight-factor model presented above was compared against both a nine and a ten-factor model. The nine-factor model accounted for an additional *2.088%* of variance by eigenvalue compared to the eight-factor model, with factors represented largely aligning between the two models. The ninth factor related to *exemplars* and included items associated with other factors in the eight-factor model with some additional items from both the *exemplar* and *streaming* facets. The ten-factor model accounted for an additional *4.105%* of variance by eigenvalue compared to the eight-factor model. As was found with the nine-factor model, the factors largely aligned with the previous model, in this instance a new factor which was dominated by items from the *respect* facet was extracted. In the eight-factor model both *respect* and *exemplars* are represented by factor 5 and this suggests that no additional benefit would be gained by utilising a larger factor model.

Amongst the demographic questions participants were asked to define their martial arts through dichotic labels. The results are presented as Tables 6.6, 6.7 and 6.8

Table 6.6

Self-reported definition of martial art as modern or traditional

Martial Art	Total	Modern	Traditional	Both	Don't know
Aikido	4		2	2	
BJJ	54	27	1	23	3
Boxing	1			1	
Capoeira	1			1	
Hapkido	1		1		
HEMA	1		1		
Iaido	2		2		
Karate	51	4	20	26	1
Jiu Jitsu	13	2	4	7	
Kendo	3		2	1	
Muay Thai	2			2	
Ninjitsu	1			1	
Silat	1		1		
Taekwondo	15		7	7	1
Kung Fu	6		4	2	
MMA	3	2		1	
Totals	159	35	45	74	5

Table 6.7

Self-reported definition of martial art as internal or external

Martial Art	Total	Internal	External	Both	Don't know
Aikido	5		1	4	
BJJ	55		21	13	21
Boxing	1		1		
Capoeira	1		1		

Hapkido	1			1	
HEMA	1				1
Iaido	2	1	1		
Karate	51	4	12	21	14
Jiu Jitsu	12		3	5	4
Kendo	4			3	1
Muay Thai	2				2
Ninjitsu	1			1	
Silat	1		1		
Taekwondo	15	1	2	7	5
Kung Fu	6	1		4	1
MMA	3		3		
Wrestling	1			1	
Totals	162	7	46	60	49

Table 6.8

Self-reported definition of martial art as hard or soft

Martial Arts	Total	Hard	Soft	Both	Don’t know
Aikido	4			3	1
BJJ	52	22	2	21	7
Boxing	1			1	
Capoeira	1			1	
Hapkido	1			1	
HEMA	1				1
Iaido	2		1	1	
Karate	46	10	2	32	2
Jiu Jitsu	12	3	1	8	
Kendo	4	2			2
Muay Thai	2			2	
Silat	1			1	
Taekwondo	15	4		9	2

Kung Fu	6		2	4	
MMA	3	1		1	1
Wrestling	1			1	
Totals	152	42	8	86	16

As part of the validation process for the MAI participants were asked to describe their MA in terms of established dichotic descriptions, namely *Modern/ Traditional, Hard/ Soft* and *Internal/ External.* Initial examination of this data (*n=153*) shows that 50% of participants were able to differentiate their training as *modern/traditional* whilst the other 50% felt their training was both or were unsure what the description meant. In terms of the dichotic *hard/ soft* this number dropped to 34.5% able to make the distinction between these two labels, 56.5% felt that it was both and 9% were either not sure or felt their training was neither hard nor soft. When analysing the final dichotic terms, *internal/ external* the number of participants able to discriminate was 33%, 41% felt their training was either, neither internal nor external or was both and a large 26% were unsure what this meant.

Discussion

The martial arts inventory is based on the premise that a student's experience of the martial arts can be defined by their exposure to 10 facets of training as described by senior martial arts teachers (Sandford & Gill, 2018). The expectation was that each facet would either form a factor on its own or be part of a superordinate factor which was inclusive of several facets. The eight factors extracted from the data set appear to have a strong relationship to the expected facets, though some unexpected relationships have occurred which require careful consideration.

Factor 1 – Meditative training

Meditative training: using the breath and introspection to manage behaviour.

The first factor has 19 items which include all 10 of the *breathing* facet questions, four from each of the *etiquette* and *introspection* facets, and one from the *exemplar* facet. Regulating breath during physical activity is not exclusive to martial arts training and the concept of meditation certainly has a much broader scope. In martial arts the inclusion of these concepts speaks to an awareness of self-control, establishing calm and synchronising ones breath to action. This meditative concept is reinforced by the *introspection* items which relate to philosophy concepts in class and internal self-assessment of training performance. The etiquette and exemplar items are associated with class behaviours which it could be argued, correlate to environments where meditative behaviours are encouraged. It is noteworthy that two of the *etiquette* items also load into factor five which is focused more specifically on *etiquette* and *respect* within the school. Nineteen items are excessive for a single factor and as such this will be reduced (Atkins, 2014) in the final inventory.

Factor 2 – Respectful discipline

Respectful discipline: Managing your responsibilities to others within the MA environment.

The four questions which make up this factor consist of two sets of two question, representing the facets *respect* and *discipline*. The first questions relate to arriving at class with a clean uniform. This item appears first in the discipline facet and was considered representative of being organised. The question appeared again for the respect facet as an indicator of taking the effort to be inoffensive to a training partner. That the two questions are highly correlated serves as an indicator that participants were still actively engaged with the study at the time of the second response which provides some evidence that respondent fatigue (Hess et al., 2012) had not affected the study.

The second pair of questions were related to the control of one's strength during training. In the first instance this was deemed a demonstration of self-discipline and as such was proposed to represent the discipline facet. The second iteration was included as part of the introspection facet where the encouragement to be aware of one's strength and to act accordingly was seen as an instruction which would be internalised and acted upon based upon personal experience.

Factor 3 – Positive Training environment

Positive training environment: A combination of MA facets which describe a positive MA experience.

Unique amongst the extracted factors, factor three consists of twelve items from eight different facets of training. One possibility which should be considered is that these correlations are an anomaly which is not representative as a factor (Atkins, 2014). However, examination of the items in relationship to each other shows that they can be classified together as a positive training environment. Specifically, a positive training

environment is one where a multitude of experiences which have been identified as potential agents of behaviour change (Sandford & Gill, 2018) are evident. Three items relate to supportive relationships with fellow students and represent the facets *etiquette, respect* and *challenge*. The next five items describe a training environment where the technical expectations of students are clearly portrayed. The facets involved were *exemplars,* where senior students set clear technical examples to be followed, *introspection* where students identify a clear understanding of what is required of them and finally *goals and rewards* where the students acknowledge the value in their training. The final theme within this factor relates to the training pedagogy employed in classes and is supported by items from the facets *streaming, discipline* and *introspection*.

This combination of eight facets; *etiquette, respect, challenge, exemplars, discipline, streaming, goals and rewards,* and *introspection*, which describe three training themes; student relationships, technical expectations, and teaching pedagogy defines an unexpected but welcome relationship within the data. The suggestion here is that certain aspects of the relevant MA facets occur consistently together or are consistently absent as a group, forming a clear narrative for the student experience. This new factor then supersedes the original facets research and provides us with an important insight into a specific component of the training experience. In this experience students have a clearly defined set of expectations which are both challenging and achievable. Good examples of how to achieve those expectations are set by other students and productive feedback on what they personally need to achieve their goals is available.

Factor 4 – Streaming

Streaming: Deliberate matching of training partners to achieve specific outcomes.

The fourth factor extracted consists of four items from the streaming facet. Streaming relates to how both the level of experience of the student and their physical profile; including, health, size and age, influence the structure of training. The items which loaded onto this factor specifically identified student size and level as relevant. Of importance is that items which matched the student to a partner of their own size or level were supported by the idea that the partners size and level were chosen. The distinction between these two concepts shows that in appropriate circumstances deliberate mis-matches of size and level are incorporated in training. This is important because it expands the pool of training partners but suggests very deliberate training objectives within the class and as such implies the facet *challenge*. Where larger, more experienced students are matched to smaller or less experienced students the facet of *respect* is implied through the necessary self-control used in these circumstances.

Factor 5 – Training Behaviour

Training behaviour: How a student interacts within the MA training environment.

Factor five incorporates items from the facets *etiquette, respect* and *exemplars* and as such provides a very clear paradigm for a training environment which is structured and has behavioural expectations clearly defined. An additional item from the *physical contac*t facet also loaded onto this factor. This item related to the striking of punching bags or focus mitts during training. Of the fourteen items in this factor there was only the one physical contact item and it had the smallest loading. All other items related to the protocols of behaviour when interacting with the training space or other students. It is highly likely that the physical contact item is a correlational artefact within the data and as such it should be questioned as a useful indicator of this factor.

The *etiquette* items set a number of prescribed behaviours for students to follow, *respect* items speak to the decorum with which the student behaves, and *exemplar* items

show senior students providing positive behavioural examples. The suggestion here is not just of a space where action is conducted with rigid military style discipline but rather a space where students are comfortable in what is expected of them and behave towards one another in a positive manner.

Factor 6 – Heavy Training

Heavy training: Where challenge meet threat..

The items related to this factor revolve around the concept of challenge which exceeds acceptable parameters. Of the twelve items loaded to this factor, two items from the *challenge* facet and one from the *physical contact* facet combine to define the students expectation that training is likely to lead to injury. In defining the item, students were told that an injury was one which ‘requires treatment, or for you to modify your activity’. This should exclude basic bumps and bruises associated with contact training and record more serious interactions and risk events. In addition, a third challenge item related to unintentional bumps and bruises also factored here. These challenge items were structured to identify times when the challenge was considered sufficient enough that the student felt a mistake could lead to injury. The physical contact item explored the frequency of injury events as a measure of contact training. That all four of these items should factor together is logical and identifies an aspect of training which we might consider to be negative and counter-productive.

Two additional challenge items identified that being pushed to emotional and psychological limits also correlated to the negative aspects of challenge. We should note at this point that factor eight is also strongly related to the *challenge* facet and it is important to observe the association of emotional and psychological challenge here to other negative items as opposed to physical challenges which is associated to factor eight.

The last two negative items relate to the treatment of one's training partner. A negatively worded discipline item, which could be described as undisciplined behaviour and a challenge item which suggests that a poor choice of training partner is common. This last may relate to advanced practitioners being frustrated by junior partners, or junior partners being intimidated by individuals within their school. Regardless, these items add to the description of a cumulatively negative experience.

Three more items load onto this factor. Each is inversely related to the negative loadings and as such they may be considered mitigating influences. That is, the level of frustration, distress and injury received was less when these items were factored in. In statistical terms when these items increased the negative items decreased. The items related to actively caring for a partner's wellbeing, courtesy from senior students and having achievable goals.

In interviews with senior teachers (Sandford & Gill, 2018) the concept of toxic training environments where undisciplined students set out to intimidate their training partners was explored. This suggests that factor six which has been termed heavy training could equally be considered a measure of toxicity in the training environment. As such this factor will be the most difficult to score as the raw data will need to be reduced by the three positive items, but the final factor score will act either to reduce an overall experience score or to stand as a secondary score to further define the overall martial arts experience.

Factor 7 – Goal orientation

Goal orientation: How goals influence the training experience.

Drawing from the facets of *introspection*, *discipline* and *goals and rewards*, factor seven demonstrates in 7 items a training experience which is goal oriented. The goals are supported by clearly defined expectations of the school and are actuated by

personal study and review of the required material. The individual's student goals are assessed as well defined and understandable, they undertake to research and record their requirements, they review their efforts and work towards their goals. As a final note, they identify that it is possible to fail a test for a reward thus showing that their efforts must truly be of the defined standard. This factor speaks to the students self-discipline but also to the overall teaching style presented by the school (Vertonghen & Theeboom, 2010) which can be described as structured, and supportive of individual growth.

Factor 8 – Physical challenge

Physical Challenge: Defining the physical components of training and how they create challenge.

The eighth factor to be extracted identified that the training was sufficiently challenging that the student would need to persevere through adversity. Six items from the challenge facet noted that training could be difficult and take you to your physical limits, but that perseverance was both required and encouraged by both teachers and fellow students. An item from the discipline facet acknowledge the need for fortitude or resilience and three items from the physical contact facet showed that these challenges were directly related to physical interactions with other students.

Conclusions

The eight-factor model extracted from the data provides a strong overview of a martial arts students experience of training. The discovery of factor six as a negative factor was unexpected but is consistent with the underlying ten facet theory of training. The martial arts inventory of 78 items which results from this exploratory factor analysis is consistent with the underlying theory of ten facets (Table 6.9) of training associated with behaviour change and as such is suitable for further investigation.

Table 6.9

Facets as components of the Martial arts inventory factors

Factor	*Etiquette*	Respect	Introversion	Physical contact	Challenge	Exemplars	Breathing	Goals & rewards	Streaming	Discipline
1	*x*		x			x	x			
2		x	x							x
3	*x*	x	x		x	x		x	x	x
4									x	
5	*x*	x		(X)		x				
6		-x		x	x	-x		-x		x
7			x					x		x
8				x	x					x

Review of the items which make up the eight factors showed that there were more items loading on some factors than was necessary to discriminate them. A determination was made for which items to retain and a final inventory of 48 items was created (*Cronbach's Alpha* = .875) (Table 6.10). Precedence was given to items which had the greatest loading on a single factor. Some factors still had more than the optimal 10 items (Atkins, 2014) and further reductions were made. An effort was made to retain sufficient questions in any given factor to ensure the range of concepts embodied were represented.

Table 6.10

The Martial Arts Inventory Questionnaire

Factor 1
In class, I spend time in breathing meditation.
In class, I practise breathing techniques.
In class, the teacher gives an anecdote about life.
In class, the teacher links an aspect of our training to a wider life perspective.
In class, my teachers encourage me to rehearse techniques in my mind.
Factor 2
In class, I control my strength to protect other students.
I arrive at my school with training clothes that are clean.
In class, I am careful to moderate my strength to match the situation I am in.
I arrive at class with a clean uniform (training clothes).
Factor 3
At my school, the training content of a class builds on foundations which have been previously learnt.
I believe my training partners have my well-being at heart even when we are doing

intense training.

In class, the senior students set good technical examples.

In class, new techniques are repeated multiple times.

I try to incorporate any personal instructions from my teacher into my training.

In class, I am aware of what I need to do to improve my martial arts.

At my school, hard work is required to achieve the next level of training.

In class, at the end of training I thank my training partner.

Factor 4

At my school, I can attend classes which are specifically for students of my ability level.

In class, I am deliberately matched to a training partner of a specific size.

In class, I am deliberately matched to a training partner of a specific ability level.

At my school, student size is considered when matching training partners.

Factor 5

At my school, the senior students show me how to behave in class by their example.

In class, the senior students behave the way we are told to behave.

I use my teacher's title when asking for their attention (e.g. Sir).

At my school, if I need to leave the training space I gain permission from the instructor.

I behave with humility within the school environment.

I behave in a formal manner when discussing training with my teacher.

Factor 6

In class, the training can push me to my psychological limits.

In class, the training can be so intense that I feel I am in danger of injury.

In class, I can feel that my training partner is a poor match for me.

In class, training is likely to lead to me getting injured.

In class, there is some training that places me at additional physical risk.

In class, when I am frustrated, I am likely to take it out on my training partner.

At my school, the next available level in my training seems like an achievable goal.

At my school, the senior students are courteous even to the newest student.

I ensure that my actions do not place my training partner in undue danger.

Factor 7

In class, we review the basic techniques.

I research the techniques I am training in.

At my school, I have seen people fail the test for the next level of training.

I spend time in private training working towards the next level of achievement.

I spend time in private training to gain understanding of the newest technique I am studying in class.

I record techniques that I am learning.

Factor 8

How often do you interactively train with another student in class? (Physical partner-work)

In class, I take part in free-fighting (sparring, wrestling etc.).

In class, the training can push me to my physical limits.

In class, my teachers encourage me to persevere when training gets hard.

In class, when I get hit or defeated, I try to do better next time.

In class, I may be expected to perform tasks which are quite difficult.

Chapter 7: Post hoc investigations

A basic question that this research has set out to answer is, can the MAI provide a more nuanced understanding of a MA experience than would be gained by using the dichotic terms used in the MA industry. We discussed the three main dichotomies, *modern/ traditional*, *hard/ soft* and *internal/ external* in Chapter 2-Martial arts in research and as is shown in Tables 6.6, 6.7 and 6.8 there was some confusion in the minds of our respondents as to what these terms really meant. Indeed, the results suggest that when any one of these dichotic terms is used to describe a MA experience, 50% or less of those receiving this communication claim to be able to make the distinction. It is reasonable to expect that this level of understanding will further drop for those who are not part of the MA industry, and therefore have had little exposure to the jargon used for descriptive purposes. This becomes problematic when terms such as *traditional* are used by researchers when describing the student experience which led to specific behavioural outcomes, both because the term is not well understood and because the student experience is not easily replicable. Ultimately however, the question must be asked; is there an actual difference in student experience between each of the dichotic terms?

The degree to which those who use these dichotic terms actually describe a specific MA experience can be examined through post-hoc analysis of variance. That is, are there significant differences in the global MAI score for individuals who claim to train in one dichotic parameter as opposed to the other? A Kruskai-Wallis examination for each of the dichotic descriptions was undertaken using MAI scores calculated from the 48 questionnaire items chosen for inclusion in the final iteration of the MAI. The results as outlined below show that whilst poorly understood as a linguistic

communication there is some merit to their use for those who understand their implications.

Results

The first Kruskai-Wallis ANOVA was completed on the dichotic terms *modern/ traditional* and a significant result occurred (*n=152, H=31.686, df=3, p<.01*). An analysis of effect size (Cohen's *f=.208*) found it to be large. Post-hoc pairwise analysis found that there was a significant difference between those who claimed to be training in a modern or traditional setting (*Bonferroni adjusted alpha, p<.01*), with traditional experiences having a higher MAI score. A second significant result occurred between those who claimed to be training in an experience which was both modern and traditional compared to those who were just training in a modern context (*Bonferroni adjusted alpha, p<.01).*

The second Kruskai-Wallis ANOVA was completed on the dichotic terms *interna*l/ *external* and again a significant result occurred (*n=152, H=26.368, df=4, p<.01*). The effect size was large (Cohen's *f=.173*) and the post-hoc pairwise analysis showed that there were significant differences between those who labelled their training as external and those who considered their training both (*Bonferroni adjusted alpha, p<.01)* but also between those who said *both* and those who were *not sure* (*Bonferroni adjusted alpha, p<.01).*

The final analysis was completed on the dichotic *terms soft/ hard.* The Kruskai-Wallis ANOVA was significant (*n=152, H=10.072, df=4, p=.039*) with a medium effect size (Cohen's *f=.066*). Post-hoc pairwise analysis showed there was a clear difference between those who designated their training as *hard* and those who stated their training was *both* soft and hard (*Bonferroni adjusted alpha, p=.037).*

Discussion

The use of dichotic terms to describe a martial arts experience is an established naming convention. The results from our post hoc analysis relate to the perception of martial arts practitioners own MA experiences. There is a significant difference between a *traditional* and a *modern* MA experience as demonstrated through the MAI. Even when a traditional experience had modern aspects added such as in the *both* response, there was a measurable difference compared to a modern experience. The mean modern result was significantly lower than either of the other two conditions. Of the three dichotic naming conventions the traditional/ modern does seem to be the most explanatory. However, 50% of respondents could not differentiate between the two or were training in a MA experience which is eclectic in nature and encompasses both paradigms. This clearly reduces the value of such descriptives as useful research terminology and reinforces the potential value of the MAI for quantifying the martial arts student's experience. It would seem that a higher MAI score equates to a more traditional experience of the MA.

The results of the analysis of the dichotic terms *internal/ external* were far from illuminating. There was no significant difference between students who said their training was internal compared to those who said their training was external. A quarter of participants did not understand this distinction at all and 41% could not make the distinction because they either believed the experience was both or neither. The significant differences occurred in two very disparate circumstances. Firstly, there was a significant difference between those who claimed to have *both* experiences and those who were not sure about the relevance of the terms. This would suggest that elements of the training experience for those *not sure* is closer to that described by those in the *external* condition. Indeed, the mean rankings for *external* (*M=62.97 ranked*) and *not*

sure (*M=62.59 ranked*) are very similar. The second significant difference concerned the *both* and *external* conditions. The MAI score for those in the *both* (*M=101.10 ranked*) condition was considerably higher than that for *external,* suggesting a more positive experience. The lack of differentiation between external and internal may be a product of the small number of participants who chose the internal condition (*n=7*), and as such it would be unwise to draw conclusions from the relevant data. Whilst the tradition/ modern dichotic has some merit, the data here suggests that the internal/ external dichotic is not a relevant method for describing the martial arts experience.

The final dichotic pair of descriptives *hard/ soft* failed to provide unique descriptors for the martial arts experience. Indeed, 61.5% of respondents were unable to use these terms to differentiate their experience. There was one significant variance which existed between those who felt their training could be categorised as *hard* and those who chose *both*. Once again those who chose the other main distinction *soft,* were few in number (*n=8*) and as such caution should be used in drawing any conclusions.

Overall the post-hoc analysis of the data collected provide us with two conclusions which are both supportive of the intent of the MAI. The existing terms have been shown to be poorly understood by martial artists, and in many contexts overlap so that the experience of the student can be described as a combination of both dichotic terms. In addition to this the MAI has shown its worth as an instrument which can be used to quantify martial arts experiences and fine tune their description in research. The identification of clear differences between a traditional experience and a modern experience with a higher global MAI score for those in a traditional group can be seen as evidence for the validity of the instrument. This is demonstrated by the relationship these distinctions have to data sets which have used these terms in defining the martial arts experience (Trulson, 1986).

Chapter 8: Validity of the Martial Arts Inventory

The MAI consists of a questionnaire of 48 questions which represent eight factors. Ostensibly the inventory measures a student's experience of MA with questions which relate to their individual training and to the place where they train with others. The eight factors have been named; *meditative training, respectful discipline, positive training environment, streaming, training behaviour, heavy training, goal orientation* and *physical challenge*. The scale items were created from qualitative research (Sandford & Gill, 2018) which attempted to identify elements of training which might affect student behaviour both in and outside the training environment, and as such the MAI is representative of *the student experience of MA which is most likely to influence student behaviour*.

The validity of an instrument such as the MAI can be established in many ways which include environmental validity, convergent and divergent validity and ultimately a confirmatory factor analysis (CFA). To complete a CFA approximately 500 participants would be required for statistical power. As this researcher has discovered, gathering this many responses from the MA community can be problematic. The most effective means for gathering such numbers will be to collect the MAI results from a number of studies and perform the CFA on the amalgamated data. This leads us to the concept of environmental validity. Environmental validity relates to the successful use of a questionnaire in research, and the understanding that can be gained by examining the relationship between the questionnaire with other psychological constructs. To establish environmental validity a number of research projects must be completed and an analysis of the results used to establish the merit and therefore validity of the questionnaire. Studies which build environmental validity may also provide data for a future CFA. One test of validity which might be established in a single study is to test

for convergent validity. Convergent validity s usually established through the use of a new questionnaire such as the MAI, in tandem with an existing questionnaire. It is expected that where both questionnaires are measuring the same construct there should be considerable correlation between the results of the two tools (convergence) thus demonstrating a degree of validity.

A fundamental difficulty in establishing the validity of the MAI is the lack of any other instrument purporting to measure the same or even similar constructs. The objective of the MAI was to establish a quantification of the student experience of MA as related to student behaviour. Some of the MA research results that have been published directly relate to improvements in self-regulation (Lakes & Hoyt, 2004; Trulson, 1986; Vertonghen & Theeboom, 2010). It seems likely that a small to moderate correlation should occur between a martial arts experience as defined by the MAI and an assessment of self-regulation (Refer: self-regulation, chapter 2). As such, convergent validity may be demonstrated as a correlation between a global score of self-regulation and the global MAI. Further support for the validity of the MAI may be found through a relationship with the psychological construct, mindfulness. There may be a relationship between mindfulness and the MAI factor meditative training and as such it is worth undertaking a brief exploration of what is included in the mindfulness construct.

Mindfulness can be considered a state of consciousness as opposed to a cognitive process (Brown & Ryan, 2003). A mindful person has an increased level of attention to and awareness of what they are experiencing in the present moment. Cognitive processes can then act on this enhanced experience to avoid automatic responses and habits (Brown & Ryan, 2003). Mindfulness can also relate to meta cognition where a greater awareness of what one is thinking in a given moment is

achieved. Again this does not refer to decision making but rather the availability of all pertinent data in the moment for superior decision making. Brown and Ryan (2003) note that the concept of mindfulness relates to the practise of philosophical and religious traditions such as Bhuddism where mindfulness is seen as a precursor to living a more appropriate life. There are clear historical relationships between MA and traditions of this sort such as zazen meditation (Nakamura, 1992), yoga (Gogen Yamaguchi 1909-1989), and Tai Chi Chuan (Yang, 1982) which is itself a renowned MA.

The MAI factor, *meditative training*, embodies aspects that relate to the mindfulness construct. Items related to this factor include breathing and meditation which are associated with the mindful meditation practices. Philosophical introspection items can be related to the philosophical and religious traditions of mindfulness and an item regarding self-talk can relate to the increased awareness associated with mindfulness. Whilst the similarities between mindfulness and *meditative training* are far from exact, we might expect to see a small to medium correlation between the two.

Method

It was proposed that to demonstrate convergent validity, the MAI of 48 items would be correlated against the Short Self-Regulation Questionnaire (SSRQ) of 31 items. In addition to this the MAI factor called mindful training would be correlated with the Mindful Attention Awareness Scale (MAAS) of 15 items. Questionnaires with low item counts were chosen to ensure that the cumulated item count would be less likely to cause respondent fatigue (Hess et al., 2012). The chosen questionnaires have been widely used in research and have shown both validity and reliability across multiple uses (Brown & Ryan, 2003; Carey, Neal, & Collins, 2004; Carlson & Brown, 2005; Neal & Carey, 2005). The expectation is that a medium effect size ($f^2 >= .15$) would be found between the dependant and independent variables.

Ethics approval was sought from the Victoria University Human ethics committee and a survey was constructed within the Qualtrics software which included the MAI, SSRQ and MAAS. Questions were randomised within each questionnaire but not across the entire survey. That is, respondents completed all of the questions for the MAI in a random order before being introduced to the next questionnaire.

The Self-Regulation Questionnaire was originally a 63-item scale with a proposed seven factors. Validation work by Carey et al. (2004) found that a single factor, 31-item scale maintained good internal consistency (α=*.92*) and strongly correlated to the original scale (*r*=*.96*). Additional psychometric validation of the SSRQ (Neal & Carey, 2005; Šebeňa et al., 2018) has found an acceptable level of internal consistency ranging between α=*.73* and α=*.86.* The SSRQ is completed on a 5-point likert scale with the response labels, *Strongly disagree*, *Disagree, Uncertain or unsure, Agree, Strongly agree*. An example from the questionnaire is: "I usually think before I act". Fourteen of the questions are negatively worded and require reverse coding.

The MAAS consists of 15 items which all load as a single factor. The items are negatively worded, for example: "I find myself doing things without paying attention," and are scored on a six-point likert scale with a range of, 1-*almost always*, 2-*very frequently*, 3-*somewhat frequently*, 4-*somewhat infrequently*, 5-*very infrequently*, 6-*almost never*. The scale has good internal consistency (α=*.82*) and has been validated through a CFA (K. W. Brown & Ryan, 2003; Carlson & Brown, 2005).

Participants

The *Prolific* on-line tool which connects researchers to potential participants was used. *Prolific* has a pool of over 100 000 potential participants. It was first necessary to survey the prolific pool for actively training martial artists. From this initial survey 176

martial artists were discovered. Invitations were sent to these individuals to participate in the study with a designated reward of $4 for their time.

Participant numbers required for this research to achieve statistical power can be calculated as either *n=50 + (8 x number of independent variables)* or *n=104 + number of independent variables* (Allen & Bennett, 2010). There are six independent variable in the study. These variables include, *gender*, *age*, *schooling*, *income* and *years of training*, plus the MAI. Based on these variables and the expectation of a medium correlation (Allen & Bennett, 2010) the number of participants required is either 98 or 110. As per best practise a minimum of 110 participants was sought.

The total number of respondents exceeded the minimum required (*n=159*) and was made up of 18 females and 141 males. Ages ranged between 18 (the minimum accepted for the study) and 63 (μ=30years), and participants training experience ranged from 1 year to 45 years (μ=6.92 years). Schooling was recorded on a scale of *secondary*, *certificate or diploma*, *degree* or *post graduate* and a certificate or diploma was the average educational achievement. Annual income was recorded in income ranges as follows: $0-$15000, $15001-$45000, $45001-$75000 and $75001-$105000 which are similar to ranges used by the Australian Census. The average response (μ=2.36) approximates an income of around $50000. Analysis of the demographic data showed that *annual income* and *level of education* approached normality, however *gender*, *age* and *years of training* did not.

Results

Table 8.1

Correlations between dependant variables SSRQ and MAAS and demographic independent variables and the MAI.

Dependent	Independent	Pearson	Sig.
SSRQ	Gender	.096	.228
	Age	.193*	.015
	Education	.230*	.003
	Income	.237*	.003
	Years train’	.157*	.048
	MAI	.505*	.000
MAAS	Gender	.005	.951
	Age	.184*	.020
	Education	.052	.517
	Income	.061	.449
	Years train’	.134	.093
	MAI	.360*	.000

** significant*

Bivariate analyses were made between each of the dependent variables and the individual independent variables to determine which would be included in the regression analysis. Parametric Pearson’s co-efficient and non-parametric Kendall’s Tau and Spearman’s Rho were calculated. Table 8.1 shows the parametric correlation coefficients, the non-parametric results are excluded for clarity as they provided similar results and add nothing to interpretation. For the SSRQ gender was not significant and

was not included in the regression analysis. For the MAAS only age and the MAI were significant and as such all other variables were excluded. Both parametric and non-parametric tests shows consistent results regardless of normality with the only concern being the relationship between years of training and SSRQ. Viewing histogram and normal q-q plots for *years of training* clearly shows that the distribution is skewed (*skewness statistic=1.142, SE=0.192)* and that clusters of outliers exist in the higher training periods. This makes the Pearson statistic inappropriate as it requires near normality in the data, and the data cannot easily be brought to normality through statistical transformation. Therefore, the apparent significance of the relationship between SSRQ and years of training must be discounted.

Nine univariate outliers were then removed from the data (*n=145)* and tests of normality were conducted. Whilst the Bartlett and Shapiro-Wilk tests did not confirm normality, visual analysis of the box plots and normal q-q plots showed near normality in the data. A hierarchical regression analysis was then conducted on the dependant variable SSRQ with *age*, *education*, and *income* in the first analysis and MAI added in the second analysis. The assumptions of normality, linearity and homoscedasticity in the residuals were met.

The initial model confirmed the correlations between each of the independent variables and SSRQ (Table 8.1) and the model was found to be significant (R= *.296, R^2=.088, f=4.529, p=.005*) however, analysis of the model showed that the only significant, unique predictor of SSRQ was income (*Table 8.2*). The adjusted R^2 value of *.068* suggested that 6.8% of variance could be predicted through demographics, which can be considered a small effect size (f^2*=.073)*. The addition of the MAI to the model (Table 8.2) was again significant (*R=.548, R^2=.301, f=15.038, p<.001*) with the MAI as the only significant unique predictor variable (*Table 8.2*). The result is highly

significant and large in size (*adjusted* R^2*=.281,* f^2*=.390*) and suggests that approximately 21% (R^2 *change = .213*) of variance in the SSRQ can be uniquely predicted through the MAI.

Table 8.2

Hierarchical regression coefficients for dependant variable SSRQ

	Unstandardised		Standardised			95% Confidence	
Model 1	B	Std. Error	Beta	t	Sig.	Lower Bound	Upper Bound
(constant)	106.311	6.021		17.657	.000	94.408	118.214
Age	.099	.197	.043	.501	.617	-.291	.489
Education	2.635	1.612	.143	1.634	.104	-.553	5.822
Income	3.207	1.434	.196	2.236	.027*	.37	6.043
Model 2							
(constant)	48.156	10.367		4.645	.000	27.661	68.652
Age	-.084	.176	-.037	-.477	.634	-.431	.264
Education	2.206	1.419	.120	1.555	.122	-.598	5.011
Income	2.097	1.272	.128	1.648	.102	-.418	4.611
MAI	.194	.030	.479	6.524	.000*	.135	.253

* *Statistically significant result*

The second relationship to be tested was between the measure of mindfulness (MAAS) and the MAI factor which has been named *meditative training*. Having established that the necessary assumptions had been met for a regression analysis in the previous test, a multiple hierarchical regression on the dependant variable was undertaken with the first model using the independent variable *age* and the second adding the variable *meditative training*. Analysis of the residuals showed that all

assumptions had been met. Both independent variables were confirmed to have a significant relationship to the dependant variable and in the first model *age* was found to be a significant predictor for MAAS score (*R=.190, R^2=.036, f=5.381, p=.022)* (Table 8.3) with a predictive value of 3% and a small effect size (*adjusted R^2=.030, f^2=.031*).

Table 8.3

Hierarchical regression coefficients for dependant variable MAAS

The second model was significant with a small effect size (*R=.302, R^2=.091, f=7.150, p=.001)* and approximately 8% of the variance *(adjusted R^2=.079, f^2=.086)* predicted by model.

Model 1	Unstandardised B	Std. Error	Standardised Beta	t	Sig.	95% Confidence Lower Bound	Upper Bound
(constant)	52.762	4.106		12.851	.000	44.646	60.877
Age	.320	.138	.190	2.320	.022	.047	.593

Table 8.4

Model 2

Hierarchical regression coefficients for dependant variable MAAS with independent MAI

	Unstandardised B	Std. Error	Standardised Beta	t	Sig.	95% Confidence Lower Bound	Upper Bound
(constant)	42.371	5.340		7.935	.000	31.815	52.926
Age	.206	.140	.122	1.470	.144	-.071	.482
MedT	.293	.100	.245	2.938	.004	.096	.490

MedT = Meditative Training

Model 1

	B	Error	Beta	t	Sig.	Bound	Bound
(constant)	52.762	4.106		12.851	.000	44.646	60.877
Age	.320	.138	.190	2.320	.022	.047	.593

Model 2

(constant)	17.745	8.187		2.168	.032	1.561	33.930
Age	.177	.132	.105	1.340	.182	-.084	.437
MAI	.113	.023	.379	4.835	.000	.067	.159

MAI = Martial Arts Inventory

To determine if inclusion of the full MAI would have improved predictive results the test was completed again with the substitution of MAI for *meditative training* (Table 8.4). The analysis of residuals demonstrated that all assumptions had been met and the results show that the full MAI is a significant predictor ($R=.415$, $R^2=.036$, $f=14.8$, $p<.001$) for MAAS with an increase to a predictive power of 13.6% (*adjusted* $R^2=.136$, $f^2=.157$) and a medium effect size.

Discussion

This study serves as an indicator for the validity of the MAI as a measure of student experience of martial arts. The first hypothesis for this study was that a relationship would exist between the MAI and SSRQ. The suggestion that such a relationship should exist was based on two premises. Firstly, the MAI has been constructed from the ten facets of martial arts which were identified by senior martial arts teachers as elements of the student experience most likely to lead to behaviour change (Sandford & Gill, 2018). Secondly, the behaviour changes expected largely relate to self-regulation as has been suggested through numerous published studies (Lakes & Hoyt, 2004; Trulson, 1986; Vertonghen & Theeboom, 2010). That the result should be both significant and large in effect was unexpected. The 20% predictive relationship between the MAI and self-regulation suggests that the MAI should be a valid tool for predicting a person's self-regulation through the quantification of their martial arts experience. That is, the higher a person's global score of martial arts experience the higher their relative self-regulation is likely to be. The first hypothesis of a relationship between MAI and SSRQ has been supported and provides some evidence for the validity of the MAI.

The second hypothesis concerned a relationship between the MAI-factor called *meditative training* and the MAAS. The relationship discovered was small but significant suggesting that this factor of martial arts experience did indeed predict mindfulness in the student with a predictive value of 8%. It was interesting to note that the global MAI score when correlated to the MAAS achieved a medium effect size with a predictive value of 13%. The overall predictive quality of both the *meditative training* factor and the MAI global score, for the mindfulness construct further supports the argument for the validity of the MAI.

The results are highly suggestive that the MAI is both a valid instrument and is fit for purpose as a tool to quantify the student experience of martial arts. In addition to this the research regarding martial arts and behaviour which has been previously published (Vertonghen & Theeboom, 2010) has been supported through the established relationships between martial arts experience and both self-regulation and mindfulness. A final observation regarding the data relates to the greater predictive power of the entire MAI for mindfulness over the single factor *meditative training.* The possibility that the whole martial arts experience acts as a gestalt influence upon behaviour above any one element, supports the suggestion that the martial arts may hold a unique amalgam of experience in which the whole is greater than the constituent parts.

Chapter 9: Concluding discussion

The aim of this research project was to develop the MAI. The resultant inventory of 48 items has been developed using psychometric techniques and appears reliable and has demonstrated some validity. The scale appears to measure the student's personal experience of MA and their perceptions of the place where they train. The true value of the MAI will be established through its use in research of the relationships between MA training and psychological and behavioural outcomes, as well as professional applications. This future research could also provide valuable information with which to complete a confirmatory factor analysis (CFA) and establish a stronger argument for the validity of the MAI.

The items included in the factors of MAI have been vigorously tested. Face validity of initial items was established through an interactive preliminary study. In this study MA practitioners demonstrated their understanding of the intent of questions and added their own narrative to their appropriateness for inclusion. A revised set of questions were then submitted to an EFA and eight factors were extracted. Of the 78 items that made up the 8 factors, 48 were chosen for the inventory. A test of internal consistency found Cronbach's alpha to be an acceptable .875 for these 48 items. The MAI in this form was then subjected to a test of convergent validity with the SSRQ (self-regulation) and the MAAS (mindfulness). The results for the SSRQ were highly significant and large in effect size and those with the MAAS were significant and of medium effect size. These figures provide some evidence for the validity of the MAI and the construct '*student experience of MA*' however, there remains the need to gather additional evidence through future studies.

The principal objective of the MAI has been to define the MA student's experiences during their training. It has become apparent that the final set of question items examine this experience through two avenues. The first avenue is the direct experience of the individual in their own training. An example from factor 3, 'The positive training environment' is: "I try to incorporate any personal instructions from my teacher into my training." The second avenue of questions inquire about the training place and how the student interacts with it. From factor 6, "At my school, the senior students are courteous even to the newest student." Both of these avenues combine to form a construct which we have termed the 'student experience of the martial arts'.

The MAI as a measure of the student experience of martial arts can be applied to a number of research scenarios. Areas for research include psychosocial behaviour, but also industry norming, and cause and effect experimentation. Future research which seeks to replicate previous findings regarding MA, such as those discussed in Chapter 2, may now report the MAI scores associated with the results. By examining the individual factor values it will be possible to define and replicate the experience students have had. These factor values will also prove powerful in determining which combinations of factors can provide which benefits, and also which experiences lead to negative behaviours. The use of the MAI across studies will also be valuable in ensuring that a comparable experience has been achieved by participants in each context. Through consistency of experience it will be possible to design intervention strategies where a MAI defined experience is seen as the cause to a specific, hopefully beneficial, effect.

The value of the MAI to the MA industry may also lie in the comparison of experience across sites within a single style or across styles within an organisation. This would allow an organisation to establish optimal experience values for each facet for their students. Through periodic testing the organisation could ensure that minimum

standards of experience were being maintained. The information gained could be used in staff training and developing training pedagogies or could even be an entry requirement for membership in the group. The MAI may also prove instructive if correlations can be found between certain behaviours and a specific factor or group of factors. This may be valuable both in designing interventions and in problem solving aggression within a MA context. Finally, once research has established relationships between MAI scores and beneficial outcomes, such as improved self-regulation, the public could reasonably expect that the experiences being provided will draw on these results.

The opportunity to test the MAI through its application in research will, as has been stated, allow the validity of the instrument to be defined. It should be noted that many MA practitioners do not speak English, and there is therefore an opportunity to see the scale normed for other languages where research is being conducted. This norming process may also establish whether the experiences evaluated by the MAI are universal across cultures and countries. The application of the MAI is not limited to the behavioural sciences and may yet prove to be valuable in other sports related research. For example, in physiology where relationships between a specific experience may correlate to injury above and beyond more obvious structural or technical concerns.

The MAI is a psychometrically tested instrument which is ready for use in both scientific and industry research. The tool is currently limited to English and an on-line application but future iterations may well overcome this. The intrinsic value of the tool lies in its unique nature as the first attempt to quantify the student experience of MA. If future research is able to improve on the MAI then the MAI will have served the important purpose of establishing the construct of *the student experience of MA training as it relates to the behaviour of a MA student*.

References

Aleksovska-Velickovska, L & Kostovski, Z. (2008). Factor structure of psychology domain with sportsmen-The karateists in the Macedonia. *Acta Kinesiologica, 2*(1), 42-46

Allen, P., & Bennett, K. (2010). *PASW statistics by SPSS: A practical guide, version 18.0* (1st Edition ed.). South Melbourne, Australia: Cengage Learning.

Anderson, C., & Brown, C. E. (2010). The functions and dysfunctions of hierarchy. *Research in Organizational Behavior, 30*, 55-89. doi:10.1016/j.riob.2010.08.002

Atkins, R. (2014). Instruments measuring perceived racism/racial discrimination: review and critique of factor analytic techniques. *International Journal of Health Services, 44*(4), 711-734. doi:10.2190/HS.44.4.c

Australian Bureau of Statistics. (2019). *Average weekly earnings, Australia, Nov 2018*. Retrieved from https://www.abs.gov.au/ausstats/abs@.nsf/0/7F76D15354BB25D5CA2575BC001D5866?Opendocument.

Ball, K., & Martin, J. (2012). Self-defense training and traditional martial arts: Influences on self-efficacy and fear related to sexual victimization. *Sport, Exercise, and Performance Psychology, 1*(2), 135-144. doi:10.1037/a0025745

Barton-Wright, E. W. (1899). How a man may defend himself against every form of attack. *Pearson's Magazine, March*.

Bastian, B., Jetten, J., Hornsey, M. J., & Leknes, S. (2014). The Positive consequences of pain: A biopsychosocial approach. *Personality and Social Psychology Review, 18*(3), 256-279. doi:10.1177/1088868314527831

Battistella, E. L. (2009). The Yardstick of Manners. *Society, 46*(4), 363-367. doi:10.1007/s12115-009-9223-8

Baumeister, R. F., Gailliot, M., DeWall, C. N., & Oaten, M. (2006). Self-regulation and personality: how interventions increase regulatory success, and how depletion moderates the effects of traits on behavior. *J Pers, 74*(6), 1773-1801. doi:10.1111/j.1467-6494.2006.00428.x

Baumeister, R. F., Vohs, K. D., & Tice, C. M. (2007). The strength model of self-control. *Current Directions in Psychological Science, 16*(6), 351-355.

Bernstein, I. H., & Teng, G. (1989). Factoring items and factoring scales are different: Spurious evidence for multidimensionality due to item categorization. *Psychological Bulletin, 105*(3), 467-477.

Bishop, P. A., & Herron, R. L. (2015). Use and misuse of the likert item responses and other ordinal measures. *International Journal of Exercise science., 8*(3), 297-302.

Blascovitch, J. (2008). Challenge and threat. In A. J. Elliot (Ed.), *Handbook of approach and avoidance motivation.* New York, NY: Psychology Press.

Brown, J. D. (2009). Choosing the right type of rotation in PCA and EFA. *Shiken: JALT Testing and Evaluation SIG Newsletter, 13*(3).

Brown, K. W., & Ryan, R. M. (2003). The benefits of being present: Mindfulness and its role in psychological well-being. *Journal of Personality and Social Psychology, 84*(4), 822-848. doi:10.1037/0022-3514.84.4.822

Buse, G. J. (2006). No holds barred sport fighting: a 10 year review of mixed martial arts competition. *British Journal Sports Medicine, 40*(2), 169-172. doi:10.1136/bjsm.2005.021295

Carey, K. B., Neal, D. J., & Collins, S. E. (2004). A psychometric analysis of the self-regulation questionnaire. *Addictive Behaviors, 29*(2), 253-260. doi:10.1016/j.addbeh.2003.08.001

Carifio, J., & Perla, R. (2008). Resolving the 50-year debate around using and misusing Likert scales. *Medical Education, 42*(12), 1150-1152. doi:10.1111/j.1365-2923.2008.03172.x

Carifio, J., & Perla, R. J. (2007). Ten common misunderstandings, misconceptions, persistant myths and urban legends about likert scales and likert response formats and their antidotes. *Journal of Social Sciences, 3*(3), 106-116. doi:10.3844/jssp.2007.106.116

Carlson, L. E., & Brown, K. W. (2005). Validation of the Mindful Attention Awareness Scale in a cancer population. *J Psychosom Res, 58*(1), 29-33. doi:10.1016/j.jpsychores.2004.04.366

Cellar, D. F., Stuhlmacher, A. F., Young, S. K., Fisher, D. M., Adair, C. K., Haynes, S., . . . Riester, D. (2010). Trait Goal Orientation, Self-Regulation, and Performance: A Meta-Analysis. *Journal of Business and Psychology, 26*(4), 467-483. doi:10.1007/s10869-010-9201-6

Çokluk, Ö., & Koçak, D. (2016). Using Horn's parallel analysis method in exploratory factor analysis for determining the number of factors. *Educational Sciences: Theory & Practice, 16*(2), 537-551. doi:10.12738/estp.2016.2.0328

Combs, A. W. (2001). Achieving self-discipline: Some basic principles. *Theory into Practice, 24*(4), 260-263.

Commission, A. S. (2000). *Indigenous Traditional Games*. New South Wales: NSW Government, Office of Sport, Sport & Recreation.

Courtney, M. G. R. (2013). Determining the number of factors to retain in EFA: Using the SPSS R-menu v2.0 to make more judicious estimations. *Practical Research, Assessment and Evaluation, 18*(8), 1-14.

Cowden, R. G., & Meyer-Weitz, A. (2016). Self-reflection and self-insight predict resilience and stress in competitive tennis. *Social Behavior and Personality: An InternationalJjournal, 44*(7), 1133-1149. doi:10.2224/sbp.2016.44.7.1133

Cynarski, W. J. (2012). Values of martial arts in the light of the anthropology of martial arts. *Journal of Combat Sports and Martial Arts, 3*(1), 1-4.

Cynarski, W. J., Sieber, L., & Szajna, G. (2014). Martial Arts in Physical Culture. *Journal of Martial Arts Anthropology, 14*(4), 31-38. doi:10.14589/ido.14.4.4

de Ridder, D. T., Lensvelt-Mulders, G., Finkenauer, C., Stok, F. M., & Baumeister, R. F. (2012). Taking stock of self-control: a meta-analysis of how trait self-control relates to a wide range of behaviors. *Personality and Social Psychology Review, 16*(1), 76-99. doi:10.1177/1088868311418749

Draeger, D. F., & Smith, R. W. (1980). *Comprehensive Asian fighting arts.* Tokyo: Kodansha International.

Duthie, R. B., Hope, L., & Barker, D. G. (1978). Selected personality traits of martial artists as measured by the adjective checklist. *Perceptual and Motor Skills, 47,* 71-76.

Endresen, I. M., & Olweus, D. (2005). Participation in power sports and antisocial involvement in preadolescent and adolescent boys. *J Child Psychol Psychiatry, 46*(5), 468-478. doi:10.1111/j.1469-7610.2005.00414.x

Epton, T., Currie, S., & Armitage, C. J. (2017). Unique effects of setting goals on behavior change: Systematic review and meta-analysis. *J Consult Clin Psychol, 85*(12), 1182-1198. doi:10.1037/ccp0000260

Fried, Y., & Slowik, L. H. (2004). Enriching goal-setting theory with time: An integrated approach. *Academy of Management Review, 29*(3), 404-422.

Fuller, J. R. (1988). Martial arts and psychological health. *Brotosh Journal of Medical Psychology, 61*, 317-328.

Gaskin, C. J., & Happell, B. (2014). On exploratory factor analysis: a review of recent evidence, an assessment of current practice, and recommendations for future use. *Int J Nurs Stud, 51*(3), 511-521. doi:10.1016/j.ijnurstu.2013.10.005

Gray, J. A., & McNaughton, N. (Eds.). (2003). *The neuropsychology of anxiety. An enquiry into the functions of the septo-hippocampal system.* Oxford: Oxford University Press.

Green, T. (2005). Dambe: Traditional Nigerian boxing. *The Journal of Alternative Perspectives on the Martial Arts and Sciences*(Sept).

Havriluk, R. (2017). Swimming technique misconceptions: Breaststroke and butterfly breathing revisited. *Swimming World, 58*(12), 12-13.

Hennecke, M., Bleidorn, W., Denissen, J. J. A., & Wood, D. (2014). A three-part framework for self-regulated personality development across adulthood. *European JOurnal of Personality, 28*, 289-299. doi:10.1002/per.1945

Hess, S., Hensher, D. A., & Daly, A. (2012). Not bored yet – Revisiting respondent fatigue in stated choice experiments. *Transportation Research Part A: Policy and Practice, 46*(3), 626-644. doi:10.1016/j.tra.2011.11.008

Hodge, D. R., & Gillespie, D. F. (2007). Phrase completion scales. *Journal of Social Service Research, 33*(4), 1-12. doi:10.1300/J079v33n04_01

Hogg, M. A. (2007). Uncertainty-Identity Theory. *Advances in Experimental Social Psychology, 39*, 69-126. doi:10.1016/S0065-2601(06)39002-8

Hogg, M. A., & Rinella, M. J. (2017). Social identities and shared realities. *Curr Opin Psychol, 23*, 6-10. doi:10.1016/j.copsyc.2017.10.003

Jacoby, J., & Matell, M. S. (1971). Three-point likert scales are good enough. *Journal of Marketing Research, 8*, 495-500.

Jakobsson, U. (2004). Statistical presentation and analysis of ordinal data in nursing research. *Scandinavian Journal of Caring Science, 18*, 437-440, https://doi.org/10.1111/j.1471-6712.2004.00305.x

Kim, S., Kogan, D., Kontogiannis, N., & Wong, H. (1996). *Tuttle dictionary of the martial arts of Korea, China & Japan.* Tokyo, Japan: Charles E. Tuttle Company.

Kestly, T. A. (2016). Presence and play: Why mindfulness matters. *International Journal of Play Therapy, 25*(1), 14-23. doi:10.1037/pla0000019

Kostorz, K., Gniezinka, A., & Nawrocka, M. (2017). The hierarchy of values vs. self-esteem of persons practising martial arts and combat sports. *Journal of Martial Arts Anthropology, 17*(1), 15-22. doi:10.14589/ido.17.1.3

Kristjánsson, K. (2017). Emotions targeting moral exemplarity: Making sense of the logical geography of admiration, emulation and elevation. *Theory and Research in Education, 15*(1), 20-37. doi:10.1177/1477878517695679

Kroll, W., & Carlson, B. R. (1967). Discriminant function and hierarchical grouping analysis of karate participants' personality profiles. *Research Quarterly for Exercise and Sport, 38*, 405-411. doi:https://doi.org/10.1080/10671188.1967.10613409

Kurian, M., Caterino, L. C., & Kulhavy, R. W. (1993). Personality characteristics and duration of ATA Taekwondo training. *Perceptual and Motor Skills, 76*, 363-366.

Kurian, M., Verdi, M. P., Caterino, L. C., & Kulhavy, R. W. (1994). Relating scales on the children personality questionnaire to training time and belt rank in ATA taekwondo. *Perceptual and Motor Skills, 79,* 904-906.

Kusnierz, C., Cynarski, W. J., & Gorner, K. (2017). Social reception and understanding of combat sports and martial arts by both school students and adults. *Journal of Martial Arts Anthropology, 17*(1), 30-37. doi:10.14589/ido.17.1.5

Lakes, K. D., & Hoyt, W. T. (2004). Promoting self-regulation through school-based martial arts training. *Journal of Applied Developmental Psychology*, *25*(3), 283-302. doi:10.1016/j.appdev.2004.04.002

Layton, C. (1990). Anxiety in black belt and non-black belt additional karateka. *Perceptual and Motor Skills, 71,* 905-906.

Leung, S. (2011). A comparison of psychometric properties and normality in 4-, 5-, 6-, and 11-point likert scales. *Journal of Social Service Research, 37*(4), 412-421. doi:10.1080/01488376.2011.580697

Likert, R. (1932). A technique for the measurement of attitudes. *Archive of Psychology*, *22*, 5-55.

Llull, R. (1847). *The buke of the order of knighthood (Translated from the French)*. Edinborough: The Abbortsford Club.

Loveless, T. (1998). The tracking and ability grouping debate. *Educational Resource Information Center*, *2*(8), 37.

Maeda, H. (2014). Response option configuration of online administered Likert scales. *International Journal of Social Research Methodology*, *18*(1), 15-26. doi:10.1080/13645579.2014.885159

McCarthy, P. (1999). Old traditions and new realities. *Koryu Journal, 5*(1), 7-11.

Milligan, K., Badali, P., & Spiroiu, F. (2013). Using Integra Mindfulness Martial Arts to Address Self-regulation Challenges in Youth with Learning Disabilities: A Qualitative Exploration. *Journal of Child and Family Studies, 24*(3), 562-575. doi:10.1007/s10826-013-9868-1

Muthen, B., & Kaplan, D. (1985). A comparison of some methodologies for the factor analysis of non-normal likert variables. *British Journal of Mathamatical and Statistical Psychology, 38*, 171-189.

Nakamura, T. (1992). *One day- one lifetime: An illustrated guide to the spirit, practice and philosophy of Seido Karate meditation.* New York: World Seido Karate Organisation.

Nakonechnyi, I., & Galan, Y. (2017). Development of behavioural self-regulation of adolescents in the process of mastering martial arts. *Journal of Physical Eductation and Sport, 17*(3), 1002-1008. doi: 10.7752/jpes.2017.s3154

Neal, D. J., & Carey, K. B. (2005). A follow-up psychometric analysis of the Self-Regulation Questionnaire. *Psychology of Addictive Behaviour, 19*(4), 414-422.

O'Connor, B. (2000). SPSS, SAS, MATLAB, and R programs for determining the number of components and factors using parallel analysis and velicer's MAP test. Retrieved from https://people.ok.ubc.ca/brioconn/nfactors/nfactors.html

Park, H., & Melamed, D. (2015). Reward stability promotes group commitment. *Social Psychology Quaterly, 78*(4), 283-300. doi:10.1177/0190272515609272

Patil, V., McPherson, M. Q., & Friesner, D. (2010). The use of exploratory factor analysis in public health: A note on parallel analysis as a factor retention criterion. *American Journal of Health Promotion, 24*(3), 178-181. doi:10.4278/ajhp.08033131

Perciavalle, V., Blandini, M., Fecarotta, P., Buscemi, A., Di Corrado, D., Bertolo, L., . . . Coco, M. (2017). The role of deep breathing on stress. *Neurol Sci, 38*(3), 451-458. doi:10.1007/s10072-016-2790-8

Petter, N., & Steenput, E. (2000). Klare onderrichtinge der voortreffelijke worstel-konst. [Clear instructions to the excellent art of wrestling]. *Journal of Western Martial Art, 2000*(Oct).

Respect. (1990) Concise Oxford Dictionary (8th ed., p 1025). Oxford: Clarendon Press.

Reyes-Garcia, V., Balbo, A. L., Gomez-Baggethun, E., Gueze, M., Mesoudi, A., Richerson, P., . . . Shennan, S. (2016). Multilevel processes and cultural adaptation: Examples from past and present small-scale societies. *Ecology and Society, 21*(4). doi:10.5751/ES-08561-210402

Rogus, J. F. (2001). Promoting self-discipline: A comprehensive approach. *Theory into Practice*, *24*(4), 271-275.

Ruggles, D. F., & Silverman, H. (2009). From tangible to intangible heritage. In D. F. Ruggles & H. Silverman (Eds.), *Intangible heritage embodied*. Dordrecht: Springer.

Saito, M. (1999). *Budo.* Rolling Hills Estates, CAL: Aiki News

Salomoni, S., van den Hoorn, W., & Hodges, P. (2016). Breathing and Singing: Objective Characterization of Breathing Patterns in Classical Singers. *PLoS One, 11*(5), e0155084. doi:10.1371/journal.pone.0155084

Sandford, G. T., & Gill, P. R. (2018). Martial arts masters identify the essential components of training. *Physical Education and Sport Pedagogy*. doi:10.1080/17408989.2018.1530749

Scott, J. P. (1975). Personal, social, and international violence. In M. A. Nettleship, R. Dalegivens, & A. Nettleship (Eds.), *War, its causes and correlates.* The Hague: Mouton Publishers.

Šebeňa, R., Helmer, S., Petkeviciene, J., Lukacs, A., Salonna, F., Orosová, O., & Mikolajczyk, R. (2018). Psychometric Evaluation of the Short Self-Regulation Questionnaire across Three European Countries. *Studia Psychologica, 1*(60), 5-15. doi:10.21909/sp.2018.01.748

Slimani, M., Paravlic, A. H., Chaabene, H., Davis, P., Chamari, K., & Cheour, F. (2018). Hormonal responses to striking combat sports competition: a systematic review and meta-analysis. *Biol Sport, 35*(2), 121-136. doi:10.5114/biolsport.2018.71601

Stangor, C. (2011). *Research methods for the behavioral sciences.* (4th ed.). Belmont, CA: Wadsworth, Cengage Learning.

Super, S., Hermens, N., Verkooijen, K., & Koelen, M. (2014). Enhancing life prospects of socially vulnerable youth through sport participation: a mixed methods study. *BMC Public Health, 14*, 703. doi:10.1186/1471-2458-14-703

Tangney, J. P., Baumeister, R. F., & Boone, A. L. (2004). High self-control predicts good adjustment, less pathology, better grades, and interpersonal success. *Journal of Personality, 72*(2), 271-324.

Temple, E. C., & Brown, R. F. (2011). A comparison of internet-based participant recruitment methods: Engaging the hidden population of cannabis users in research. *Journal of Research Practice, 7*(2), 1-20.

Trulson, M. E. (1986). Martial Arts Training: A Novel “Cure” for Juvenile Delinquency. *Human Relations, 39*(12), 1131-1140. doi:10.1177/001872678603901204

Van Kleef, G. A., Steinel, W., van Knippenberg, D., Hogg, M. A., & Svensson, A. (2007). Group member prototypicality and intergroup negotiation: how one's standing in the group affects negotiation behaviour. *Br J Soc Psychol, 46*(Pt 1), 129-152. doi:10.1348/014466605X89353

Vaughan, G. M., & Hogg, M. A. (2010). *Essentials of social psychology*. Frenches Forest, Australia: Pearson Australia.

Vertonghen, J., & Theeboom, M. (2010). The social-psychological outcomes of martial arts practise among youth: a review. *Journal of Sports Science and Medicine, 9,* 528-537.

Vertonghen, J., Theeboom, M., & Pieter, W. (2014). Mediating factors in martial arts and combat sports: an analysis of the type of martial art, characteristics, and social background of young participants. *Perceptual & Motor Skills: Exercise & Sport, 118*(1), 41-61. doi:10.2466/06.30.PMS.118k14w3

Vine, S. J., Freeman, P., Moore, L. J., Chandra-Ramanan, R., & Wilson, M. R. (2013). Evaluating stress as a challenge is associated with superior attentional control and motor skill performance: testing the predictions of the biopsychosocial model of challenge and threat. *J Exp Psychol Appl, 19*(3), 185-194. doi:10.1037/a0034106

University of Minnesota, (2015). Interpretation of MMPI-2 clinical scales. Retrieved from https://www.pearsonassessments.com/store/usassessments/en/Store/Professional-Assessments/Personality-%26-Biopsychosocial/Minnesota-Multiphasic-Personality-Inventory-2/p/100000461.html?tab=product-details

Uyeshiba, K. (1978) *Aikido.* Tokyo, Japan: Hozansha Publishing Co. Ltd.

Wargo, M. A., Spirrison, C. L., Thorne, B. M., & Henley, T. B. (2007). Personality characteristics of martial artists. *2007, 35*(3), 399-408.

Wayson, W. W. (2001). Opening windows to teaching: Empowering educators to teach self-discipline. *Theory into Practice, 24*(4), 227-232.

Weitlauf, J. C., Smith, R. E., & Cervone, D. (2000). Generalization effects of coping-skills training: Influence of self-defense training on women's efficacy beliefs, assertiveness, and aggression. *Journal of Applied Psychology, 85*(4), 625-633. doi:10.1037/0021-9010.85.4.625

Willis, G. B. (2005). *Cognitive interviewing. A tool for improving questionnaire design.* Thousand Oaks, CA: Sage Publications.

Wisner, B. L., Jones, B., & Gwin, D. (2010). School-based meditatiopn practoices for adolescents: A resource for strengthening self-regulation, emotional coping, and self-esteem. *Children & Schools, 32*(3), 150-159.

Woltz, D. J., Gardner, M. K., Kircher, J. C., & Burrow-Sanchez, J. J. (2012). Relationship between perceived and actual frequency represented by common rating scale labels. *Psychological Assessment, 24*(4), 995-1007. doi:10.1037/a0028693

Wong, K. K. (1997). *Chi Kung for health and vitality- A practical approach to the art of energy.* London, U.K.: Random House.

Wu, H., & Leung, S. (2017). Can likert scales be treated as interval scales?—A simulation study. *Journal of Social Service Research, 43*(4), 527-532. doi:10.1080/01488376.2017.1329775

Yang, J. M. (1982). *Yang style Tai Chi Chuan.* Burbank, CAL: Unique Publications, Inc.

Zimmerman, B. J., & Kitsantas, A. (2014). Comparing students' self-discipline and self-regulation measures and their prediction of academic achievement.

Contemporary Educational Psychology, 39(2), 145-155.

doi:10.1016/j.cedpsych.2014.03.004

Appendix A

The Martial Arts Inventory

Scoring

The MAI is scored with each Likert item having a value of 0 to 10. Some items in Factor Six are scored negatively with a value of 0 to -10 (as indicated below).

The contributions of each factor are:

Meditative training:	0-50
Respectful Discipline:	0-40
Positive Training Environment:	0-80
Streaming:	0-40
Training Behaviour:	0-60
Heavy Training:	-60-30
Goal Orientation:	0-60
Physical Challenge:	0-60
Total Score:	**-30 to 420**

The questions should be presented in a random order.

The Questions

Meditative training

1. In class, I spend time in breathing meditation.
2. In class, I practise breathing techniques.
3. In class, the teacher gives an anecdote about life.
4. In class, the teacher links an aspect of our training to a wider life perspective.
5. In class, my teachers encourage me to rehearse techniques in my mind.

Respectful Discipline

6. In class, I control my strength to protect other students.
7. I arrive at my school with training clothes that are clean.

8. In class, I am careful to moderate my strength to match the situation I am in.
9. I arrive at class with a clean uniform (training clothes).

Positive Training Environment

10. At my school, the training content of a class builds on foundations which have been previously learnt.
11. I believe my training partners have my well-being at heart even when we are doing intense training.
12. In class, the senior students set good technical examples.
13. In class, new techniques are repeated multiple times.
14. I try to incorporate any personal instructions from my teacher into my training.
15. In class, I am aware of what I need to do to improve my martial arts.
16. At my school, hard work is required to achieve the next level of training.
17. In class, at the end of training I thank my training partner.

Streaming:

18. At my school, I can attend classes which are specifically for students of my ability level.
19. In class, I am deliberately matched to a training partner of a specific size.
20. In class, I am deliberately matched to a training partner of a specific ability level.
21. At my school, student size is considered when matching training partners.

Training Behaviour:

22. At my school, the senior students show me how to behave in class by their example.

23. In class, the senior students behave the way we are told to behave.
24. I use my teacher's title when asking for their attention (e.g. Sir).
25. At my school, if I need to leave the training space I gain permission from the instructor.
26. I behave with humility within the school environment.
27. I behave in a formal manner when discussing training with my teacher.

Heavy Training:

28. In class, the training can push me to my psychological limits. (Neg.)
29. In class, the training can be so intense that I feel I am in danger of injury. (Neg.)
30. In class, I can feel that my training partner is a poor match for me.(Neg.)
31. In class, training is likely to lead to me getting injured.(Neg.)
32. In class, there is some training that places me at additional physical risk. (Neg.)
33. In class, when I am frustrated, I am likely to take it out on my training partner. (Neg.)
34. At my school, the next available level in my training seems like an achievable goal.
35. At my school, the senior students are courteous even to the newest student.
36. I ensure that my actions do not place my training partner in undue danger.

Goal Orientation:

37. In class, we review the basic techniques.
38. I research the techniques I am training in.
39. At my school, I have seen people fail the test for the next level of training.

40. I spend time in private training working towards the next level of achievement.
41. I spend time in private training to gain understanding of the newest technique I am studying in class.
42. I record techniques that I am learning.

Physical Challenge:

43. How often do you interactively train with another student in class? (Physical partner-work)
44. In class, I take part in free-fighting (sparring, wrestling etc.).
45. In class, the training can push me to my physical limits.
46. In class, my teachers encourage me to persevere when training gets hard.
47. In class, when I get hit or defeated, I try to do better next time.
48. In class, I may be expected to perform tasks which are quite difficult.

Appendix B

Physical Education and Sport Pedagogy
ISSN: 1740-8989 (Print) 1742-5786 (Online) Journal homepage:
http://www.tandfonline.com/loi/cpes20

Martial arts masters identify the essential components of training

Glenn T. Sandford & Peter Richard Gill

To cite this article: Glenn T. Sandford & Peter Richard Gill (2018): Martial arts masters identify the essential components of training, Physical Education and Sport Pedagogy, DOI: 10.1080/17408989.2018.1530749
To link to this article: https://doi.org/10.1080/17408989.2018.1530749

Published online: 08 Oct 2018. Submit your article to this journal

PHYSICAL EDUCATION AND SPORT PEDAGOGY
https://doi.org/10.1080/17408989.2018.1530749

Martial arts masters identify the essential components of training
Glenn T. Sandford and Peter Richard Gill
Institute for Health and Sport, Victoria University, Melbourne, Australia

ARTICLE HISTORY
Received 11 December 2017
Accepted 22 August 2018

KEYWORDS
Martial arts; training; student experience; self-regulation; physical education

Whether as an instrument of self-help or as a prescribed intervention strategy, the MA have potential in the development of self-regulation and positive behaviour change (Lakes and Hoyt 2004). The actual student experience which may lead to these benefits is difficult to operationalise for empirical study, however. MA are often described in terms of their cultural source and style, for example, Chinese 'Cannon Fist' kung fu. An additional term may be applied to the style name which seeks to identify the training within a dichotomy such as Traditional/ Modern, Soft/Hard, Contact/ Non-contact or Internal/ External (Theeboom and De Knop 1999). These dichotomies suggest two sides in opposition much like the sides of a coin, however between two schools of MA with the same description, the actual training practises may vary widely and the subsequent effect on students may also vary. It is essential for an empirical study that the component facets of training that a student has actually experienced be defined to ensure that cultural terminology and researcher preference do not obfuscate what has been experienced and how that experience may be repeated.

The martial arts (MA) have generally been associated with specific combat and associated prac- tises from the East (Cynarski, Sieber, and Szajna 2014). There are however modern interpretations of these arts and equivalent combat techniques from alternate cultures which blur the definition of what is or is not a MA. Johnson and Ha (2015) separate MA from other combat activities by con- sidering the specific learning outcome that is the focus of a teacher's efforts. Three separate out- comes were identified, though the potential for other outcomes such as fitness were also acknowledged. The three outcomes were Combat Systems which seek to disseminate self-defence skills, Combat Sports which are involved in competition, and finally MA which work towards the psycho-physical development of the individual. This concept of MA being different from other combat-related activities is further promulgated through the humanistic theory of martial arts (Cynarski, Sieber, and Szajna 2014) which seeks to place modern MA practice within current socio-cultural contexts. Indeed, many authors have examined MA pedagogy through its place as an instrument of philosophical teaching and consider the precepts of Zen Buddhism and Taoism as the instrumental elements in transforming combat training into positive behaviour development (Brown and Johnson 2000; Cynarski and Lee-Barron 2014; Johnson 2017). For the purposes of this research, MA can be defined more broadly as the activity of training socially in martial tech- niques and as such is inclusive of all three of Johnson and Ha's groups and is not limited to practises originating in the East.

Martial arts and self-regulation

As MA covers a broad range of teachings it is important to understand what a student might experi- ence in any given session. A classification system of experiences that is generalisable across MA schools could be beneficial in linking particular experiences to specific outcomes, such as improved self-regulation. This would allow MA teaching practices to be tailored towards specific student experiences and outcomes. As specifically associated with self-control, self-regulation can be defined as the capacity that an individual has to effect changes in their behaviours to achieve their goals (Baumeister, Vohs, and Tice 2007). Many of the benefits these changes relate to revolve around personal values such as morals, ideals and social expectations. There appears to be a bidirectional relationship between using self-control and increasing self-control capacity. The strength theory uses the analogy of self-control with a muscle which through use gains greater strength (Heatherton and Baumeister 1996). The data, however, suggests a more complex interaction in which established trait levels of self-control may have a buffer of self-control capacity which can be depleted by certain exertions, but exercising self-control will subsequently lead to an increase in potential capacity. Importantly by introducing a form of regulatory exercise, research has confirmed an increased level of self-control in other unrelated areas of life (Baumeister et al. 2006).

The development of self-control capacity, which we may term willpower (Baumeister, Vohs, and Tice 2007) may take different forms throughout the lifespan. Children may build trait self- control capacity through experience and learning and it has been noted that those capable of delayed gratification (a demonstration of self-control) show evidence of greater demonstrable self-control as adolescents (Mischel, Shoda, and Peake 1988). Lakes and Hoyt (2004) noticed in their study of an intervention within a primary school that as children developed, the effect of self-regulatory training became more pronounced. This showed as a large effect for grades four and five, medium for grades two and three and a small effect for the youngest students. This may relate directly to the strengthening of willpower or to the further development of trait self-control or both. Importantly, increased development of self-control capacity over time was experienced across the study.

Self-regulation is intrinsically linked to the choices we make associated with morality, delay of gratification, and also critical thinking (Baumeister, Vohs, and Tice 2007). There are many theories to describe the mechanisms which underlie self-regulation and

the behaviours which ensue, but it is generally agreed that the application of self-regulation in the form of control of behaviour leads to positive outcomes (de Ridder et al. 2012; Job et al. 2015; Vohs and Baumeister 2011). Failure of the self-regulation system, either through under-regulation or mis-regulation can provide problematic outcomes for an individual in their relationships, impulse control, psychological adjustment, and achievement levels (Tangney, Baumeister, and Boone 2004).

Meta-analysis by de Ridder et al. (2012) found support for the benefits of high trait self-control within published research. The analysis varied according to the instruments used in studies but a small to medium effect was confirmed overall. Positive relationships between self-control and love, happiness, school grades and commitment have all been established.

This suggests that interventions which lead to improved self-regulation have the potential to impact on multiple areas of a person's life and wellbeing, and the use of Martial Arts training for this purpose has had some measure of success (Lakes and Hoyt 2004; Trulson 1986).

Lakes and Hoyt (2004) investigated the effects of a school-based MA programme as a tool for developing self-regulation in children and found significant growth in the areas of cognitive, physical and affective self-regulation over the course of a year. Trulson (1986) utilised MA training in an intervention for adolescents who had been classified as Juvenile Delinquents. The results were highly significant and showed that over six months of training, traditional MA could lead to dramatic improvements in behaviour. It is important to note however that modern MA not only failed to improve behaviour but correlated with a serious decline in social behaviours and psychological bal- ance. Trulson identifies this modern form of MA as containing a basic callisthenic warm-up followed by combat and self-defence training. The traditional MA by comparison also included meditation, philosophy lectures and non-combative practice of technique.

The concern that not all MA training would be beneficial was examined more deeply by Endresen and Olweus (2005) who explored the relationship between training in what they called 'Power Sports' and anti-social involvement in boys. The results showed a significant correlation between negative behaviours and a number of sporting activities which included boxing, wrestling, weightlift- ing and MA. MA had the smallest effect size when it was the only power sport involved, but still showed increased anti-social behaviour compared to controls. The data from both Trulson's research and that of

Endresen and Olweus are sufficient warnings that not all MA are equal in providing benefits to those involved. It is clear that in order to aspire to the promotion of positive results through MA interventions, the components of training which are responsible for the development of self-regulation and behaviour change will need to be identified.

The intervention by Trulson (1986) demonstrated that through the adolescent years it is possible to achieve profound changes in self-regulatory capacity. Male adolescents aged 13–17, who had been clinically categorised as juvenile delinquents were involved in the study. The 34 boys were split into three intervention groups who were all led by a single instructor, and after 6 months they were retested for delinquency indicators using the Minnesota Multiphasic Personality Inventory (MMPI). The variation in results was profound. The control group who took part in general physical education and game activities showed minimal development in their social skills and remained within the delinquent category. Students who were exposed to a modern MA visibly declined and showed greater delinquent qualities in their test scores compared to the pre-intervention scores. The final group of boys were exposed to a traditional MA and were able to not only take greater con- trol over their social behaviours but were no longer classified as delinquent and exhibited behaviour patterns considered normal within the MMPI instrument. These results suggest that during adoles- cence, in particular, self-control is a malleable component of personality which with the correct stimulus can be developed to attain optimal benefits in later life.

Perhaps the most immediate benefits of self-control for adolescents emerging into adulthood is its effect on academic performance. Self-control visualised as time management has been shown to be a predictor of university-level academic performance (Kitsantas, Winsler, and Huie 2008). Creating positive habits such as time management appears to be the area where self-control can be most influ- ential to our performance at both school and work Indeed self-control has been found to be con- siderably more effective in habit formation than in single acts of self-denial (de Ridder et al. 2012). It is reasonable to expect that an individual’s trait self-control should develop during childhood and adolescence. It is worth noting that self-control capacity may continue to be developed during

adulthood. This may be through actual increases in capacity or through the learning of techniques which allow the capacity available to be used more efficiently (Baumeister, Vohs, and Tice 2007; Heatherton and Baumeister 1996). The combination of techniques such as meditation and habit for- mation through use of self-control may make available

the capacity for trait behaviour changes. Hen- necke et al. (2014) identify three requirements for an adult to achieve trait behaviour modification. An individual must desire to change, have access to a technique which leads to change, and believe that their efforts will lead to behaviour change. Even then trait behaviour change will only occur if sufficient practice is undertaken to lead to the formation of habits associated to the required behav- ioural trait.

The research to date is supportive of the idea that some forms of MA training can lead to both development of self-regulatory capacity seen as self-control and also as a facilitating technique for positive behaviour change. However, currently, it is unclear as to what MA experiences indivi- dually or in concert are beneficial in this regard. The current practice of describing martial arts through dichotomies or by style, fails to truly identify what a student will be expected to do. For example, the traditional/modern dichotomy used by Trulson (1986) was insufficient to describe the training in his study and a supplementary list of the training components was required to define the interventions used. The identification of components or facets of the MA training which can be used severally to classify a students' experience or to define an intervention strategy is a foundation for future research. The identification of these components will ensure that the MA used in an intervention programme can be clearly understood and potentially replicated by others. It is essential that a range of MA approaches be explored to locate consistent components within and across them.

Method

Design

The current research used a qualitative methodology. The epistemological bases for this research is a critical realist approach, as we are assuming that MA facets exist independently of the researchers and participants (Willig 2013). Consistent with a critical realist approach is the assumption that knowledge is predicated on the relationships and dynamics between people and within groups at a given time and place. Data, in this case, are reliant upon the context each participant has with their MA group and experiences, and also by the circumstance of being involved in the research. This study utilised thematic analysis to locate the MA component facets as described by the par- ticipants (Braun and Clarke 2006). Facets consist of student experiences which the interviewee inti- mates may influence behaviour change within students. Each interview was reviewed and comments regarding student experience were extracted, though those regarding actual combat techniques were excluded as superficial to the

study. The resultant comments were then grouped into potential facets. Emphasis was made to find facets which were consistent in some form across all interviews. Items which were raised by just one interviewee were excluded as not symbolic of the MA as a whole. The MA facets derived represent the socially constructed accounts representative of the dynamic between the researchers and these MA 'experts'.

Researcher reflexivity

As the first author, it is important to give some context to my own involvement in the MA and the potential biases this implies. I am an exponent of Karate (Japanese) and Jiu Jitsu (Brazilian) and I have taught MA as my principal occupation for the last twenty-three years. I also teach Tai Chi Chuan and have trained and been graded in Aikido, Iaido and Kobudo. My involvement in the MA community is such that there is unlikely to be more than a single degree of separation between any study participants and myself. Throughout my career, I have seen many people develop in ways which suggest that MA could be beneficial, however, there has never been sound empirical evidence

to prove what circumstances are required to achieve those benefits. This research is part of my per- sonal journey to better understand how to evolve my teaching practices to be the most effective and beneficial to my students in the MA context.

Sampling and participants

Participants were recruited purposively based on the following criteria, they were MA instructors with more than 30 years of teaching experience, were international in that they had taught, trained, refereed or competed in locations other than their home country and were recommended by their peers or MA representative organisations as experts and leaders in their field of martial arts. Thirty years of training was arbitrarily chosen as representative of the generation of instruc- tors prior to the author's own generation. A group of 30 possible participants meeting these cri- teria were identified and contacted via telephone or email. Of those who did not take part some expressed a desire to not be interviewed, some agreed to take part in theory but proved too busy to keep an appointment, and some were supposedly contacted by their organisations gatekeepers but direct contact with the prospective participant was never made. Four participants agreed to take part in the research and they individually represent multiple MA styles and together rep- resent a major cross-section of MA-based upon current descriptive dichotomies (see Table 1). All participants were male and aged between 55 and 70 years of age. Australian and North Amer- ican backgrounds were represented.

The participants represented MA traditions emanating from Japan, China, South East Asia and Europe. Further description of the participants would affect their confidentiality.

Data collection and analysis

Ethics approval for the research was granted in 2016. The first author conducted a semi-structured face to face interview with each participant in Victoria, Australia. An informal interview style was adopted around a core of fourteen questions. Each question was asked and then the participants were allowed to expand and explore what this meant to them at their discretion. Some active listen- ing techniques and prompting were used to ensure clarity from each discussed topic. The questions (Table 2) related to class content, student experience, instructor expectations, and goal setting. Inter- views lasted between 30 minutes and 70 minutes and were recorded using the Hi-Q MP3 audio recorder for Android. Each interview was transcribed and a thematic analysis was undertaken according to the precepts suggested by Braun and Clarke (2006).

The aim of this research was to locate training facets within the training practices of the four participants. Each paragraph of transcription was analysed for statements which referred to behaviours or expectations of training. References by the participants to physical training tech- niques (eg. punches) were excluded from the analysis which instead focused on the background intent, intensity and social interactions that occur during training. The resultant lists of beha- viours/ expectations were grouped for each participant and themes consistent across partici- pants were identified. Entries for each theme were then examined to identify common elements which could be separated from other behaviours/ expectations within that theme. These elements once identified became the reportable facets within the research (Braun and Clarke 2006).

Table 1. Participants as described through existing dichotic representations of the martial arts.

Participant	Traditional/Modern	Hard/Soft	Contact/Non-contact	Internal/External
One	Both	Soft	Contact	Internal
Two	Traditional	Both	Both	Both
Three	Traditional	Hard	Contact	External
Four	Modern	Both	Contact	Both

Table 2. Interview questions.

1. What physical training would a student experience in a normal class with you?
2. Are there any training concepts you use on a less regular basis?
3. Do you equate any of this training with changes in your student's behaviour?
4. Please describe the level of physical contact your student's experience.
5. How do you respond to a student using excessive force?
6. What about insufficient force?
7. How do students benefit from these experiences?
8. Do you present a specific philosophy/ morality to your students?
9. How do you do this?
10. Do you use cultural knowledge and foreign language concepts?
11. Is this a regular experience?
12. Are there any other training aspects which you think are relevant to behaviour change in students?
13. Are your students competitive against each other in any contexts?
14. What are your thoughts on achievement of belt ranks?

Results

Three overarching themes relating to the student experience were extracted from the data and a number of training facets were associated with each theme (see Table 3). The first theme relates directly to the physical experience a student will be exposed to. The social expectations within the school which include the relationships a student has with teachers and with other students make up the second theme. Finally, training associated with mindfulness inside and outside the school was collated as a theme. In addition to these three themes, an additional training facet associated with goal setting and reward has been identified.

Physical experience

Physical combat techniques are integral to the study of MA. The streaming of these techniques to ensure they are appropriate for an individual learner was deemed an essential part of the student experience, '… we generally break up into different groups depending on the level of the people in the class … there are beginner, novice,

intermediate and advanced classes'. According to participants the intensity of training is not only varied by experience but also by individual differences with much lower expectations for children and older folk but still a requirement that students be pushed towards their limits, 'At first you might think you are dying, but you're not you're just uncomfortable um and I think that is a really great distinction to make. … it goes from huge discomfort to mild discomfort to I don't even notice it'. Whilst pushing students out of their immediate comfort zone was deemed essential this clear distinction was made, 'But it is never done in a malicious way. That is the difference. If it is done in a malicious way you will break them, you will never create a good student'.

Many different physical techniques were identified with both variations and similarities between instructors. Amongst these techniques, one facet of training, physical contact with other students, was seen as essential. Whether through the uncomfortable intimacy of wrestling techniques or the immediate danger of impact techniques, students must meet and overcome challenges which endan- ger their wellbeing and gain a real perspective of what they are capable of,

… to see how you react. Do you cower? Do you get angry? Does it make you volatile? If you get volatile or you cower it's not good, you know, we have to work on that. So that is why I insist on a bit of contact at an appro- priate level.

Table 3. The component facets of a Martial Arts training experience.

Theme	Facets		
Physical experience	Streaming	Physical contact	Challenge
Social expectations	Etiquette	Respect	Exemplars
Mindful training	Introspection	Discipline/ Attention	Breathing
Goals and Rewards			

As described by the participants MA training does not just challenge the physical, as challenge to the sense of self is also a requirement. The process of attending a grading test (for a new belt grade) forces the student to put skills on public display for assessment. A similar ordeal occurs when the student is asked to act as a leader for their peers or juniors in a particular aspect of training,

… we get people to get out in front of class and instruct, and ah, we have some very talented people, but they tremble at the knees at the thought of it. And they come back

to me a year or so later, they tell me they were scared they never thought they could speak in front of that many people.

Whether performing techniques as a public display or interacting with another through partner work, competition was considered inevitable,

I think it's important in life, having worked out who's who in the zoo and you know it tests you and it cali- brates you and ah, forces you to change and forces you to adapt so I think the idea of competition is how nature works.

Many of the facets here identified directly mitigate or control this competition to create an acceptable training environment. Sporting competition events were seen as potentially positive for students but also held a number of negative connotations. As such, rather than call sports competition a facet it is here considered a matter of individual difference where certain personality types will grow and others will lose perspective.

The reasoning behind the physical and emotional challenges faced on the training floor were summed up by one participant:

I think the biggest thing … we teach is to persevere. To persevere against obstacles, to persevere against difficul- ties no matter what life throws at you. You need to … overcome and do the best you can and that's really emphasised every session that we have whether it's through one more push-up, hitting the bag just a little harder, or trying to stop some young whirlwind who is in the peak of … condition and just to, you know, sur- vive that.

Social expectations

Relationships between students, between student and instructor and between the student and the school environment are referred to by the participants as 'training culture'. The first element of this culture is the strict etiquette regarding behaviour within the training space, '… in the dojo itself there are very strict guidelines in terms of how people will conduct themselves',

There's a certain respect and ambience you want to maintain in the dojo. You get dressed, you bow before you walk on to the mat as a sign of respect. You bow to the instructors, there is a sort of reverence and decorum that is maintained.

The suggestion is that by exposure to this culture students will adopt it without conscious intent, 'Most people change, most people are unaware of it', 'I think this is a

very subtle thing that a lot of people don't realise. I don't even talk about it much in class, I just allow it to happen', 'A person can come in to class with one particular set of attitudes but very quickly … the culture will affect them'.

The training culture also prescribes respectful behaviour towards one's training partners 'we place a lot of emphasis on respecting your opponent. Now respect goes two ways you don't belt anybody and also you don't engage at a level which is not mutually beneficial', 'there is an innate fairness and a friendliness that doesn't reward people who are bullies or overly aggressive'. Indeed, the concept of reciprocal training was raised, 'a reciprocal culture where they're not there for them(selves), they're there for the other guy. So you're there for everyone else in my school, to help them. Luckily the deal works because they are all there for you'. The implications for students where this level of respect is not maintained were also mentioned in our interviews, 'that starts from being selfish … just using the other students as cannon fodder for your development. That's not how it works in my school', '… because you are learning a fighting art which can do damage … understand that it is not a game it has
consequences if you misuse it'. Expulsion from training was the universal response to inappropriate aggressive behaviour that was not modified after warning. Comments associated with expulsion included '… some psychological issue there that I can't deal with and I can't put the other students at risk, so I have no tolerance for that', 'they will affect other students … they just left because of that one idiot', 'I don't tolerate it whatsoever … I would just tell them immediately that this environment isn't suitable for them'. In an additional insight
… gyms where they are really all about fighting and not about personal character development and they might foster a certain sense of toughness, being a bully, so they might encourage highly aggressive behaviour … cause they will push off the students that are not into that so what they will be left with is a group of people who are overly aggressive sort of feeding off each other.

The role of students as exemplars and mentors was an expected part of their training and develop- ment, 'Someone who has been there longer than you, they know more than you, they are older than you, they are your seniors, you need to respect them and they are here to help you', '… another part of martial arts schools is that seeing what other people are doing and learning from them', '… the way you conduct yourself. By example. It's no good saying yellow if you are red!' The process of becoming an exemplar to support other students was also seen to be an important part of an indi-

viduals' growth with participants variously referencing having students assist with teaching chil- dren, using students as preferred partners for new students and having students lead sections of the class.

Mindful training

As described by the participants, throughout the training experience students are encouraged to introspect and self – evaluate, 'Well I think they're learning to not accept what they think their limits are',

I am asking people to continually examine what is going on in their training … if you are able to do that in your training how about entertaining the possibility that you could do it off the mat in other areas of your life to even greater effect.

Indeed there is the presumption that the lessons learned will provide scaffolding to change behaviour beyond the MA training, '… we try to … get everybody to a point of socially acceptable balance I guess. In their behaviour and also in their capabilities', 'whatever we get from the training we should be able to apply those things in every other area of life'.

Applying principals of mindful practice occurs from the moment one begins training

I am also trying to get them to start to pay attention, to make a separation from whatever the stresses that went to getting them through the front door, to getting them now to listen to me, to be present in the moment,

'when I ask people to do physical work I am asking them to do it mindfully … and I think that mind- fulness changes their behaviour'. Attention to detail in this manner also speaks to the discipline required to maintain the etiquette and respect expected of each student especially where the safety of their peers is concerned, ' because they are learning a fighting art which can do damage. Their level of control has to correspond to that, their level of discipline has to correspond to that'.

Breathing exercises were used at the start of class to encourage students to take control of themselves and prepare for their training. In some cases, additional breathing exercises were used to end classes as well. Meditation was mentioned by two participants but was not univer- sally accepted, 'I don't force people because meditation really isn't for everybody and you need to be ready to accept meditation. … I teach people a very simple meditation … but not for lengthy periods of time'. In some cases breathing exercises were not used but rather a discussion of focused mindfulness was substituted, 'Attention to detail. I try to establish a culture of attention to detail …

it goes to establishing a culture in your mind that you are not going to accept mediocrity'.

Goals and rewards

MA achievements are often linked to a ranking system which is generally associated with some form of coloured belt awards. The attainment of these belt ranks was identified as having distinct personal significance, '… so people are going to measure them self so the belts are a way of them measuring their progress in a way that's kind of nice. Because it's not comparing themselves against the other person', and to be synonymous with appropriate goal setting and achievement, '… I'm a purple belt now, I was a blue belt, I'm getting better'. Belt awards may be linked to individual achievement 'the idea is to get better than themself', but awards given for little effort were seen to be counterproductive and to have potentially serious consequences '(in) a lot of these schools the black belt means nothing and every five year old has a black belt', 'In some corners of the martial arts landscape belt inflation is running so rampant the belts are meaningless'.

Discussion

The four interviews of this study were never intended to provide answers to the big questions as to the merits of MA training. They have however given a rare insight into the thoughts and expectations of some of the MA most experienced practitioner-teachers. These thoughts serve to inform future study not by providing answers but by providing a better definition of the questions. The underlying purpose for defining MA facets was to be able to classify a student's experience of MA training. By describing and quantifying the learning that takes place in MA training, future research may explore links between this learning and the development of self-regulation through MA training. The con- cern that under certain circumstances training could lead to quite negative social behaviour may also be correlated to the experience or lack of experience of a particular facet or group of facets. Through an analysis of training outcomes as related to exposure to the identified facets, we may be able to identify the key ingredients to mitigate the suggested negative outcomes. Examination of the ten identified training facets suggests multiple avenues for the development of behavioural and person- ality characteristics and it is worth mentioning these briefly.

The facets of physical contact and challenge, appear to require self-regulation during the experi- ence of combat. This may be demonstrated through the discipline required to

ensure that training techniques do not exceed the acceptable boundaries, even in circumstances where there is a risk of serious injury. In the circumstances identified by the participants of this study, failure to self-regu- late will lead to injury either of the self or of a training partner. In addition, students are required to regulate their responses to discomfort and danger in combat training exercises. It would seem that under these circumstances, in accordance with the strength theory of self-regulation (Baumeister, Vohs, and Tice 2007), the self-regulatory muscle is constantly being depleted and built up by training activities. This should lead to growth in the self-regulatory capacity of students, but introspection may be a complicit facet in ensuring that this capacity is activated in ways that could benefit the individual (Kestly 2016). In addition to self-regulation, the training of combat skills may foster self-esteem, assertiveness and determination (Kostorz, Gniezinka, and Nawrocka 2017). These characteristics could be developed through greater self-efficacy in regard to defending the self from physical threat.

In addition to self-esteem, MA may be a key method to develop mindfulness. Indeed, it may be that success in MA training requires the development of mindful attitudes and awareness to negotiate the physical dangers of training. The use of mindfulness intervention strategies for changes in behaviour patterns are now well documented (Demarzo et al. 2015) and interventions related to physiological symptoms and psychological health have suggested some efficacy from mindfulness training (Montgomery, Kim, and Franklin 2011). Whilst the MA may not be suitable in all instances, the inclusion of this practice in a motivated cohort of students may provide indi- viduals with mindfulness tools which can be activated to support a myriad of coping strategies (Rempel 2012).

Etiquette and respect relate to self-regulation of the social self. Etiquette may act as a focusing activity, pre-framing behaviours which are mindful and appropriate, effectively preparing a student to be respectful; which is essential to the safety of others. Respect from others combined with stream- ing of challenges by MA teachers may together ensure that the self-regulatory benefits from physical contact and challenge are maintained and do not become problematic threats (Bastian et al. 2014). Finally, a focus on mindful awareness of the self and of others leads to an acknowledgement that behaviours can be changed. In acting as an exemplar, students may be forced to acknowledge their existing behaviour and consciously modify it within the training space and this is almost cer- tainly motivated by social expectations and cues.

While much of this conjecture may well align with existing theory, for example, the theory of challenge and threat (Blascovich 2008), it is only through further study that these facets can be related directly to behavioural development. This study, whilst informative, is unlikely to have cap- tured a complete cross-section of instructor views. For example, we failed to include proponents with a non-western cultural perspective, and the voice of female instructors has also not been captured here. Each of the participants interviewed did report teaching female students, but differences in stu- dent experience across gender will require additional research.

The premise behind this study is that some of facets of martial arts training identified will lead to positive personal development. It should be noted that this type of development has been programmed into certain physical education programmes. As an example, a study by Koh, Ong, and Camire (2014) integrated the training of social values into the development of ball handling skills. The results were positive in increasing student salience of the proposed values and there was some observation of behaviour change within the students. This suggested that actively including information regarding social behaviour and linking this to actual experi- ence in the game context could successfully influence students. It remains to be seen whether the facets of MA mirror the techniques used in these types of studies or whether some combination of these facets causes a growth which is potentially greater than the individual facets experienced separately.

To best utilise the information gleaned from the experts interviewed, each of the MA facets needs to be analysed both individually and through its interactions with other facets. Existing theories such as those of self-regulation (Baumeister et al. 2006) and challenge and threat (Blascovich 2008) amongst others may be used to direct and inform further research. Future analysis can then be tested with an empirical study to determine the actual importance of each facet. As far as has been ascer- tained this is the first attempt to expand the standard descriptive terms for the MA into a number of building block facets. The opportunity arises to develop an instrument around the student experi- ence which utilises the 10 facets. Studies which seek to consider the influence of MA training can then use this instrument either to find correlations in behaviour and training or to exclude training as a potential confounding variable. For example, a recent study examined the differences between MA students and a control group to ascertain if there were any appreciable differences (Kostorz, Gniezinka, and Nawrocka 2017). Amongst other findings, the study identified greater self-esteem

amongst the MA practitioners who were involved in Judo or Pszczynska. The study did not, however, test to see if there were differences between these two arts. By defining each art by its component facets, it would quickly become evident if there was an equivalent student experience across the cohort, thereby increasing the value of that study for any who wish to replicate it with an alternate MA group.

The next logical step in this research is to begin to validate the facets and to form a survey instrument to measure the MA facets of the student experience. In addition, Vertonghen and Thee- boom (2010) have pointed out the importance in MA research of taking into account self-selection bias within student groups and the teaching style of MA instructors. A facets instrument should either include the capture of this data or be used in tandem with an existing instrument which does so.

Notes on contributors

Glenn T. Sandford has a post graduate degree in Psychology and is currently undertaking a Master's Degree at Victoria University. Glenn is an exponent of Karate (Japanese) and Jiu Jitsu (Brazilian) and has taught Martial Arts for more than 20 years.

Peter Richard Gill is a lecturer in Psychology at Victoria University. Peter's research interests include men's health and wellbeing, reflectivity, and self-regulation.

References

Bastian, B., J. Jetten, M. J. Hornsey, and S. Leknes. 2014. "The Positive Consequences of Pain: A Biopsychosocial Approach." Personality and Social Psychology Review 18 (3): 256–279. doi:10.1177/1088868314527831.

Baumeister, R. F., M. Gailliot, C. N. DeWall, and M. Oaten. 2006. "Self-regulation and Personality: How Interventions

Increase Regulatory Success, and How Depletion Moderates the Effects of Traits on Behavior." Journal of Personality 74 (6): 1773–1801. doi:10.1111/j.1467-6494.2006.00428.x.

Baumeister, R. F., K. D. Vohs, and D. M. Tice. 2007. "The Strength Model of Self-control." Current Directions in Psychological Science 16 (6): 351–355. doi:10.1111/j.1467-8721.2007.00534.x.

Blascovich, J. 2008. "Challenge and Threat." In Handbook of Approach and Avoidance Motivation, edited by A. J. Elliot, 431–446. New York: Psychology Press.

Braun, V., and V. Clarke. 2006. "Using Thematic Analysis in Psychology." Qualitative Research in Psychology 3: 77– 101. doi:10.1191/1478088706qp063oa.

Brown, D., and A. Johnson. 2000. “The Social Practice of Self-defense Martial Arts: Applications for Physical Education.” Quest 52: 246–259. doi:10.1080/00336297.2000.10491713.

Cynarski, W. J., and J. Lee-Barron. 2014. “Philosophies of Martial Arts and Their Pedagogical Consequences. IDO MOVEMENT FOR CULTURE.” Journal of Martial Arts Anthropology 14 (1): 11–19.

Cynarski, W. J., L. Sieber, and G. Szajna. 2014. “Martial Arts in Physical Culture. IDO MOVEMENT FOR CULTURE.”

Journal of Martial Arts Anthropology 14 (4): 31–38. doi:10.14589/ido.14.4.4.

Demarzo, M. M. P., J. Montero-Marin, P. Cuijpers, E. Zabaleto-del-Olmo, K. R. Mahtani, A. Vellinga, and J. Garcia- Campayo. 2015. “The Efficacy of Mindful-based Interventions in Primary Care: A Meta-analytic Review.” Annals of Family Medicine 13 (6): 573–582. doi:10.1370/afm.1863.

Endresen, I. M., and D. Olweus. 2005. “Participation in Power Sports and Antisocial Involvement in Preadolescent and Adolescent Boys.” Journal of Child Psychology and Psychiatry 46 (5): 468–478. doi:10.1111/j.1469-7610.2005. 00414.x.

Heatherton, T. F., and R. F. Baumeister. 1996. “Self-regulation Failure: Past, Present, and Future.” Psychological Inquiry 7 (1): 90–98. Accessed from http://sites.dartmouth.edu/thlab/publications/.

Hennecke, M., W. Bleidorn, J. J. A. Denissen, and D. Wood. 2014. “A Three-part Framework for Self-regulated Personality Development Across Adulthood.” European Journal of Personality 28: 289–299. doi:10.1002/per.1945. Job, V., G. M. Walton, K. Bernecker, and C. S. Dweck. 2015. “Implicit Theories About Willpower Predict Self-regu- lation in Grades and Everyday Life.” Journal of Personality and Social Psychology 108 (4): 637–647. doi:10.1037/

pspp0000014.

Johnson, J. A. 2017. “From Technique to Way: An Investigation Into Taekwondo’s Pedagogical Process. IDO MOVEMENT FOR CULTURE.” Journal of Martial Arts Anthropology 17 (4): 3–13. doi:10.14589/ido.17.4.2.

Johnson, J. A., and P. Ha. 2015. “Elucidating Pedagogical Objectives for Combat Systems, Martial Arts, and Combat Sports. IDO MOVEMENT FOR CULTURE.” Journal of Martial Arts Anthropology 15 (4): 65–74. doi:10.14589/ ido. 15.4.9.

Kestly, T. A. 2016. “Presence and Play: Why Mindfulness Matters.” International Journal of Play Therapy 25 (1): 14– 23. http://doi.org/10.1037/pla0000019.

Kitsantas, A., A. Winsler, and F. Huie. 2008. “Self-regulation and Ability Predictors of Academic Success During College: A Predictive Validity Study.” Journal of Advanced Academics 20 (1): 42–68. doi:10.4219/jaa-2008-867.

Koh, K. T., S. W. Ong, and M. Camire. 2014. “Implementation of a Values Training Program in Physical Education

and Sport: Perspectives From Teachers, Coaches, Students, and Athletes.” Physical Education and Sport Pedagogy 21 (3): 295–312. doi:10.1080/17408989.2014.990369.

Kostorz, K., A. Gniezinka, and M. Nawrocka. 2017. “The Hierarchy of Values vs. Self-esteem of Persons Practicing Martial Arts and Combat Sports. IDO MOVEMENT FOR CULTURE.” Journal of Martial Arts Anthropology 17 (1): 15–22. doi:10.14589/ido.17.1.3.

Lakes, K. D., and W. T. Hoyt. 2004. “Promoting Self-regulation Through School-based Martial Arts Training.” Applied Developmental Psychology 25: 283–302. doi:10.1016/j.appdev.2004.04.002.

Mischel, W., Y. Shoda, and P. K. Peake. 1988. “The Nature of Adolescent Competencies Predicted by Preschool Delay of Gratification.” Journal of Personality and Social Psychology 54 (4): 687–696. http://doi.org/10.1037/0022-3514.54. 4.687.

Montgomery, K. L., J. S. Kim, and C. Franklin. 2011. “Acceptance and Commitment Therapy for Psychological and Physiological Illness: A Systematic Review for Social Workers.” Health and Social Work 36 (3): 169–181. Accessed from www.researchgate.net.

Rempel, K. D. 2012. “Mindfulness for Children and Youth: A Review of the Literature with an Argument for School- Based Implementation.” Canadian Journal of Counselling and Psychotherapy 46 (3): 201–220. Accessed from http:// cjc-rcc.ucalgary.ca/cjc/index.php/rcc/article/view/1547.

de Ridder, D. T. D., G. Lensvelt-Mulders, C. Finkenauer, F. M. Stock, and R. F. Baumeister. 2012. “Taking Stock of Self- control: A Meta-analysis of How Trait Self-control Relates to a Wide Range of Behaviors.” Personality and Social Psychology Review 16 (1): 76–99. doi:10.1177/1088868311418749.

Tangney, J. P., R. F. Baumeister, and A. L. Boone. 2004. “High Self-control Predicts Good Adjustment, Less Pathology, Better Grades and Interpersonal Success.” Journal of Personality 72 (2): 271–324. doi:10.1111/j.0022-3506.2004. 00263.x.

Theeboom, M., and P. De Knop. 1999. “Asian Martial Arts and Approaches of Instruction in Physical Education.”

European Journal of Physical Education 4: 146–161. doi:10.1080/1740898990040204.

Trulson, M. E. 1986. “Martial Arts Training: A Novel ‘Cure’ for Juvenile Delinquency.” Human Relations 39 (12): 1131–1140. doi:10.1177/001872678603901204.

Vertonghen, J., and M. Theeboom. 2010. “The Social-psychological Outcomes of Martial Arts Practise among Youth: A Review.” Journal of Sports Science and Medicine 9: 528–537. http://www.jssm.org.

Vohs, K. D., & Baumeister, R. F. (Eds.). (2011). Handbook of Self-Regulation. Research, Theory and Applications. [Kindle version]. New York: The Guildford Press.

Willig, C. 2013. Introducing Qualitative Research in Psychology: Adventures in Theory and Method. Maidenhead: Open University Press/McGraw-Hill Education.

Appendix C

Preliminary items ordered by martial arts facet.

Streaming

1. Ability level specific classes
    a. I attend separate classes for my ability level.
2. Partners chosen for similarity
    a. My training partners are of a similar size or skill level.
3. Classes for specific content
    a. I attend separate classes to develop different areas of my training
4. Classes for age groups
    a. There are separate classes available for different age groups (eg. Children and teenagers)
5. Classes for gender
    a. There are specialist classes available for female students.
6. Content builds on thing previously learnt
    a. Class content builds on foundations previously learnt
7. Modification for injury
    a. Students carrying injuries have modified training options
8. Modification for disability
    a. Disabled students have modified training options
9. Modifications for body size
    a. Student size is taken into account when matching training partners
10. Classes focused on self-defence concepts
    a. There is an opportunity to learn specific self-defence concepts

Physical Contact

1. Bruising during training
    a. I get bruised during training
2. Incidence of injury
    a. I get injured during training
3. Partner work training
    a. I complete training exercises with a partner
4. Falling down
    a. I get thrown or am expected to fall or roll during training
5. Impacting bags
    a. I strike focus mitts or a bag during training
6. Programmed set training
    a. I complete choreographed training exercises with a partner
7. Free sparring
    a. I take part in free-sparring during training
8. Light contact sparring
    a. I take part in light contact sparring during training
9. Heavy contact sparring
    a. I take part in heavy contact sparring during training
10. Touch contact only sparring
    a. I take part in 'touch contact only' sparring during training

Challenge

1. Pushed to limits
    a. I get pushed to my limits
2. In danger
    a. I feel that I am in danger of injury when training
3. Outmatched
    a. I feel that I am outmatched by my opponent when training
4. Injured
    a. I feel that I am about to be injured during training
5. Difficult but achievable tasks
    a. Tasks I undertake in training are quite difficult but are achievable
6. Risk
    I take physical risks during training
7. Encouragement from teachers
    a. My teachers encourage me to persevere when training gets hard
8. Support from other students
    a. My fellow students encourage me to persevere when training gets too hard
9. Expected to persevere
    a. I am expected to persevere no matter how hard I feel a situation has become
10. Keep going
    a. I strive to keep going no matter how hard I find a training situation

Etiquette

1. Entry to floor
    a. I catch the instructor attention or bow before entering the training floor
2. Speaking to instructor
    a. I my teachers title when asking for their attention (eg. Sir)
3. Working with partner
    a. I bow or shake hands before starting training with a partner
4. Wearing a uniform
    a. I wear a specific uniform to training
5. After injury
    a. There is a procedure to follow if I am injured or injure another during training
6. Wearing jewellery
    a. Jewellery must be removed for training
7. Greeting a training partner
    a. There is a formal way to greet a new training partner before training begins
8. Thanking a training partner
    a. At the end of training I thank my training partner
9. Arriving on time
    a. I arrive early or on time to classes
10. Asking permission to leave
    a. Before leaving the training space I gain permission from the instructor

Respect

1. Care for training partner
    a. I ensure that my actions do not place my training partner in undue danger
2. Care for environment (training)
    a. I behave formally and with reverence in the training hall
3. Speaking to teacher
    a. I am formal when discussing training with my teacher
4. Payment of fees
    a. I pay my training fees on time
5. Expectations for cleanliness
    a. I arrive at class washed and with a clean uniform (training clothes)
2. Class acknowledgement of instructions
    a. The class verbally (or through another signal) acknowledges the instructions from the teacher
3. Feel safe while training even though there is some danger
    a. I feel safe when training even though I know there is some danger
4. Partners have your well-being at heart when training with you
    a. I believe my training partners have my well-being at heart even when we are working hard
5. Cleaning floors
    a. I take part in cleaning the training floor
6. Personal hygiene
    a. I ensure that my nails are cut and wounds are suitably covered before training

Exemplars

1. Students are asked to demonstrate techniques
    a. Students are asked to demonstrate techniques in front of the class
2. Students chosen as partners for instructor demonstration
    a. The instructor uses students in their technical demonstrations
3. Opportunities to train with senior students
    a. I train with more experienced students
4. Senior student mentor junior students
    a. Senior students work through techniques with me
5. Senior students model technique for junior students
    a. Senior students model correct technique for me
6. Senior students provide examples of good technique
    a. The senior students set good technical examples
7. Senior students provide examples of good behaviour
    a. The senior students show me how to behave in class through example
8. Senior students are courteous
    a. The seniors are courteous even to the newest student
9. Senior students follow the school rules
    a. The senior students behave the way we are told to behave
10. Senior students are supportive of the teachers
    a. The senior students support the actions and requests of the teachers

Discipline

1. I control my strength to protect other students

    a. I control my strength to protect other students
2. I follow the class rules
    a. I follow the class rules
3. I arrive at class before it starts
    a. I arrive at class before it starts
4. My training clothes are always clean and ready for class
    a. My training clothes are always clean and ready for class
5. When I get hit I try to do better next time
    a. When I get hit I try to do better next time
6. I don't take out my frustration on my training partners
    a. I don't take out my frustration on my training partners
7. Repetition of basic techniques
    a. In class we review the basic techniques
8. Repetition of new techniques
    a. New techniques are repeated multiple times throughout a class
9. Focus on the technique being taught
    a. I pay full attention to the technique being taught in class
10. Pay attention to personal instructions
    a. I try to incorporate any personal instructions into my training

Breathing

1. Each class starts with a moment of breathing
    a. Class starts with a moment of breathing
2. Each class ends with a moment of breathing
    a. Class ends with a moment of breathing
3. Some techniques require breathing regulation
    a. Techniques require breathing regulation
4. When challenges increase we are encouraged to attend to our breathing
    a. When challenges increase I am encouraged to attend to my breathing
5. We are told to direct our thoughts while breathing
    a. I am told to direct my thoughts and regulate my breath
6. We are told to relax and breathe
    a. I am told to relax and breathe
7. We spend time in breathing meditation
    a. I spend time in breathing meditation
8. We regulate our breathing during techniques
    a. I regulate my breath during a technique
9. We practice breathing techniques
10. There are specific classes for meditative practices
    a. I attend a meditation class

Introspection

1. The instructor gives lectures about life
    a. The instructor gives an anecdote or lesson about life
2. I spend time thinking about my last class
    a. I spend time thinking about my last class
3. Some aspects of our training are linked to other aspects of life
    a. The instructor links an aspect of our training to a wider life perspective

4. I am more aware of moderating my strength when training
    a. I am more aware of moderating my strength during training
5. I am more aware of my weaknesses when training
    a. I am more aware of my weaknesses during training
6. I strive to overcome my personal weaknesses through training
    a. I strive to overcome my personal weaknesses through training
7. I rehearse techniques in my mind
    a. I rehearse techniques in my mind
8. I keep a training diary
    a. I keep a training diary
9. I write notes and draw diagrams about techniques I am learning
    a. I record and review techniques that I am learning
10. I read books and magazines about training
    a. I research the techniques and history of the techniques I am training in (For this think about electronic media as well)

Goals and rewards

1. There are clear levels of achievement
    a. There are clear levels of achievement which I can work towards
2. The next level seems like an achievable goal
    a. The next available level seems like an achievable goal
3. People who have achieved a training level earned it
    a. People who have achieved a training level have earned it
4. It is not easy to get the next level
    a. It is not easy to achieve the next level of training
5. A lot of hard work is required to achieve the next level
    a. Hard work is required to achieve the next level of training
6. Each level has a clear definition of requirement
    a. The requirement for each level of training is clearly defined
7. Gaining a level feels like I have achieved something worthwhile
    a. Gaining a level in my training feels like a worthwhile achievement
8. I plan my training to work towards the next level
    a. I plan my training to work towards the next level of achievement
9. I plan my training to gain understanding of the newest techniques
    a. I plan my training to gain understanding of the newest technique
10. Training is its own reward
    a. I find training is its own reward.

Appendix D

Preliminary questionnaire items-part 1.

The following questions relate to class options or training options that are available where you do your training. If you train at more than one place, consider all of your training as a whole.

What does 'training as a whole' mean to you?

Other comments/ thoughts?

I can attend separate classes for my ability level.

What are 'separate classes'?

Do you use the term 'classes' or would you use another term?

What do you understand as an ability level?

Other comments/ thoughts?

My training partners are of a similar size or skill level.

Who do you take to be your training partners?

Other comments/ thoughts?

I can attend separate classes to develop different areas of my training.

If you can attend such classes, please identify the areas of training available?

Other comments/ thoughts?

There are separate classes available for different age groups (eg. Children and teenagers).

Do the children train to a separate syllabus or technical expectation?

Other comments/ thoughts?

There are specialist classes available for female students.

Did you know this off the top of your head, or did you need to jog your memory?

Other comments/ thoughts?

Class content builds on foundations previously learnt.

What would you describe as the 'foundations' of class content?

Other comments/ thoughts?

Students carrying injuries have modified training options.

Please describe a modified training option.

Other comments/ thoughts?

Disabled students have modified training options.

What sort of modifications might be considered?

Other comments/ thoughts?

Student size is taken into account when matching training partners.

Did you read this to mean the same size, OR an appropriate size for the training being undertaken?

Other comments/ thoughts?

There is an opportunity to learn specific self-defence concepts.

What does it mean to learn a self-defence concept?

Other comments/ thoughts?

The previous 10 questions all related to one theme, which we have termed 'streaming'.

Do all of these questions fit as part of a theme? Y/N

Please identify any that you think are misplaced.

Can you think of other areas pertinent to this theme which have not been covered? Y/N

Please explain the areas you think we should consider as part of this theme.

Final comments/ thoughts for this theme?

I get unintentionally bruised during training.

Other comments/ thoughts?

I receive an injury during training.

Other comments/ thoughts?

I complete training exercises with a training partner

Other comments/ thoughts?

I get thrown or am expected to fall or roll during training

Other comments/ thoughts?

I use focus mitts or a bag during training

Other comments/ thoughts?

I complete pre-arranged training exercises with a partner

What do you take 'pre-arranged training exercises' to mean?

Other comments/ thoughts?

I take part in free-sparring during training.

Is free-sparring the best term to describe this?

Other comments/ thoughts?

I take part in light contact sparring during training.

What do you consider 'light contact' to include?

Other comments/ thoughts?

I take part in heavy contact sparring during training

What do you consider heavy contact to include?

Other comments/ thoughts?

I take part in 'touch contact only' sparring during training.

Other comments/ thoughts?

The previous 10 questions all related to one theme, which we have termed 'physical contact'.

Do all of these questions fit as part of a theme? Y/N

Please identify any that you think are misplaced.

Can you think of other areas pertinent to this theme which have not been covered? Y/N

Please explain the areas you think we should consider as part of this theme.

Final comments/ thoughts for this theme?

I get pushed to my limits.

What limits were you considering?

Other comments/ thoughts?

I feel that I am in danger of injury when training.

Other comments/ thoughts?

I feel that I am outmatched by my opponent when training.

Other comments/ thoughts?

I feel that I am about to be injured during training.

Other comments/ thoughts?

Tasks I undertake in training are quite difficult but are achievable.

Other comments/ thoughts?

The previous 5 questions all related to one theme, which we have termed 'challenge'.

Do all of these questions fit as part of a theme? Y/N

Please identify any that you think are misplaced.

Can you think of other areas pertinent to this theme which have not been covered? Y/N

Please explain the areas you think we should consider as part of this theme.

Final comments/ thoughts for this theme?

Preliminary questionnaire items-Part 2.

I catch the instructor's attention or bow before entering the training floor.

Other comments/ thoughts?

I use my teachers title when asking for their attention (eg. Sir).

Other comments/ thoughts?

I bow or shake hands before starting training with a partner.

Other comments/ thoughts?

I wear a specific uniform to training.

Other comments/ thoughts?

There is a procedure to follow if I am injured or injure another during training.

Other comments/ thoughts?

Jewellery must be removed for training.

Other comments/ thoughts?

There is a formal way to greet a new training partner before training begins.

Other comments/ thoughts?

At the end of training I thank my training partner.

Other comments/ thoughts?

I arrive early or on time to classes.

Other comments/ thoughts?

Before leaving the training space I gain permission from the instructor.

What does 'training space' mean in this context?

Other comments/ thoughts?

The previous 10 questions all related to one theme, which we have termed 'etiquette'.

Do all of these questions fit as part of a theme? Y/N

Please identify any that you think are misplaced.

Can you think of other areas pertinent to this theme which have not been covered? Y/N

Please explain the areas you think we should consider as part of this theme.

Final comments/ thoughts for this theme?

Students are asked to demonstrate techniques in front of the class.

Under what circumstances would this occur?

Other comments/ thoughts?

The instructor uses students in their technical demonstrations.

Other comments/ thoughts?

I train with more experienced students.

Other comments/ thoughts?

Senior students work through techniques with me.

What does 'work through techniques' mean?

Other comments/ thoughts?

Senior students model correct technique for me.

Other comments/ thoughts?

The senior students set good technical examples.

Other comments/ thoughts?

The senior students show me how to behave in class through example.

Other comments/ thoughts?

The seniors are courteous even to the newest student.

Other comments/ thoughts?

The senior students behave the way we are told to behave.

Other comments/ thoughts?

The senior students support the actions and requests of the teachers.

Other comments/ thoughts?

The previous 10 questions all related to one theme, which we have termed 'exemplars'.

Do all of these questions fit as part of a theme? Y/N

Please identify any that you think are misplaced.

Can you think of other areas pertinent to this theme which have not been covered? Y/N

Please explain the areas you think we should consider as part of this theme.

Final comments/ thoughts for this theme?

I take physical risks during training.

Give an example of a risk you might take in this context.

Other comments/ thoughts?

My teachers encourage me to persevere when training gets hard.

Other comments/ thoughts?

My fellow students encourage me to persevere when training gets too hard.

Other comments/ thoughts?

I am expected to persevere no matter how hard I feel a situation has become.

Other comments/ thoughts?

I strive to keep going no matter how hard I find a training situation.

Other comments/ thoughts?

The previous 5 questions all related to one theme, which we have termed 'challenge'.

Do all of these questions fit as part of a theme? Y/N

Please identify any that you think are misplaced.

Can you think of other areas pertinent to this theme which have not been covered? Y/N

Please explain the areas you think we should consider as part of this theme.

Final comments/ thoughts for this theme?

Preliminary questionnaire items-Part 3.

I control my strength and speed to protect other students.

Other comments/ thoughts?

I follow the class rules.

Other comments/ thoughts?

I arrive at class before it starts.

Other comments/ thoughts?

My training clothes are always clean and ready for class.

Other comments/ thoughts?

When I get hit or defeated I try to do better next time.

Other comments/ thoughts?

I don't take out my frustration on my training partners.

Other comments/ thoughts?

In class we review the basic techniques.

Other comments/ thoughts?

New techniques are repeated multiple times throughout a class.

Other comments/ thoughts?

I pay full attention to the technique being taught in class.

Other comments/ thoughts?

I try to incorporate any personal instructions into my training.

What do you perceive 'personal instructions' to be.

Other comments/ thoughts?

The previous 10 questions all related to one theme, which we have termed 'discipline'.

Do all of these questions fit as part of a theme? Y/N

Please identify any that you think are misplaced.

Can you think of other areas pertinent to this theme which have not been covered? Y/N

Please explain the areas you think we should consider as part of this theme.

Final comments/ thoughts for this theme?

Class starts with a few moments of just breathing.

Other comments/ thoughts?

Class ends with a few moments of breathing and reflection.

Other comments/ thoughts?

Techniques require breathing regulation.

Other comments/ thoughts?

When challenges increase I am encouraged to attend to my breathing.

Other comments/ thoughts?

I am expected to direct my thoughts and regulate my breath.

Other comments/ thoughts?

I am expected to relax and breathe.

Other comments/ thoughts?

I spend time in breathing meditation.

Other comments/ thoughts?

I regulate my breath during a technique.

Other comments/ thoughts?

We practise breathing techniques.

Other comments/ thoughts?

I attend a meditation class.

Other comments/ thoughts?

The previous 10 questions all related to one theme, which we have termed 'breathing'.

Do all of these questions fit as part of a theme? Y/N

Please identify any that you think are misplaced.

Can you think of other areas pertinent to this theme which have not been covered? Y/N

Please explain the areas you think we should consider as part of this theme.

Final comments/ thoughts for this theme?

I ensure that my actions do not place my training partner in undue danger.

What level of danger to your partner are you avoiding?

Other comments/ thoughts?

I arrive at class, washed and with a clean uniform (training clothes).

Other comments/ thoughts?

I behave formally and with reverence in the training hall.

Is ‘reverence’ the correct word for this?

Other comments/ thoughts?

I am formal when discussing training with my teacher.

What form does the formality take?

Other comments/ thoughts?

I pay my training fees on time.

Other comments/ thoughts?

The previous 5 questions all related to one theme, which we have termed 'respect'.

Do all of these questions fit as part of a theme? Y/N

Please identify any that you think are misplaced.

Can you think of other areas pertinent to this theme which have not been covered? Y/N

Please explain the areas you think we should consider as part of this theme.

Final comments/ thoughts for this theme?

Preliminary questionnaire items-Part 4.

The instructor gives an anecdote or lesson about life.

Other comments/ thoughts?

I spend time thinking about my last class.

Other comments/ thoughts?

The instructor links an aspect of our training to a wider life perspective.

Other comments/ thoughts?

I am more aware of moderating my strength during training.

Other comments/ thoughts?

I am more aware of my weaknesses during training.

Other comments/ thoughts?

I strive to overcome my personal weaknesses through training.

Other comments/ thoughts?

I rehearse techniques in my mind.

Other comments/ thoughts?

I keep a training diary.

Other comments/ thoughts?

I record and review techniques that I am learning.

Other comments/ thoughts?

I research the techniques and history of the techniques I am training in.

Other comments/ thoughts?

The previous 10 questions all related to one theme, which we have termed 'introspection'.

Do all of these questions fit as part of a theme? Y/N

Please identify any that you think are misplaced.

Can you think of other areas pertinent to this theme which have not been covered? Y/N

Please explain the areas you think we should consider as part of this theme.

Final comments/ thoughts for this theme?

There are clear levels of achievement which I can work towards.

What is a 'level of achievement'?

Other comments/ thoughts?

The next available level seems like an achievable goal.

Other comments/ thoughts?

People who have achieved a training level have earned it.

Other comments/ thoughts?

It is not easy to achieve the next level of training.

Other comments/ thoughts?

Hard work is required to achieve the next level of training.

Other comments/ thoughts?

The requirement for each level of training is clearly defined.

Other comments/ thoughts?

Gaining a level in my training feels like a worthwhile achievement.

Other comments/ thoughts?

I plan my training to work towards the next level of achievement.

Other comments/ thoughts?

I plan my training to gain understanding of the newest technique.

Other comments/ thoughts?

I find training is its own reward.

Other comments/ thoughts?

The previous 10 questions all related to one theme, which we have termed 'goals and rewards'.

Do all of these questions fit as part of a theme? Y/N

Please identify any that you think are misplaced.

Can you think of other areas pertinent to this theme which have not been covered? Y/N

Please explain the areas you think we should consider as part of this theme.

Final comments/ thoughts for this theme?

The class, verbally (or through another signal) acknowledges the instructions from the teacher.

I feel safe when training even though I know there is some danger.

Other comments/ thoughts?

I believe my training partners have my well-being at heart even when we are working hard.

Other comments/ thoughts?

I take part in cleaning the training floor.

Other comments/ thoughts?

I ensure that my nails are cut, and wounds are suitably covered before training.

Other comments/ thoughts?

The previous 5 questions all related to one theme, which we have termed 'respect'.

Do all of these questions fit as part of a theme? Y/N

Please identify any that you think are misplaced.

Can you think of other areas pertinent to this theme which have not been covered? Y/N

Please explain the areas you think we should consider as part of this theme.

Final comments/ thoughts for this theme?

Appendix E

MAI for Exploratory Factor Analysis

Many people training in the martial arts take part in training at more than one location or supplement their training with additional training activities. For this survey we ask you to consider just one martial arts experience which you would like to use as a reference in answering this survey. We are looking for information about what you experienced within a specific martial arts environment rather than your personal journey through the Martial Arts. The martial art you will be telling us about is called (eg. Karate, Tai Chi, Silat etc):

From this point we will refer to this martial art as your 'school'.

This is an example of the format of the of questions we will ask. You can see the question on the left and the possible answers on the right. The Asterix (*) mark spots in between the 'anchor' words. This allows you to choose points that fit somewhere in between the words provided. For example, if you perform free fighting activities more than once a month but not once a week, you can select one of the Asterix between the two words on the scale to more accurately represent your answer.

Never, Almost Never, *, Rarely, *, Seldom, *, Occasionally, *, Most of the time, Always.

The Questions.

At my school, I can attend classes which are specifically for students of my ability level.
In class, I am deliberately matched to a training partner of a specific size.
In class, I am deliberately matched to a training partner of a specific ability level.
At my school, I can attend additional classes to develop specific areas of my training.
How often do you receive an injury during training? Consider an injury, one that requires treatment, or for you to modify your activity.
How often do you interactively train with another student in class? (Physical partner-work)
At my school, there are separate classes available for different age groups (e.g. Children).
At my school, there are specialist classes available for female students.
At my school, the training content of a class builds on foundations which have been previously learnt.
At my school, I am expected to take falls during training.
In class, I strike a target (e.g. focus mitts or a bag).
In class, I complete pre-arranged training exercises with a partner.
In class, I take part in free-fighting (sparring, wrestling etc.).
At my school, student size is considered when matching training partners.
In class, the training can push me to my physical limits.
In class, the training can push me to my psychological limits.
In class, the training can push me to my emotional limits.
In class, the training can be so intense that I feel I am in danger of injury.
In class, I can feel that my training partner is a poor match for me.
In class, training is likely to lead to me getting injured.
In class, there is some training that places me at additional physical risk.
At my school, students who attend classes with injuries have modified training options.
In class, my teachers encourage me to persevere when training gets hard.
In class, my fellow students encourage me to persevere when training gets hard.
At my school, I am expected to persevere no matter how hard I feel a situation has become.
I strive to keep going no matter how hard I find a training situation.
I feel safe when training even though I know there is some danger
I believe my training partners have my well-being at heart even when we are doing intense training.
At my school, students are asked to demonstrate techniques in front of the class.
In class, more experienced students are deliberately partnered with less experienced students
At my school, senior students work through techniques with junior level students.
At my school, senior students model correct behaviour.
In class, the senior students set good technical examples.
At my school, the senior students show me how to behave in class by their example.
At my school, the senior students are courteous even to the newest student.
In class, the senior students behave the way we are told to behave.
In class, the senior students show support for the teachers.
In class, I control my strength to protect other students.
At my school, I follow the class rules.
I arrive at class before it starts.
I arrive at my school with training clothes that are clean.

In class, when I get hit or defeated, I try to do better next time.
In class, when I am frustrated, I am likely to take it out on my training partner.
In class, we review the basic techniques.
In class, new techniques are repeated multiple times.
In class, I pay attention to the technique being taught
I try to incorporate any personal instructions from my teacher into my training.
In class, we begin with a few moments of just breathing.
At my school, class ends with a few moments of formal breathing.
In class, I spend time in breathing meditation.
I regulate my breathing during training.
In class, I practise breathing techniques.
In class, the teacher gives an anecdote about life.
In class, the teacher links an aspect of our training to a wider life perspective.
At my school, I am made aware of what I must do to improve.
In class, I am aware of what I need to do to improve my martial arts.
In class, my teachers encourage me to rehearse techniques in my mind.
I research the techniques I am training in.
At my school, people who have achieved a training level have earned it.
In class, I may be expected to perform tasks which are quite difficult.
At my school, I have seen people fail the test for the next level of training.
At my school, hard work is required to achieve the next level of training.
At my school, the requirement for each level of training is clearly defined.
I feel it is a worthwhile achievement when I attain a new level in my training.
I spend time in private training working towards the next level of achievement.
I spend time in private training to gain understanding of the newest technique I am studying in class.
I find training is its own reward.
At my school, there are clear levels of achievement which I can work towards.
At my school, the next available level in my training seems like an achievable goal.
I keep a training diary.
I record techniques that I am learning.
In class, I am careful to moderate my strength to match the situation I am in.
At my school, my teachers encourage me to spend time thinking about my last class.
At my school, there are specialised meditation classes.
At my school, the techniques I learn require breathing regulation.
At my school, when facing a difficult challenge, I have been encouraged to attend to my breathing.
At my school, I am taught to regulate my breath.
At my school, when students are not coping with an exercise they may be encouraged to ‘relax and breathe’ through the training.
In class, the teacher uses students in their technical demonstrations.
I take part in cleaning the training floor.
I ensure that wounds are suitably covered before training.
I ensure that my nails are cut before training.
At my school, I follow a set protocol before entering the training floor. (e.g. Bow)
I use my teacher's title when asking for their attention (e.g. Sir).
I make a formal acknowledgement (e.g. shake hands) of my training partner before we begin working together.
At my school, specific clothing must be worn when training.
In class, if I am injured there is a specific procedure for me to follow.

In class, if I injure someone there is a specific procedure for me to follow.
At my school, jewellery must be removed prior to training.
At my school, there is a formal way to greet a new training partner before training begins.
In class, at the end of training I thank my training partner.
At my school, I am expected to arrive early to classes.
At my school, if I need to leave the training space, I gain permission from the instructor.
I ensure that my actions do not place my training partner in undue danger.
I behave with humility within the school environment.
I behave formally within the school.
I behave in a formal manner when discussing training with my teacher.
I pay my training fees on time.
I arrive at class with a clean uniform (training clothes).
At my school, the students verbally (or through another signal) acknowledge the instructions from the teacher.
In class, I take part in light contact training.
In class, I take part in heavy contact training.
In class, I take part in ‘touch contact only’ training.
At my school, disabled students have modified training options.
At my school, there are opportunities to learn specific self-defence concepts.
In class, I get unintentionally bruised from training.