

WAX ON, WAX OFF, OR WHATEVER WORKS FOR YOU:

ON THE ROLE OF PRE-COMPETITION EMOTIONS IN ELITE KARATEKA

KYLER AMSBURY

Master's Thesis in Sport and

Exercise Psychology

Spring 2015

Department of Sport Sciences

University of Jyväskylä

ACKNOWLEDGEMENTS

This thesis would not have been completed without the unwavering support of my friends, family, and supervisor Dr. Montse Ruiz. I am forever in debt!

Peace, love, and sport psychology.

ABSTRACT

Amsbury Kyler, 2015. *Wax On, Wax Off, Or Whatever Works For You: On The Role Of Pre-Competition Emotions In Elite Karateka*. Master's Thesis in Sport and Exercise Psychology. Department of Sport Sciences. University of Jyväskylä. 44 p.

The purpose of the current study aimed to examine the performance related experiences of elite karate athletes prior to a major international competition. The secondary aim was to explore the relationship between athlete and coach performance ratings.

Athletes selected emotional and non-emotional words to describe their experiences related to performance. Results indicated that best performance was characterized by high intensities of helpful emotion and non-emotion descriptors, while worst performance was characterized by high intensities of harmful descriptors. Moreover, intensities of emotions and non-emotions during actual good performance neared intensities recalled during best performance. Lastly, the coach reported athletes' performance positively higher than the subjective rating from the athlete.

Participants included five members of the Canadian National Wado-Kai karate team ($n = 5$) competing in international championships. Performance related experiences were assessed using the *PBS-20* and *ESP-40* questionnaire while recalling best and worst performance, and prior to kata and kumite performance. The participants and the coach rated their performance following competition.

The Individual Zones of Optimal Functioning (IZOF) model posits that each individual athlete exhibits a unique constellation of emotion, non-emotions and intensities when experiencing peak, or dysfunctional, performance (Hanin, 2000).

Practitioners are advised to provide interventions and tools that propel athletes to a pre-established zone of optimal functioning.

Keywords: Individual zones of optimal functioning, Psychobiosocial state, kata, kumite

TABLE OF CONTENTS

ABSTRACT

1 INTRODUCTION.....	6
2 LITERATURE REVIEW.....	8
2.1 History of Emotions.....	8
2.2 Arousal, Anxiety and Performance.....	8
2.3 Optimal States.....	10
2.4 Individual Zones of Optimal Functioning.....	11
2.5 Psychobiosocial States.....	13
3 PURPOSE OF THE STUDY.....	16
4 METHODOLOGY.....	17
4.1 Participants.....	17
4.2 Measures.....	17
4.2.1 Performance Related States.....	17
4.2.2 Performance Measures.....	18
4.3 Procedure.....	18
5 RESULTS.....	19
5.1 Data Analysis.....	20
5.2 PBS-20.....	21
5.3 ESP-40.....	24
5.4 Athlete vs. Coach Performance Ratings.....	25
5.5 Group Level Analysis.....	26
6 DISCUSSION.....	29
6.1 Coach vs. Athlete Ratings of Performance.....	29

6.2 Idiosyncratic Nature of Emotions and Non-Emotions.....	30
6.3 Limitations, Practical Implications, and Future Work.....	31
6.4 Conclusion	33
7 REFERENCES.....	34
APPENDIX A	40
APPENDIX B	43

1 INTRODUCTION

Human performance testing through individual and team sport is arguably ingrained in the DNA of our species; the first Olympic games can be traced back to our ancestors of 776 BC (Ancient Olympics - First Olympic Games History from Olympia, 2014). Consequently, scientific fields like Psychology of Sport have emerged and offered questions relating to the mental side of peak physical performance. For instance, what role do emotions play in affecting performance? Is there is a stable and predictable relationship between the mental and physical facets of peak performance? Early work focused on the effects of competitive anxiety and was explained through the inverted-U hypothesis (Yerkes & Dodson, 1908). Essentially, poor performance is expected when arousal (i.e., anxiety) is too high or too low, and good performance is expected when arousal levels are moderate and optimal.

Though this theory carried weight for several decades, it was highly criticized for its cookie-cutter qualities and the inability to take into account individual differences when identifying optimal levels of anxiety for performance (Jones, Swain, and Hardy, 1993). To combat this issue, Hanin (1978) purposed the Zone of Optimal Functioning (ZOF) hypothesis. Like the title suggests, ZOF posits that athletes possess a range of anxiety where optimal performance is likely to occur. Each athlete exhibits a unique zone and is exclusive to that athlete. Therefore, optimal performance can occur for one athlete experiencing low levels of arousal, while optimal performance can occur for another athlete experiencing high levels of arousal (Hanin, 1978).

As interest in emotions and performance expanded, there was a natural progression from research on competitive anxiety to research on other emotions and their effects on performance (Gould & Udry, 1994). Of course, anxiety is only one of the many stars within the emotional constellation experienced by athletes during peak performance (Robazza, 2006). This constellation is unique and individual to each athlete for each performance. In light of this, Hanin (2000a) extended his ZOF model to the Individual Zone of Optimal Functioning (IZOF), centered on the individual appraisals of person-environment interactions (Lazarus, 1991). For example, one could appraise a rapid heart rate before a competition as having too many nerves and thus debilitating performance; on the other hand, another athlete could appraise that same

rapid heart rate as positive excitement and thus facilitating performance. So, IZOF takes into account any emotion, non-emotion and/or situation experienced by an athlete and focuses on the subjective, unique appraisal by the athlete.

In light of this, these emotional experiences (i.e., unique emotions felt during performance with an attached appraisal) often become patterned, since sport performance is highly repetitive; for example, the appraisal of nervousness should be consistent across most situations. These emotional experiences are manifested in five dimensions: a) form, b) content, c) intensity, d) context and e) time. The content dimension refers to an emotion being experienced within a performance related state and, when combined with the discrete emotion approach (Lazarus, 2000), is conceptualized within four categories (Watson & Tellegen, 1985): pleasant and functionally optimal (P+), pleasant and dysfunctional (P-), negative and functionally optimal (N+) and negative and dysfunctional (N-). The intensity dimension refers to how strong or weak a certain emotion/non-emotion is experienced. The context and time dimensions refer to the situation the emotion/non-emotions are experienced and the frequency and duration of the experience, respectively. The form dimension refers to how the emotion is manifested.

It is the assumption that athletes are aware of and able to report emotions and non-emotions related to performance experiences (Hanin, 2000b). The recall method hinges on the valid awareness an athlete holds of previous performance related states. Fortunately, the recall method has received substantial support and is considered a valid method of capturing athletes' performance related states (Hanin & Syrjä, 1996; Robazza, Bortoli, & Nougier, 2000). The empirical or direct method (cf. Woodcock, 2011) is based on multiple assessments prior to *actual* good or poor performances. Though bypassing the issue of memory bias, the direct method has been criticized for its intrusiveness and impracticality (Hanin, 2000b). But when used in conjunction with the recall method, both approaches yield similar results and thus offers further validity to the direct method (Robazza, Bortoli & Hanin, 2004).

2 LITERATURE REVIEW

2.1 History of Emotions

In sport, and life in general, human organisms exhibit an array of emotions that are both stable and dynamic over time. Early research on the experience of emotion centred on the theory that physiological changes precede the experience of a specific emotion; for example, an increase in heart rate and trembling may cause a psychological response of fear or nervousness (James & Lange, 1922). If one finds themselves lost in the woods and confronted by a carnivorous grizzly bear, the initial reaction will be physiological by nature (i.e., increased perspiration, heart rate, and trembling), followed by the psychological response of fear and worry. In sharp contrast, other theorists have argued emotion to be the exact opposite chain of events. That is, a psychological response precedes the physiological response, and not vice versa (Cannon, 1927). In this case, a confrontation with a grizzly bear evokes the psychological response of fear and worry, triggering the physiological response of increased heart rate, perspiration, and trembling. Though both theories of emotion are in opposition of one another, both can agree that the emotional experience involves both a physiological and psychological component. A third and final theory of emotion argues that physiological responses to external stimuli do not automatically trigger a psychological response; rather, the physiological response is cognitively appraised and interpreted by the experiencer, leading to the psychological response based on the meaning derived from the immediate context (Schachter & Singer, 1962). For example, increased heart rate and perspiration could be interpreted as fear when confronted by a grizzly bear, but could also be interpreted as passion when embarking on a first date.

2.2 Arousal, Anxiety and Performance

One physiological and psychological experience that has been paid particular attention to in the context of performance is *arousal*. The Yerkes-Dodson law states that performance level on a given task is positively correlated with mental and physiological arousal; that is, as arousal increases, so does performance (e.g., increased attention). However, this only holds true up until a certain threshold, at which point performance begins to decrease (Yerkes & Dodson, 1908) and can be explained through the impairment of attention, working memory and decision making.

It is important to note that this idea seems to manifest itself only when one must perform a difficult task. When one is performing a simple task, however, performance appears to steadily

increase with arousal before exhibiting a ceiling effect. Unlike difficult tasks where performance decreases when arousal is high, easy tasks seem to be performed best when highly aroused. So, optimal levels of arousal fluctuate based on the type and the difficulty of the task being performed. Because of this, the shape of the curve seen in the illustration above is highly variable (Diamond, Campbell, Park, Halonen & Zoladz, 2007).

Optimal levels of arousal in performance clearly have implications in the sporting context. For instance, an individual or team may wish to be highly aroused when facing a seemingly inferior opponent, and moderately aroused when facing a seemingly superior opponent. Research on emotion in sport held an early focus on the effects of anxiety on performance, as discussed above. Liebert and Morris (1967) suggested a multidimensional theory of anxiety in which two subcomponents comprise the experience: a) the cognitive component, defined as the mental aspect of anxiety manifested in negative expectations of performance, and b) the somatic component, defined as the physiological aspect of anxiety manifested in rapid heart rate and increased muscle tension (this should appear quite similar to the physiological and psychological components of emotion outlined in the previous section). Martens, Vealey and Burton (1990) distinguished between the effects of each subcomponent of anxiety on sport performance, and argued that cognitive anxiety is negatively correlated with performance (i.e., as cognitive anxiety increases, performance decreases) and that somatic anxiety exhibits an inverted-U on performance (i.e., similar to optimal arousal in a difficult task, too little or too much bodily anxiety becomes detrimental to performance). However, this theory has been criticized for considering only the separate effects of anxiety and limited by a lack of empirical support (Gould & Krane, 1992). For instance, athlete *A* may experience a high level of pre-competition anxiety that will prove to be detrimental to performance. However, athlete *B* experiencing the same level of anxiety may appraise the situation as facilitative to their performance, since experience from previous best performances exhibited this same level of anxiety. Therefore, rather than blanketing intensities of anxiety as either helpful or harmful, a subjective, individual appraisal of emotion should be gathered from each individual athlete (Hanin, 1997). In sum, each individual athlete ought to experience their own optimal state composed of idiosyncratic features, propelling optimal performance.

2.3 Optimal States

An *optimal state* can be defined as the subjective, experiential state providing the best internal conditions leading to total task involvement and effective recruitment and utilization of mental resources (Hanin, 2000). Optimality has long been implicated but never truly defined in previous research (Ruiz & Hanin, 2004a). For example, Ravizza (1977) identified *peak experiences* of athletes, in which exceptional performance is often characterized by genuine feelings of joy, complete focus, and transcendence of the self, all leading to total task involvement (i.e., focusing on the task and nothing but the task). Similarly, the concept of a *flow state* has been defined by Csikszentmihalyi (1975). When an athlete experiences a state of flow, there is often a perfect balance between the skill level of the athlete and the challenge at hand. In addition, the concept of time is often lost (e.g., “I didn’t even realize that the game was almost over”), full concentration and the loss of consciousness is experienced, similar to the “transcendence of self” described by Ravizza (1977). An ideal *performance state* was further identified by Loehr (1982), where an athlete or performer is in a state of mental and physical relaxation, experiencing high energy, self-confidence, optimism, focus and control. Again, and as noted in Ruiz and Hanin (2004a), peak experiences, flow experiences, and ideal performance states all imply the concept of optimality; that is, all of these experiences are optimal states that result in optimal performance.

The aforementioned states related to optimal performance provide a general account of the experiences felt by most athletes, but again, they hardly take into account the idiosyncratic emotions felt by individual athletes while experiencing these states. For example, while an ideal performance state is characterized by high self-confidence and low anxiety (Loehr, 1982), can this characterization be extended to every athlete? Certainly, optimal performance could be characterized by moderate self-confidence and high anxiety in athlete *A*, but high self-confidence and low anxiety in athlete *B*. One approach that addresses this issue is the *Directional Perception Approach*, or the directionality hypothesis (Jones & Swain, 1995). Using this procedure, athletes’ perceptions of cognitive and somatic anxiety are gathered by accessing and identifying the function of anxiety on performance. That is, athletes are asked to describe whether the symptoms of cognitive and somatic anxiety are facilitative (helpful) or debilitating (harmful) to their performance. Given this approach, it is possible to generate individual profiles concerned with

how anxiety affects performance for athletes, and certainly combats the issue of individual differences among athletes' perceptions.

Though the Directional Perception Approach is an insightful tool, the concept still lacks certain specificity. For example, increased heart rate may be perceived as facilitative for an athlete. But are there any boundaries on how much or how little this form of somatic anxiety is needed to remain facilitative? That is, is there a scenario where increased heart rate actually becomes harmful, even though the athlete has responded that increased heart rate is facilitative to their performance? Optimal levels (e.g., intensity of the experience) ought to be defined and included when identifying certain emotions and non-emotions that are facilitative or debilitating to athletic performance.

2.4 Individual Zones of Optimal Functioning

The Individual Zones of Optimal Functioning (IZOF) model was initially developed to assess optimal intensities of competitive anxiety (Hanin, 1997; 2000; 2003). Rather than simply identifying the impact of anxiety on performance, the IZOF model aims to describe, explain and predict performance related states. The model includes five dimensions of the human emotional and non-emotional experience, and is thus a more robust and comprehensive model than the Direct Perception Approach. Here, *intensity* is defined as the structure and strength of emotional experiences, ranging from low, medium, to high. In addition, the model further considers four other dimensions that can be used to describe performance-related states: content, form, time and context. *Content* refers to an emotion being experienced within a performance related state and is conceptualized within two categories (Watson & Tellegen, 1985): pleasant and unpleasant. When combined with the discrete emotion approach (Lazarus, 2000), emotions can be pleasant and functionally optimal (P+), pleasant and dysfunctional (P-), negative and functionally optimal (N+) and negative and dysfunctional (N-). Given this, a negative emotion (e.g., anger) can be deemed facilitative to performance, while a positive emotion (e.g., self-confidence) can be deemed debilitating to performance, depending on the appraisal from the athlete. Best performance should occur when the athlete is high in facilitative emotions, and low in debilitating emotions. *Form* refers to how the emotion is manifested (e.g., cognitively, physiologically); *time* refers to the moment, duration, and frequency that the emotion is experienced; and the *context* describes the situation in which the emotion is experienced.

In the context of the IZOF model, *performance-related experiences* are those experiences that are composed of the past and present features of a person's performance (i.e., all of the characteristics that accompany a certain quality of performance). So, emotions can be conceptualized as characteristics that help construct the quality of a performance; for instance, high self-confidence and high vigour may be characteristic of athlete A's best performance, while low self-confidence and high anger may be characteristic of athlete A's worst performance. These emotions that act as components of a performance-related experience can be accessed and reflected in situational states, stable patterns of experience and emotional metaexperiences (Hanin, 2000). Mayer and Gaschke (1988) define emotional metaexperiences as the knowledge and self-reflection of emotional experiences that are concerned with evaluating and regulating emotions. The authors further argue that these experiences include the cognitions that monitor the emotional experience and that are directly under the person's control. For instance, we can consider a karate athlete who recalls and reflects that feeling aggressive and excited is characteristic of their best performance, while also identifying the strategies used to elicit those emotions before a competition. According to the IZOF model, these emotional metaexperiences reflect performance-related experiences, and can thus give the athlete and researcher access to the emotions involved in optimal performance-related states. Importantly, athletes at an elite skill level have been shown to be increasingly aware of their performance-related emotional experiences than those at non-elite level (Davis & Cox, 2002).

A study carried out by Robazza, Pellizzari, Bertollo and Hanin (2008) investigated the functional impact of emotions on performance within the frameworks of both the IZOF model and the Directional Perception Approach. Using elite Italian swimmers and track and field athletes, intensity of idiosyncratic emotions, their functional impact (i.e., positive or negative to performance), and hedonic tone (i.e., pleasant or unpleasant) of trait and state anxiety and self-confidence was gathered for each athlete. Athletes completed the Competitive State Anxiety Inventory-2 (CSAI-2; Martens, Vealey, Burton, Bump, & Smith, 1990b), the Competitive Trait Anxiety Inventory-2 (a trait version of the CSAI-2); the athletes were then asked to choose personally relevant emotional descriptors from a list containing over 70 pleasant and unpleasant emotions. Given previously identified emotional profiles gathered through metaexperiences, it was hypothesized that pre-performance intensities of emotions and anxiety nearing previously established optimal levels would be indicative of good performance, while the opposite would

hold true for poor performance. Within the framework of the Directional Perception Approach, it was further hypothesized that pre-performance symptoms (e.g., anxiety) deemed as facilitative would be indicative of good performance, while pre-performance symptoms deemed as debilitating would be indicative of poor performance. Performances were then self-assessed in retrospect, ranging from poor, to average, to good. It was found that good performances were associated with pre-performance emotional intensities nearing optimal levels (IZOF), while pre-performance emotions deemed facilitative were also associated with good performance (Directional Perception Approach). The results provide support for both the IZOF model and the Directional Perception Approach (Robazza et al., 2008) and can thus be interpreted as compatible models.

2.5 Psychobiosocial States

There is a unique and specific emotional experience in high achievement settings, especially when we consider qualitatively different situations (e.g., success and failure situations); therefore, there is a need for a more holistic description of a performance related state that includes both emotion and non-emotion experiences. During performance, there are emotions and non-emotions present in human functioning; for instance, and bringing the conversation full circle, there are psychological and biological changes when confronted by a grizzly bear. Hanin and Stambulova (2002) had Russian athletes from various sports generate metaphors reflecting certain feeling states prior to, during, and after best and worst ever performance. The authors found that athletes most often identify cognitive, communicative, motivational, motor-behavioural, and physiological components when describing feeling states. These modalities were further tested in Ruiz and Hanin (2004) who asked elite karate athletes to describe how they felt during optimal performance, as compared to how they felt during a simple working state. Again, the authors found that the above five modalities were most often referred to, but an additional two more modalities were identified: a) affective and b) operational. Thus, an increasingly thorough description of an athlete's performance state can be obtained through the identification of these common and repeating form modalities.

Hanin (2010) describes eight modalities in which emotional experiences are manifested, and these modalities comprise the complete Psychobiosocial state (PBS) of an athlete responsible for total human functioning. A Psychobiosocial state (PBS) emerges from the interaction of

specific modalities including: a) cognitive (e.g., alert), b) affective (e.g., nervous), c) motivational (e.g., inspired), d) volitional (e.g., indecisive), e) bodily (e.g., energetic), f) motor (e.g., relaxed), g) operational (e.g., ineffective), and h) communicative (e.g., sociable). As described previously, these modalities can be pleasant and facilitative to performance, unpleasant and facilitative to performance, pleasant and debilitating to performance, and unpleasant and debilitating to performance.

Hanin and Syrjä (1995), in the first extension of the IZOF model from anxiety to positive and negative emotions, examined these emotions on performance in junior ice hockey players. After the athletes recalled their subjective experiences of best and worst performances, individual emotional profiles of positive and negative emotions, and their functional quality, were generated. The junior hockey athletes reported that they were closer to their optimal zones (i.e., increased facilitative emotions) when performing their best, and further from their optimal zone when performing their worst. This finding has been replicated in archery (Robazza, Bortoli, & Nougier, 2000), badminton and squash (Syrjä, Hanin, & Tarvonen, 1995), and soccer (Syrjä, Hanin, & Pesonen, 1995).

Cottyn, De Clercq, Crombe and Lenoir (2012) investigated the effects of height-induced manipulation of emotions and balance beam performance in elite gymnasts; that is, it was hypothesized that as the height of a balance beam increased, so should stress (e.g., increased heart-rate) and dysfunctional emotions (e.g., fear), thus resulting in decreased performance. As expected, increasing the height of the balance beam led to increased heart-rate and fear, ultimately resulting to poorer performance. However, what was interesting was that this effect was found only at the highest level of the beam and on the first attempt; since this was the first time the gymnasts ever performed on the balance beam at this height, it surely caused some feelings of anxiety and fear. On subsequent attempts, performance increased, and the self-report of dysfunctional emotions, taken before every attempt, decreased.

Cohen, Tenenbaum, and English (2006) conducted an IZOF-based study that was incorporated into a psychological skills training program for two elite female golfers. After building idiosyncratic emotional performance profiles for the golfers, three dimensions were focused on: arousal, pleasantness, and functionality. Several strategies were used to enhance emotional regulation (e.g., imagery, relaxation, self-talk) so that the athletes could achieve and

approach their established levels of optimal functioning. The authors found that enhanced emotional regulation and awareness led the golfers to better approach their “zone”, and consequently led to improved performance by the end of one golf season (Cohen et al., 2006).

Robazza, Bortoli, and Hanin (2004) examined pre-competition emotions, bodily symptoms and task-specific qualities as predictors of performance in elite Italian karate athletes. Initially, the athletes recalled their best and worst performance so as to develop an individual profile consisting of the idiosyncratic emotions (e.g., anger, confidence), bodily symptoms (e.g., tension, perspiration), and task-specific qualities (e.g., execution, speed) exhibited during these performances. Performance was immediately self-evaluated (good vs. average) after the first of a series combats in order to control for confounding variables (e.g., referee involvement, opponent ability) that would affect the predictive power of pre-competition states on performance. A significant correlation was found between good performance and the experience of facilitative emotions and bodily symptoms prior to competition. That is, successful achievements were associated with pre-competition states that approached the optimal emotional profile of best performances, lending support to the validity and predictive powers of the IZOF model, especially in the sport of karate (Hanin, 1997; 2000).

3 PURPOSE OF THE STUDY

The current study examined the experiences of elite Canadian karate athletes ($n = 5$) using both the recall and direct methods in relation to most successful and unsuccessful performances. Further, experiences prior to actual performances were measured. In addition, the secondary purpose of the study aimed to explore the relationship between performance ratings from competing athlete and their coach. It is hypothesized that, considering recalled best and actual good performance: a) athletes will experience higher intensities of helpful emotions and non-emotions, b) athletes will experience lower intensities of harmful emotions and non-emotions. Considering recalled worst and actual less than good performance, it is hypothesized that: c) athletes will experience higher intensities of harmful emotions and non-emotions, d) athletes will experience lower intensities of helpful emotions and non-emotions (Robazza, Bortoli, & Hanin, 2004; Hanin, 2000a). It is further hypothesized that emotional descriptors felt prior to performance will be highly idiosyncratic and variable across the participants (Hanin, 2000).

4 METHODOLOGY

4.1 Participants: Five members of the Canadian National Wado Kai Karate Team attending the 2014 Scottish International Open Karate Championships in Edinburgh participated in this study. Ages of the athletes ranged from 18 to 44 years old ($M = 28.6$, $SD = 11.7$) with varying levels of team and international experience (two to ten years).

4.2 Measures:

4.2.1 Performance Related States

The Psychobiosocial State Scale (*PBS-20*; Ruiz, Hanin & Robazza, 2015) consists of 20 questions, directly measuring the form, content, and intensity dimensions, while also allowing for an appraisal (i.e., impact rating, helpful or harmful) of the considered emotion/non-emotion. Ten of the twenty questions refer to commonly harmful descriptors, while the remaining ten questions refer to commonly helpful descriptors. A participant is asked to complete the scale, choosing between certain emotion/non-emotion options that best describe how they feel during a given context. Each question contains three to four descriptors (i.e., content) related to a certain Psychobiosocial category (i.e., form); thus, the *PBS-20* individually assesses each of the eight modalities present in human functioning.

Intensity

The participant selects one descriptor and is then asked to rate how intense their selection is experienced using the Borg Category Ratio Scale (*CR-10*; Borg, 1998), with anchors occurring at 0 = nothing at all, 0.5 = very, very little, 1 = very little, 2 = little, 3 = somewhat, 4 = moderately, 5 = much, 7 = very much, 10 = very, very much, and 11 or # = maximal possible.

Impact

Further, the impact rating of the descriptor is obtained (i.e., appraisal of harmful or helpful). Participants are presented three to four modal descriptors and only one must be selected; again, the participant chooses the one that best describes how they felt in a certain moment (e.g., during best, worst, or current performance).

Scores from each selected descriptor can be displayed in a graph to illustrate the Psychobiosocial state experienced during a certain athletic performance, with functionally helpful descriptors on one end of the x-axis and functionally unhelpful descriptors on the other. The practical validity of this scale has been examined in Ruiz, Hanin and Robazza (2015).

The Emotion State Profile (*ESP-40*; Hanin, 2010b.) scale consists of 40 items to assess functionally optimal pleasant (P+), functionally optimal unpleasant (N+), dysfunctional pleasant (P-), and dysfunctional unpleasant (N-) emotions. The *ESP-40* is divided into 10 rows and 4 columns of emotion labels most often used when describing an athlete's state before or during performance. Participants endeavor across each row of the four emotions presented, ranking each item in the row based on how accurate it describes their emotional state. A score of 4 would be placed on the emotion in the row best describing the presence of the emotion, a score of 1 would be placed on the emotion in the row best describing the absence of the emotion and a score of 2 and 3 are placed on the remaining emotions in the row.

4.2.2 Performance Measure

A karate specific action repertoire scale was developed to assess performance without having to consider the outcome of the competition. The scale contains two separate sections referring to actions and techniques used in kata (15 items; e.g., rhythm) and kumite performance (16 items; e.g., speed of execution); participants are able to rate their performance on each of these items for a specific performance. All performances were filmed by the researcher and were made available for viewing by the athlete. The coach and the athletes were encouraged to freely discuss the ratings and observations from the performances. The ratings were then transcribed by the researcher and the audio from the discussions was recorded using a Toshiba laptop.

4.3 Procedure

Prior to the Scottish International Open Championships, contact was made with the Canadian National Wado-Kai Karate Team and clearance was granted for the current researcher to accompany the team to the competition. After a practice session, one day before competition, the full purpose of the study was explained and informed consent was obtained; it was further clarified that the participants had the right to withdraw at any point.

Emotional profile of the athlete's current state was obtained using the *ESP-40* and *PBS-20*. The participants further completed another set of these questionnaires with the intent to evaluate performance related states present during best performance; emotions and their intensities during poor performances were not obtained due to the ethical dilemma of asking participants to recall worst performances prior to an important competition. The questionnaires were completed in a quiet seminar room.

Prior to kata performance, within 20 minutes of competition, athletes were asked to complete the questionnaires to profile their current state immediately before performance.

Prior to kumite performance, within 20 minutes of competition start time, athletes again completed the *ESP-40* and *PBS-20* to profile their current state immediately before performance. All questionnaires were completed in a private training area next to the site of competition.

Following the tournament, participants completed a subjective analysis of their performance using the Karate Action Repertoire Scale. The athletes were interviewed by the researcher and were asked to rate themselves on each performance item on the scale. Athletes who performed more than one kata or kumite performance were instructed to give their overall performance rating for each item on the scale.

A coach's analysis of performance was also obtained for each athlete from the head kata and kumite coach in a private interview with the researcher. The coach watched the recorded performances of each athlete and completed the Karate Action Repertoire Scale for both their kata and kumite performances. The coach was instructed to give overall performance ratings for each item if the athlete competed in more than one kata or kumite performance. All performances were filmed by the researcher and were made available for viewing by the athlete and coach. The coach and the athletes were encouraged to freely discuss the ratings and observations from the performances. The ratings were then transcribed by the researcher and the audio from the discussions was recorded using a Toshiba laptop.

5 RESULTS

5.1 Data Analysis

Nineteen profiles containing emotion and non-emotion descriptors and their intensity for best, worst and actual performances were generated.

Given the profiles birthed from the *ESP-40*, four different types of profiles can emerge:

Type 1 = N- < N+ < P+ > P- “optimal positive”

Type 2 = N- < N+ > P+ > P- “optimal negative”

Type 3 = N- > N+ > P+ > P- “dysfunctional negative”

Type 4 = N- < N+ < P+ < P- “dysfunctional positive”

Performance was rated following the competition by both the head coach and the karateka on a number of different performance factors. To classify performances as poor, average, or good, an overall average score for each performance from the athlete and coach was obtained: an overall average score from 0 to 1.49 was classified as a poor performance, 1.50 to 2.99 as an average performance, and 3 to 4 as an above average performance. Out of 9 performances, five performances were deemed above average ($M = 3.47$, $SD = 0.16$) and four performances were deemed average ($M = 2.49$, $SD = 0.13$). No poor performances were observed.

A paired samples t-test was conducted to compare the athlete’s performance ratings and the coach’s performance ratings using SPSS. At the individual level, a paired samples t-test was again used to compare athlete and coach’s ratings of kata and kumite performance for each individual participant (nine total comparisons).

5.2 PBS-20

Figure 1 presents an individual profile representing experiences related to recalled most successful and unsuccessful kata performances of an elite karateka.

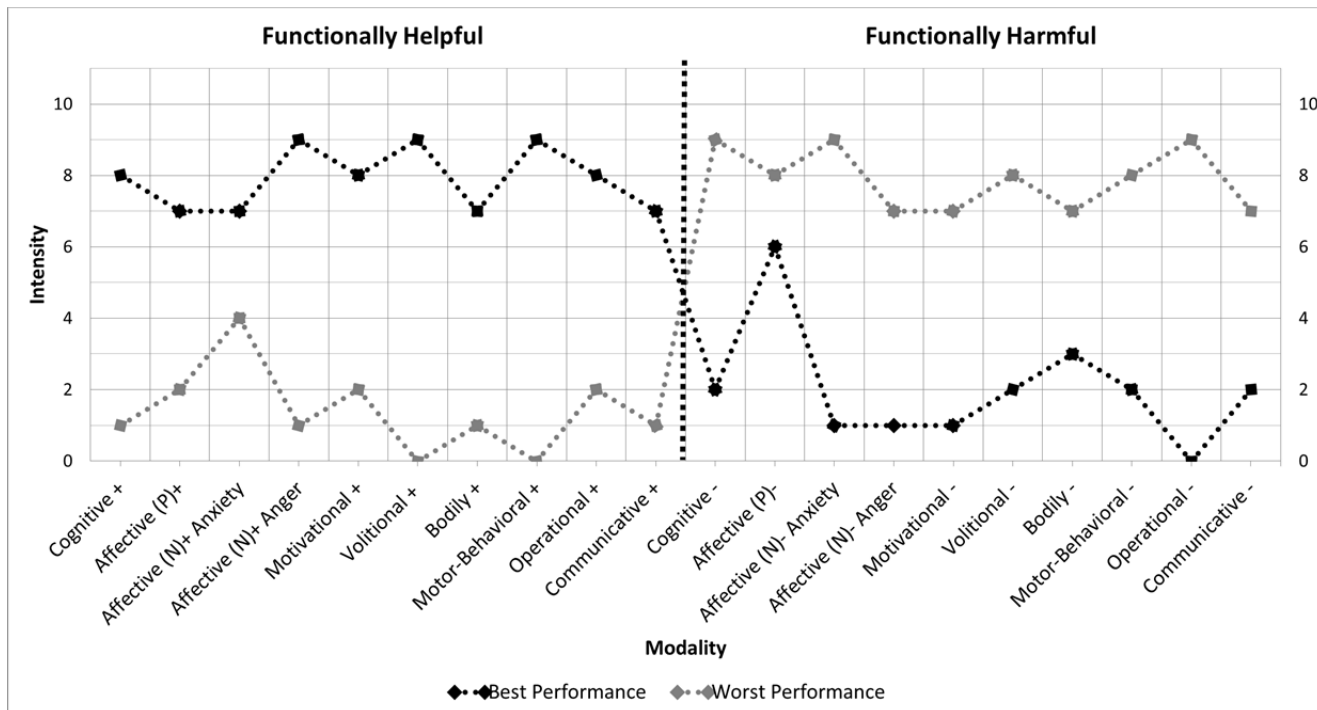


Figure 1

As seen in Figure 1, best performance is characterized by increased intensities of helpful modalities and decreased intensities of harmful modalities. However, the opposite holds true for worst performance, characterized by lower intensities of helpful modalities and higher intensities of harmful modalities. Figure 2 shows an individual profile related to recalled most successful and unsuccessful performances in kumite from an elite karateka.

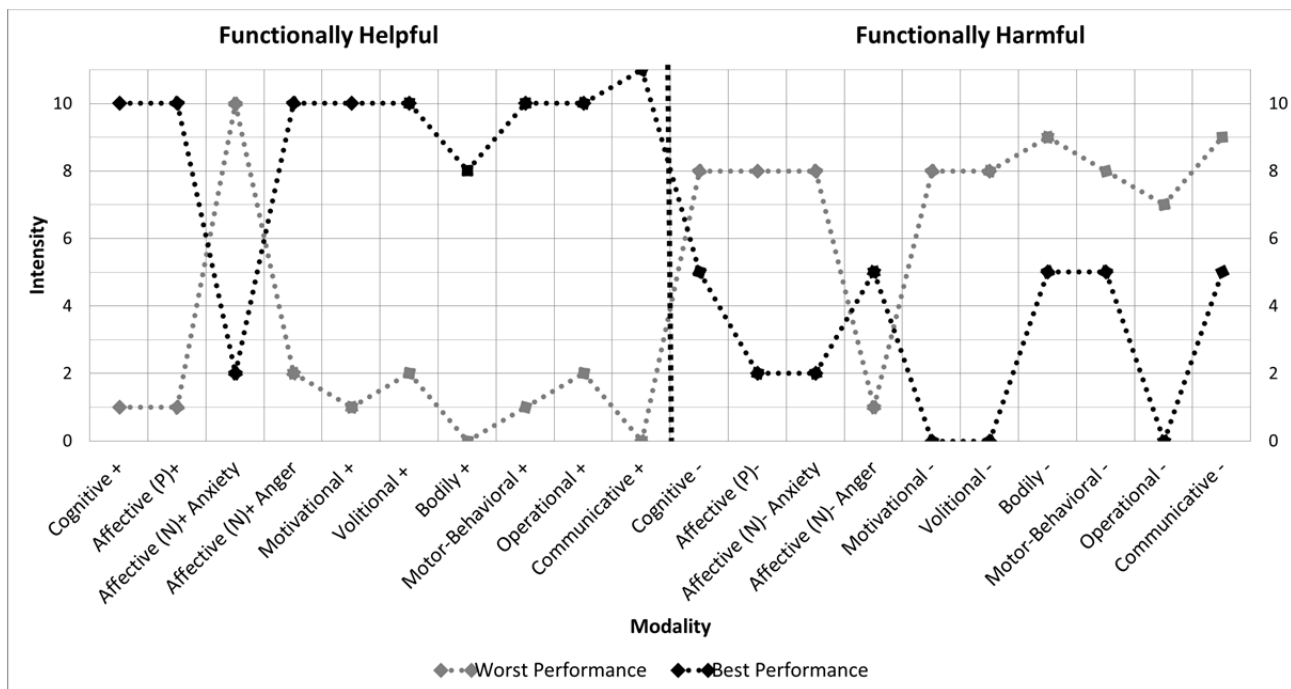


Figure 2

In this case, best performance is still characterized by higher intensities of helpful modalities and worst performance by higher intensities of harmful modalities. However, a lower intensity of the helpful affective (N+) anxiety modality and increased intensity of the harmful affective (N-) anxiety modality, in comparison to worst performance, can be observed. The impact on performance ratings elicited from the athlete show that, for this participant, increased affective (N-) anxiety intensity is helpful to performance (2) and decreased affective (N+) anxiety intensity is harmful to performance (-2). So, while the profile appears dysfunctional within those modalities, the impact ratings given by the participant provides insight into as to why a good and poor performance was experienced, respectively.

Recalled performance experiences were then compared to actual performance. As Figure 3 below shows, a recalled state of good kata performance is congruent with an actual good performance state.

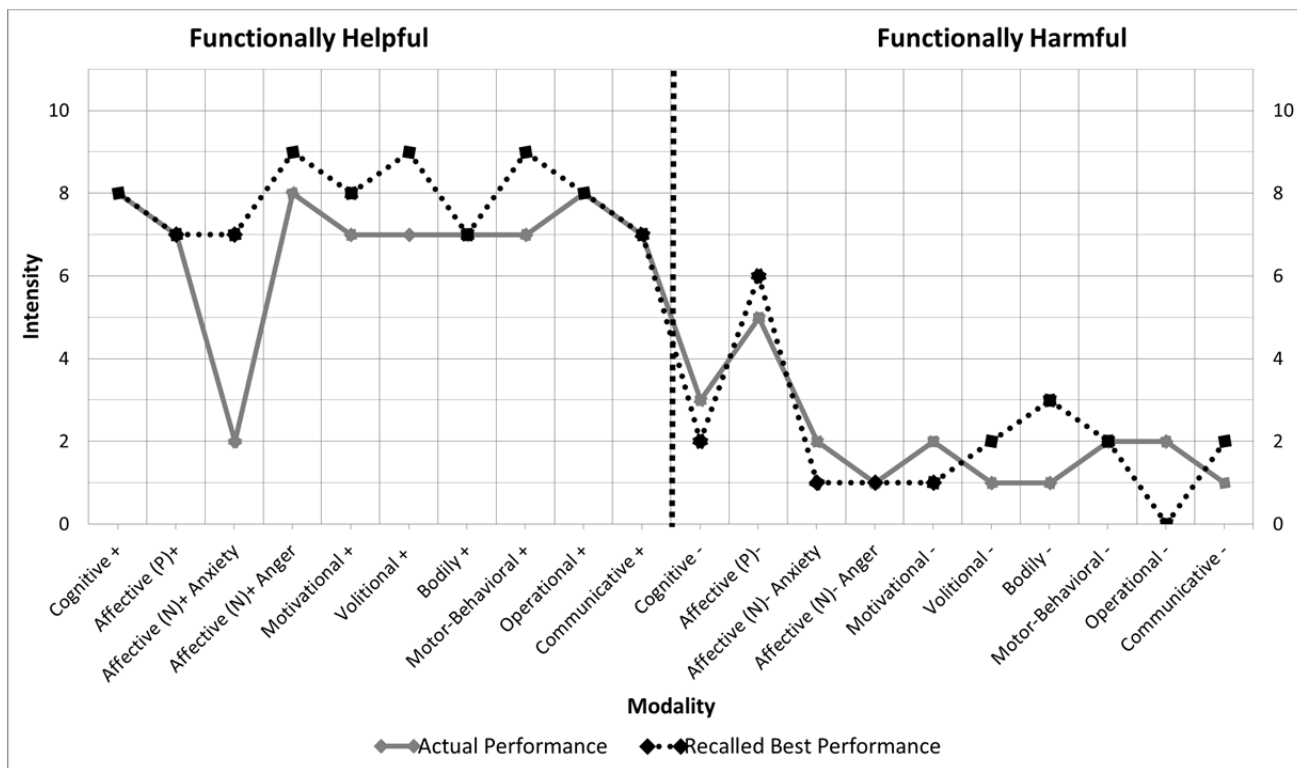


Figure 3

The only rather noticeable difference between recalled best and actual performance can be seen in the affective (N+) anxiety category, which was coupled with an impact rating of 2. In this situation, a low intensity was facilitative. Figure 4 shows a recalled unsuccessful performance plotted against an actual average performance.

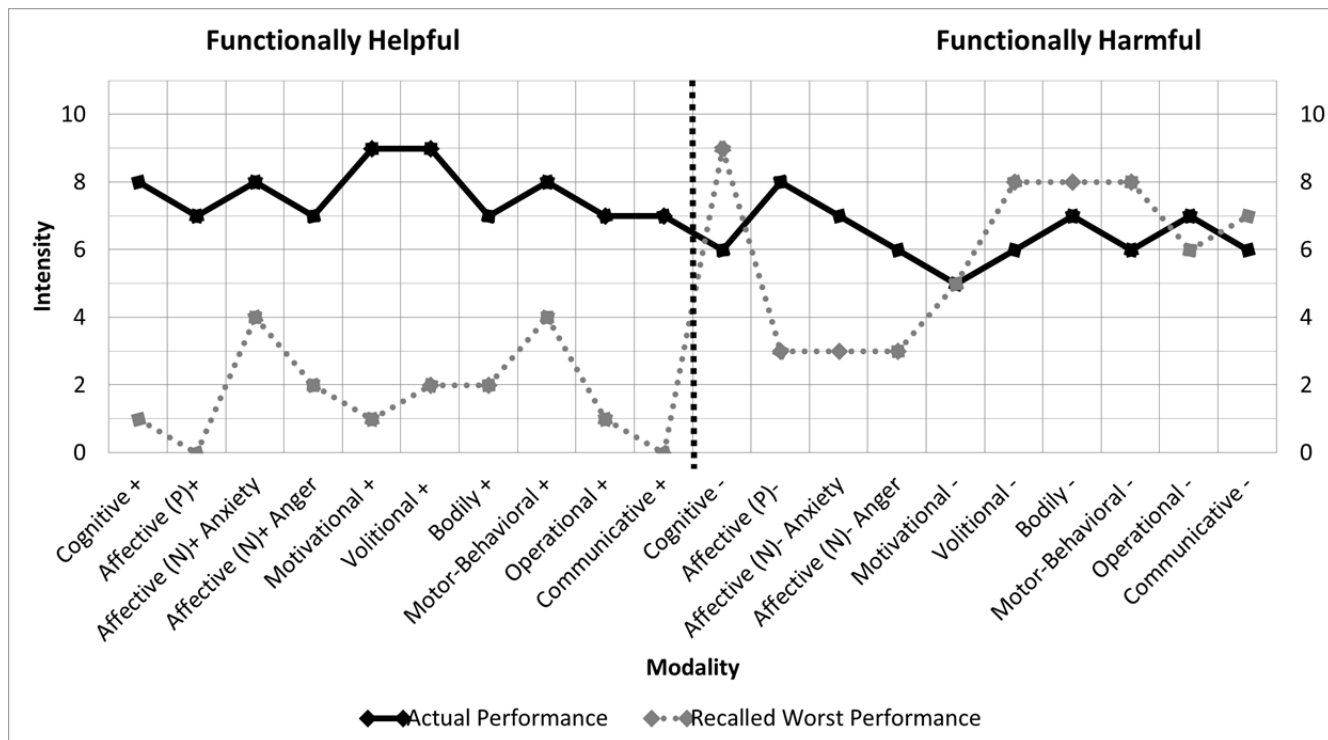


Figure 4

Though the participant experienced high intensities of functionally helpful emotions and non-emotions, the participant concurrently experienced high intensities of functionally harmful emotions and non-emotions. Thus, a less than average performance ensued.

5.3 ESP-40

An example profile borne from the *ESP-40* data can be seen below in Figure 5. Here, an “optimal positive” profile is depicted, where $N^- < N^+ < P^+ < P^-$. The recalled and actual performances all refer to kumite.

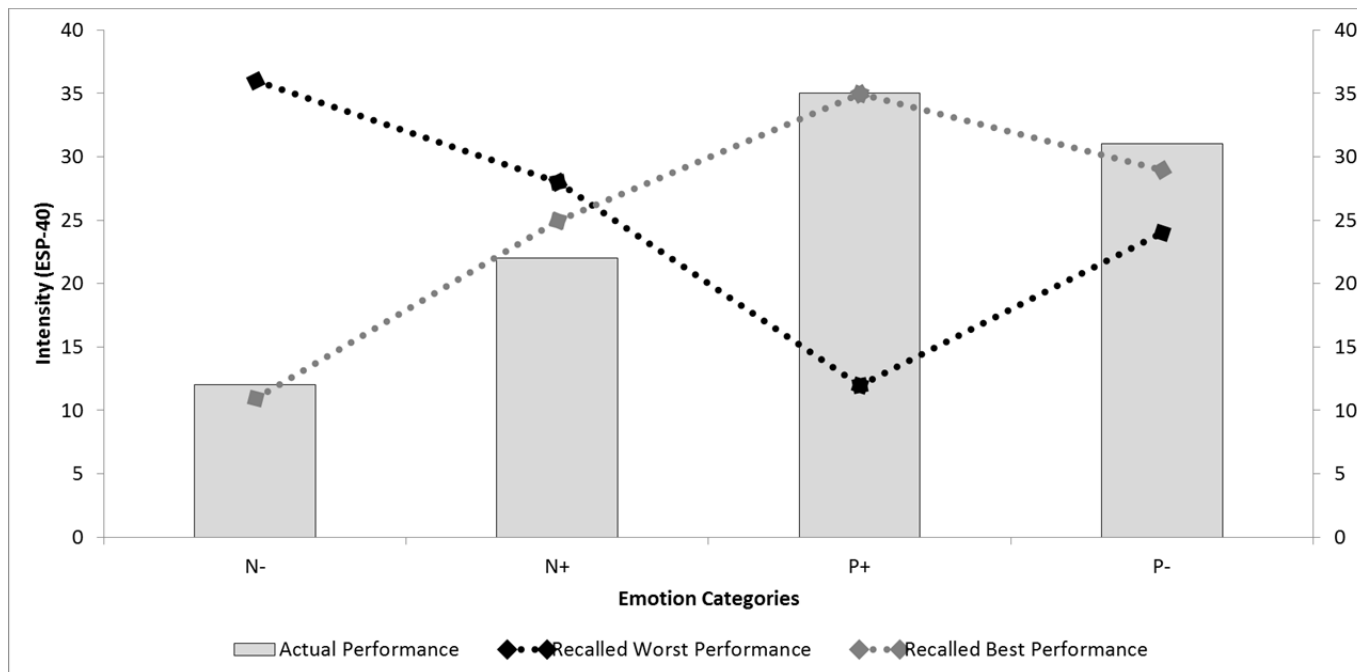


Figure 5

Much like the profiles birthed from the *PBS-20* questionnaire, best performance is characterized by increased intensities of positively and negatively toned helpful emotions; in contrast, worst performance is characterized by increased intensities of negatively toned harmful emotions, and decreased intensities of positively toned helpful emotions. The gray bars representing an actual kumite performance are congruent with the recall of best performance. Other profiles of recalled performances created from the *ESP-40* questionnaire resemble the structure in Figure 6, where $N- < N+ < P+ < P-$ “optimal positive”.

5.4 Athlete vs. Coach Performance Ratings

A significant difference was found between the athlete ratings ($M = 2.88$, $SD = 0.89$) and coach ratings ($M = 3.18$, $SD = 0.74$), $t(134) = -3.83$, $p = 0.00$. That is, performance ratings elicited from the coach were higher than the subjective performance ratings from the karateka.

A significant difference between performance ratings from the karateka and coach was found only for two of the nine performances, $t(15) = -5.75, p = 0.00$ and $t(15) = -4.47, p = 0.00$. In both cases, the performance was kumite and the coach's ratings ($M = 3.81, SD = 0.40; M = 3.00, SD = 0.73$) were higher than the subjective athlete ratings ($M = 3.13, SD = 0.62; M = 2.00, SD = 0.89$), respectively. Figure 6 below shows an example comparison of athlete and coach ratings.

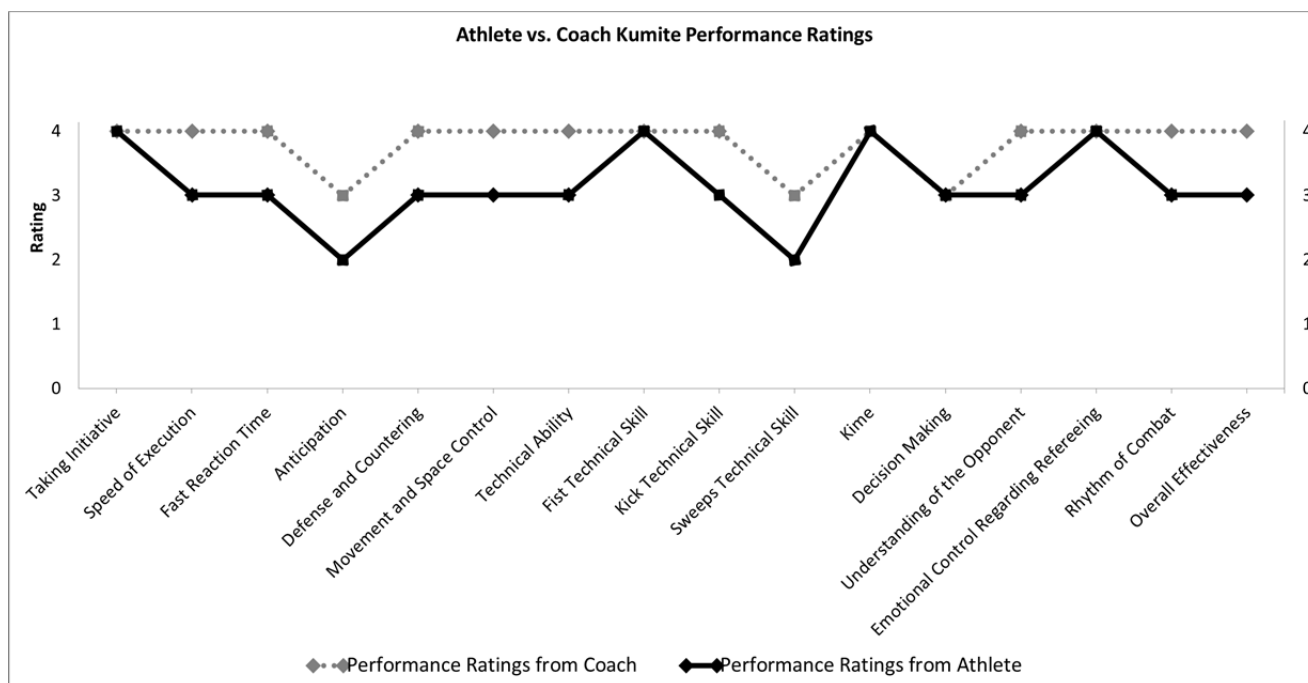


Figure 6

5.5 Group Level Analysis

At the group level, a large variability in descriptor intensities was found between best and worst performances. Means of the intensities of the descriptors chosen for best performances can be seen below in Figure 7.

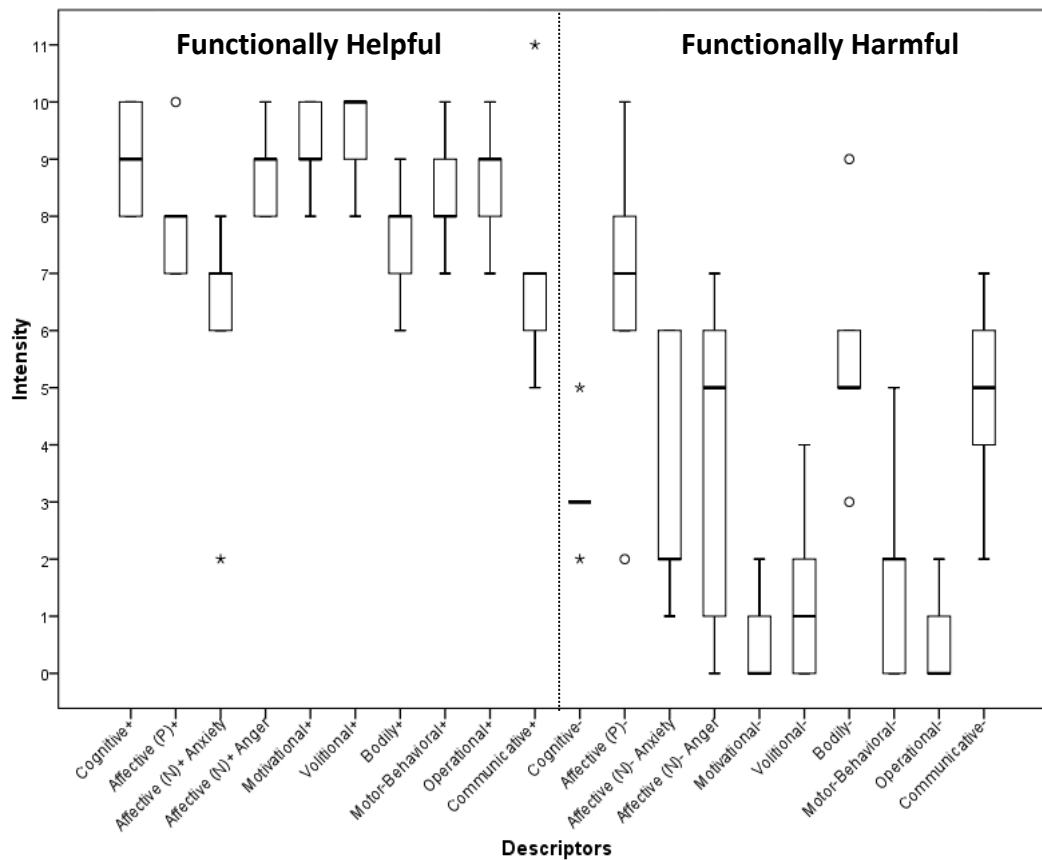


Figure 7

Regarding best performances, intensities were higher for functionally helpful states than functionally harmful states. Increased variability was found within functionally harmful descriptors, specifically in the affective (N-) anger ($M = 3.80$, $SD = 3.11$) and the affective (P-) ($M = 6.60$, $SD = 2.97$) modalities. Concerning functionally helpful descriptors, increased variability was found within the affective (N+) anxiety ($M = 6.00$, $SD = 2.35$) and the communicative ($M = 7.20$, $SD = 2.28$) modalities.

Regarding worst performances, intensities were higher for functionally harmful states than functionally helpful states. Means of the intensities of the descriptors chosen for best performances can be seen below in Figure 8.

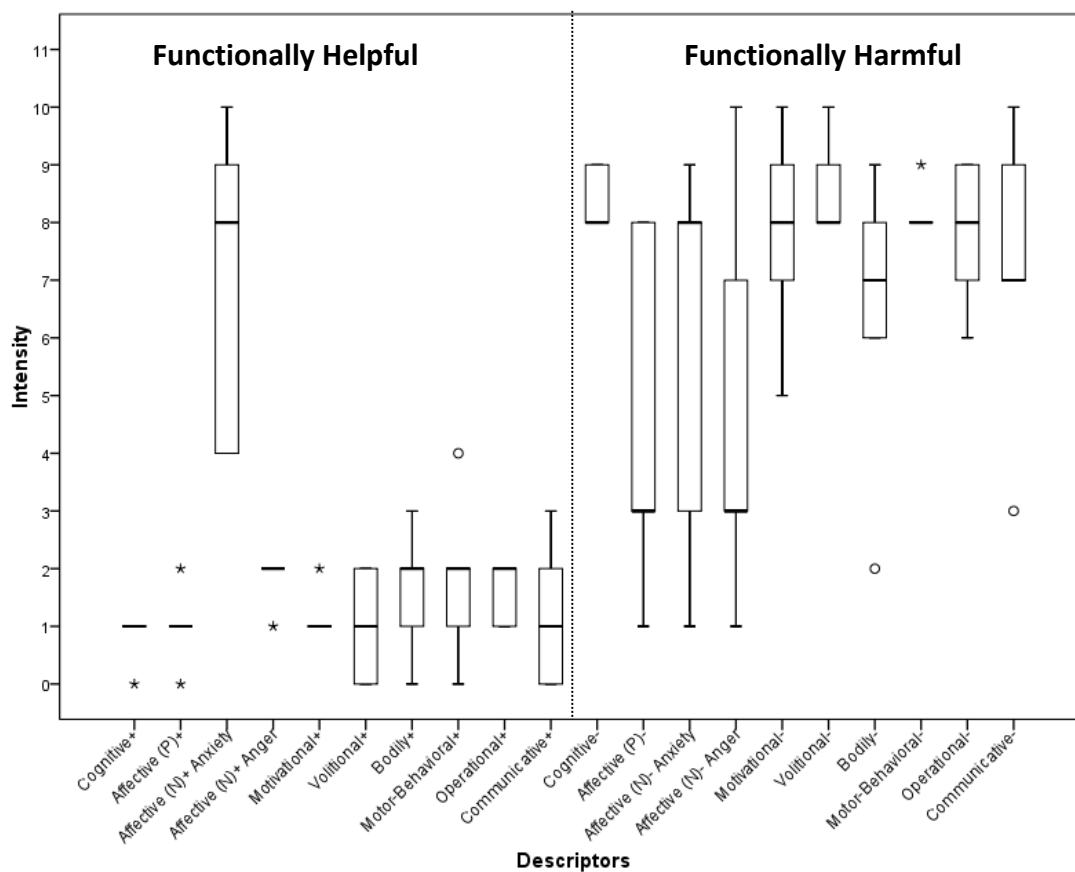


Figure 8

Increased variability was found within functionally harmful descriptors, specifically in the affective (N-) anger modality ($M = 4.80$, $SD = 3.63$) and the affective (N-) anxiety modality ($M = 5.80$, $SD = 3.56$). Concerning functionally helpful descriptors, increased variability was found within the affective (N+) anxiety ($M = 7.00$, $SD = 2.83$) and motor-behavioral ($M = 1.80$, $SD = 1.48$) modalities.

6 DISCUSSION

The study examined athletes' experiences prior to most successful and unsuccessful performances. Experiences prior to actual performances were also measured. In addition performance was also assessed by athletes and their coaches. The findings suggest that the *PBS-20* scale can be used effectively in individualized multi-modal profiling of emotional and non-emotional experiences. Further, the findings suggest that the *PBS-20* is a more sensitive instrument than the *ESP-40*, detecting and identifying more idiosyncratic differences in emotional and non-emotional states during performance. Simply put, the *ESP-40* does not take into account non-emotions involved in performance-related states and is thus a disadvantage to the usefulness of the scale. However, both scales showed that best performance is characterized by high intensities of helpful descriptors and low intensities of harmful descriptors; conversely, worst performance is characterized by high intensities of harmful descriptors and low intensities of helpful descriptors. This was expected and is in line previous literature in emotional and non-emotional states in performance (Robazza et al., 2004; Ruiz & Hanin, 2011). Further, it was shown that modal intensities prior to actual above average performance neared intensities recalled during best performance, while modal intensities prior to average performance were further distant from intensities recalled during best performance. This is in line with the in/out zone of functioning (Hanin, 1997, 2000c).

6.1 Coach vs. Athlete Ratings of Performance

The results show that coach's ratings of athletes' performances were generally higher than those elicited from the athlete themselves. This suggests that, in this situation, a performer is

harder on themselves than the coach and thus feels worse about their performance compared to an outside source. Interestingly, two significant differences in athlete and coach ratings stemmed from kumite, or fighting, performance. This can be explained through the fact that there are more uncontrollable variables during kumite (e.g., opponent ability, referee judgement) than during kata. In kata, which focuses on form, there is a highly specific sequence of movements that one practices and replicates; since the performance can be compared to a previously established template known deeply by both the coach and the athlete, judgements should be increasingly similar. However, during kumite, the coach and the athlete may hold differing judgments of performance, since there is nothing to compare the performance to—one must openly judge what they felt went good and what went bad. So, kata performance is simply more standardized than kumite performance.

It should be further noted that different coaches with different coaching philosophies could yield different results than shown above. In this instance, this was the first serious international tournament for many of the team members and being the only team from North America, there were rather minimal expectations for the karate athletes. Moreover, the competition was framed as an experience-builder for the team. It could be the case that the coach in the current study was simply proud and satisfied with his athletes' performance, regardless of outcome, and thus rated their performance higher than the athletes themselves.

6.2 Idiosyncratic Nature of Emotions and Non-Emotions

During best performance, the most variability was found within the affective anger and anxiety modalities, regardless of valence. For one athlete, being increasingly nervous may be helpful, acting as a signal that an important performance is approaching; likewise, in a combat

sport like karate, being angry may also be helpful to performance for one, but debilitating to another (Ruiz & Hanin, 2004). This is another testament to the effective individualized multi-modal profiling of the *PBS-20*. It is also interesting to note the increased variance within the *communicative* modality. Again, this can be interpreted through the directionality of communication prior to performance. For instance, one athlete may choose to be social before a performance, causing them to feel relaxed and fluid before commencing; however, another athlete may choose to be uncommunicative and quiet before a performance, allowing them to focus and concentrate on the performance at hand.

For worst performances, again the most variability was found within the affective anger and anxiety modalities, regardless of valence, and can be explained above. Among helpful descriptors, a large amount of variance was found within the motor-behavioural category. This can be explained in two ways: 1) it makes sense if this category is of low intensity during worst performance, since a low rating assumes the athlete is not feeling physically fit and thus a less than good performance ensues, or 2) if an athlete experiences a high intensity of this category during this performance, and thus feels physically good, other harmful modalities of high intensity are undermining the motor-behavioural experience and causing a poor performance. So, in the latter case, differing harmful emotional and non-emotional experiences prior to performance can circumvent helpful physical feelings.

6.3 Limitations, Practical Implications, and Future Work

Among the limitations of the current study is the small sample size. While the athletes compete regionally in Canada throughout the year, the national team comes together for 3 to 5 competitions during the competitive season, depending on funding and location. It should be

noted that there are 14 members on the team in total; however, only 5 members were able attend the competition due to personal reasons. In light of this, alternate and up-and-coming karate athletes were brought to compete but were excluded from the current study (open tryouts for the team occur every two years and this competition acted as viable experience for the amateurs).

Important to discuss is the extension of the current results to the applied field of sport psychology. For example, the awareness of facilitating and debilitating performance states can be enhanced within the athlete; if an athlete better understands the psychological, biological and social factors that positively and negatively affect their personal performance, then measures can be taken to maximize facilitating emotions and non-emotions, and minimize their debilitating counterparts. Further, the applied sport psychologist can intervene and assist in the process of proper preparation. Of course, the goal is to aid the performer in reaching a zone of optimal functioning, while giving them the tools to monitor the dynamics within this zone (Hanin, 2000c).

Future research should investigate the predictive powers of pre-competition emotions and non-emotions identified in the *PBS-20* scale (see Robazza et al., 2004; Terry & Slade, 1995). If an optimal zone can be sketched for an athlete by identifying the emotional and bodily symptoms that accompany that zone (again, through athlete metaexperiences of best and worst performances and/or the direct method), and it is found that an athlete is experiencing the components of this zone prior to competition, then it seems likely that one can predict, with greater probability, that the athlete will perform at an optimal level (Robazza, Bortoli & Hanin, 2004). As was seen in Robazza et al., (2008) using elite swimmers and track and field athletes, retrospective reports of good performance were associated with being in-the-zone prior to competition and reports of poor performance were associated with being out-of-the-zone prior to

competition. So, the literature seems to suggest that one could predict future performance based on pre-competition emotions. Terry and Slade (1995) investigated the correlation between pre-competition psychological states in elite karate athletes and their accompanying performance outcome. Again, the authors administered the Competitive State Anxiety Inventory-2 questionnaire, along with the Profile of Mood States (POMS), 40 minutes before combat. Terry and Slade found that those who exhibited successful performance were high in vigour, anger, and self-confidence, while coincidentally low in tension, depression, fatigue, and anxiety. Since these emotions could account for such a large volume of the variance found in karate performance, the authors concluded that karate performance may be exceptionally mood dependent.

6.4 Conclusion

The purpose of the current study was to explore the performance related experiences of elite Canadian karate athletes, while exploring the relationship between athlete and coach's rating of performance. As expected, it was found that recalled best and actual good performance was characterized by increased intensities facilitating emotions and non-emotions; on the other hand, recalled worst and actual average performance were characterized by increased intensities of debilitating emotions and non-emotions. This lends support for the practical validity of the *PBS-20* scale, while lending further support for the validity of the direct method of performance-related state analysis. The large variation of descriptors chosen amongst the participants lends support for the idiosyncrasy of emotions and optimal functioning (Hanin, 1997; 2000). Moreover, it was found that the coach tended to rate athletic performance higher than those ratings elicited from the athlete themselves. The practical implications for these findings suggest that practitioners should provide interventions and tools that propel athletes to a pre-established zone of optimal functioning.

7 REFERENCES

- Ancient Olympics - First Olympic Games History from Olympia. (n.d.). Retrieved April 6, 2015, from <http://www.olympic.org/ancient-olympic-games>
- Borg, G. (1998). Borg's perceived exertion and pain scales. Leeds, UK: Human Kinetics.
- Cannon, W.B. (1927). "The James-Lange theory of emotions: A critical examination and an alternative theory". *The American Journal of Psychology*, 39, 106–124.
doi:10.2307/1415404
- Cohen, A. B., Tenenbaum, G., & English, R. W. (2006). Emotions and golf performance: An IZOF-based applied sport psychology case study. *Behavior Modification*, 30, 259-280.
- Cottyn, J., De Clercq, D., Crombez, G., & Lenoir, M. (2012). The interaction of functional and dysfunctional emotions during balance beam performance. *Research Quarterly for Exercise and Sport*, 83, 300-307.
- Csikszentmihalyi, M. (1975). *Beyond Boredom and Anxiety: Experiencing Flow in Work and Play*, San Francisco: Jossey-Bass.
- Davis, J. E., & Cox, R. H. (2002). Interpreting direction of anxiety within Hanin's Individual Zone of Optimal Functioning. *Journal of Applied Sport Psychology*, 14, 43–52.
- Diamond, David M.; Adam M. Campbell, Collin R. Park, Joshua Halonen, and Phillip R. Zoladz (2007). The Temporal Dynamics Model of Emotional Memory Processing: A Synthesis on the Neurobiological Basis of Stress-Induced Amnesia, Flashbulb and Traumatic

Memories, and the Yerkes-Dodson Law. *Neural Plasticity* 2007: 60803.

doi:10.1155/2007/60803

Gould, D., & Krane, V. (1992). The arousal-performance relationship: Current status and future directions. In T. Horn (Ed.), *Advances in sport psychology* (pp. 119–141). Champaign, IL: Human Kinetics.

Gould, D., & Udry, E. (1994). Psychological skills for enhancing performance: Arousal regulation strategies. *Medicine and Science in Sports and Exercise*, 26, 83-93.

Hanin, Y. L. (1978). A study of anxiety in sports. In W. F. Straub (Ed.), *Sport psychology: An analysis of athlete behavior* (pp. 236-249). Ithaca, NY: Movement.

Hanin, Y. L. (1997). Emotions and Athletic Performance: Individual Zones of Optimal Functioning Model. *European Yearbook of Sport Psychology*, 1, 29-72.

Hanin, Y. L. (Ed.). (2000). *Emotions in sport*. Champaign, Illinois: Human Kinetics.

Hanin, Y. L. (2000a). Individual zones of optimal functioning (IZOF) model. In Y. L. Hanin (Ed.), *Emotions in sport* (pp. 65-89). Leeds, UK: Human Kinetics.

Hanin, Y. L. (2000b). Successful and poor performance and emotions. In Y. L. Hanin (Ed.), *Emotions in Sport* (pp. 157-187). Leeds, UK: Human Kinetics.

Hanin, Y. L. (2000c). IZOF-based emotion-profiling: Step-wise procedures and forms. In Y. L. Hanin (Ed.), *Emotions in sport* (pp. 303-313). Leeds: Human Kinetics.

- Hanin, Y. L. (2003). Performance related emotional states in sport: A qualitative analysis. Forum: Qualitative Social Research, 4 (1). Retrieved from: <http://www.qualitative-research.net/fqs-texte/1-03/1-03hanin-e.html>
- Hanin, Y.L. (2004). Emotions in Sport: An Individualized Approach. In: C. D. Spielberger (Ed.), *Encyclopedia of Applied Psychology*. Vol. 1 (pp. 739-750). Oxford, UK: Elsevier Academic Press.
- Hanin, Y., & Stambulova, N. B. (2002). Metaphoric description of performance states: An application of the IZOF model. *The Sport Psychologist*, 16, 396-415.
- Hanin, Y. L., & Syrjä, P. (1995). Performance affect in junior ice hockey players: An application of the individual zones of optimal functioning model. *The Sport Psychologist*, 9, 169-187.
- Hanin, Y. & Syrjä, P. (1996). Predicted, actual, and recalled affect in Olympic-level soccer players: Idiographic assessments on individualized scales. *Journal of Sport & Exercise Psychology*, 18, 325-335.
- James, W.; C.G. Lange (1922). *The emotions*. Baltimore: Williams & Wilkins Co.
- Jones, G. and Swain, A.B.J. (1995) Predispositions to experience debilitating and facilitative anxiety in elite and non-elite performers. *The Sport Psychologist* 9, 201-211.
- Jones, G., Swain, A., & Hardy, L. (1993). Intensity and direction dimensions of competitive state anxiety and relationships with performance. *Journal of Sport Sciences*, 11, 533-542.
- Lazarus, R. S. (1991). Progress on a cognitive-motivational-relational theory of emotion. *American Psychologist*, 46, 819-834.

Liebert, R. M., & Morris, L. W. (1967). Cognitive and emotional components of test anxiety: A distinction and some initial data. *Psychological Reports, 20*, 975-97.

Loehr, J. E. (1982). *Athletic excellence: Mental toughness training for sports*. Denver, CO: Forum.

Martens, R., Vealey, R. S., & Burton, D. (1990). *Competitive anxiety in sport*. Champaign, IL: Human Kinetics.

Martens, R., Vealey, R.S., Burton, D., Bump, L., Smith, D.E. (1990b). Development and validation of the Competitive State Anxiety Inventory-2. In R. Martens, R. S. Vealey, & D. Burton (Eds.), *Competitive anxiety in sport* (pp. 117–178) Champaign, IL: Human Kinetics

Mayer, J. D., & Gaschke, Y. N. (1988). The experience and meta-experience of mood. *Journal of Personality and Social Psychology, 55*, 102-111.

Mayer, J. D., & Stevens, A. (1994). An emerging understanding of the reflective (meta-) experience of mood. *Journal of Research in Personality, 28*, 351-373.

McNair, D., Lorr, M., Dropplemen, L. Edits manual: *Profile of mood states*. San Diego: Educational and Industrial Testing Services, 1971.

Ravizza, K. (1977). Peak experiences in sport. *Journal of Humanistic Psychology, 17*(4), 35-40.

Robazza, C. (2006). Emotion in sport: An IZOF perspective. In S. Hanton & S. D. Mellalieu (Eds.), *Literature reviews in sport psychology* (pp. 127-158). New York, NY: Nova Science.

- Robazza, C., Bortoli, L., & Nougier, V. (2000). Performance emotions in an elite archer: A case study. *Journal of Sport Behavior*, *23*, 144-163.
- Robazza, C., Bortoli, L., & Hanin, Y. (2004). Precompetition emotions, bodily symptoms, and task-specific qualities as predictors of performance in high-level karate athletes. *Journal of Applied Sport Psychology*, *15*, 151-165.
- Robazza, C., Pellizzari, M., Bertollo, M., & Hanin, Y. L. (2008). Functional impact of emotions on athletic performance: Comparing the IZOF model and the directional perception approach. *Journal of Sports Sciences*, *26*, 1033-1047.
- Ruiz, M. C., & Hanin, Y. L. (2004). Athletes' self-perceptions of optimal states in karate. *Revista de Psicología del Deporte*, *13*, 229-244.
- Ruiz, M., & Hanin, Y. (2004). Idiosyncratic description of anger states in skilled Spanish karate athlete: An application of the IZOF model. *Revista De Psicología Del Deporte*, *13(1)*, 75-93.
- Ruiz, M. C., Hanin, Y. L., & Robazza, C. (2015). Multimodal assessment of athletes' performance related feeling states: Developing the psychobiosocial states (PBS-S) scale. Submitted.
- Schachter, S., & Singer, J. (1962). Cognitive, Social, and Physiological Determinants of Emotional State. *Psychological Review*, *69*, 379-399.
- Syrjä, P., Hanin, Y. L., & Pesonen, T. (1995). Emotion and performance relationship in soccer players. In R. Vanfraechem-Raway & Y. Vanden Auweele (Eds.), *Proceedings of the*

IXth European Congress on Sport Psychology: Integrating laboratory field studies (Part 1, pp. 191-197). Brussels: Belgian Federation of Sport Psychology.

Syrjä, P., Hanin, Y., & Tarvonen, S. (1995). Emotion and performance relationship in squash and badminton players. In R. Vanfraechem-Raway, & Y. Vanden Auweele (Eds.), *Proceedings of the ninth European congress on sport psychology* (pp. 183–190). Brussels, Belgium: FEPSAC/Belgian Federation of Sport Psychology.

Terry, P. C., & Slade, A. (1995). Discriminant effectiveness of psychological state measures in predicting performance outcome in karate competition. *Perceptual and Motor Skills*, *81*, 275-286.

Watson, D. & Tellegen, A. (1985). Toward a consensual structure of mood. *Psychological Bulletin*, *98*, 219-235.

Woodcock, C. (2011). A multi-method examination of the processes and outcomes of IZOF interventions in competitive sport: implications for program design, delivery, and evaluation (Unpublished doctoral thesis). University of Birmingham, Birmingham, U.K.

Yerkes R.M., & Dodson J.D. (1908). "The relation of strength of stimulus to rapidity of habit formation". *Journal of Comparative Neurology and Psychology*, *18*, 459–482.

APPENDIX A
Subjective/Coach Performance Analysis

Team Member: _____

Instructions: Please use each performance element below to rate your overall performance. The scale is as follows:

0: Unacceptable

1: Poor

2: Satisfactory

3: Good

4: Excellent

For example, if you feel that you were *excellent* at taking the initiative and being offensive during a fight, rate this element as a *4*. If, however, you feel that your speed was *poor* and slow, rate this element as a *1*. Please complete the performance analysis for both kata and kumite. Each set of questionnaires you fill out should have a corresponding subjective performance analysis; that is, if you fill out each questionnaire before every individual performance, each performance should have a corresponding analysis. However, if you only have time to fill out each questionnaire once before a set of three fights, only one performance analysis is needed for those 3 fights.

Kumite Performance Elements:

Taking the initiative (Being offensive)	0	1	2	3	4
Speed of Execution	0	1	2	3	4
Fast Reaction Time	0	1	2	3	4
Anticipation	0	1	2	3	4
Defense and Countering	0	1	2	3	4
Movement and Space Control	0	1	2	3	4
Technical Ability	0	1	2	3	4
Fist Technical Skill	0	1	2	3	4
Kick Technical Skill	0	1	2	3	4
Sweeps Technical Skill	0	1	2	3	4
Good Kime (Focus of power)	0	1	2	3	4
Good Decision Making	0	1	2	3	4
Understanding of the Opponent	0	1	2	3	4
Emotion Control Regarding Refereeing	0	1	2	3	4
Rhythm of Combat	0	1	2	3	4
Overall Effectiveness of Combat	0	1	2	3	4

Comments:

Kata Performance Elements:

Bunkai (Knowledge of Kata)	0	1	2	3	4
Techniques and Applications	0	1	2	3	4
Embusen (Floor pattern of a given kata)	0	1	2	3	4
Transitions (Body movements)	0	1	2	3	4
Timing	0	1	2	3	4
Rhythm	0	1	2	3	4
Balance	0	1	2	3	4
Good Form of the Kata	0	1	2	3	4
Hikite (Retracting arm)	0	1	2	3	4
Kime (Focus of power)	0	1	2	3	4
Ki (energy, determination, attitude)	0	1	2	3	4
Kiai (shout to manifest the ki)	0	1	2	3	4
Concentration	0	1	2	3	4
Zanshin (tension-relaxation state after a technique)	0	1	2	3	4
Overall Technical Ability and Execution	0	1	2	3	4

Comments:

APPENDIX B
CONSENT FORM



**Faculty of Health and Sports Sciences
Department of Sport Psychology**

Lead Researchers Kyler Amsbury
+358 414984265
kyleramsbury@gmail.com

Supervisor Dr. Montse Ruiz
Department of Sports Psychology, University of Jyväskylä
montse.ruiz@jyu.fi

Purpose: The purpose of this research will be to: a) identify pre-competition emotions felt by elite karate athletes (i.e., the Canadian National Wado-Kai Karate Team) leading up to the 2014 Open Karate Championships in Edinburgh, Scotland, b) further identify pre-competition emotions felt by elite karate athletes *immediately* prior to performance, and c) utilize these pre-competition emotions to predict, with greater probability, the likelihood of success in future competition.

Task: Participants will be asked to complete two questionnaires (Psychobiosocial State Scale, PBS-20; Emotional State Profile, ESP-40) on two separate occasions during the week prior to competition, and immediately before (approximately 45-60 minutes) each performance during the 2014 Open Karate Championships. The questionnaires to be completed are designed to identify and explore pre-competition emotions felt by elite athletes. Finally, kata and kumite performance will be self- and coach-evaluated using a karate-specific action repertoire scale.

Confidentiality: All the information will be kept confidential, and the data will be stored in a secure office with restricted access. Only the researcher and faculty supervisor mentioned above will have access to this information. Upon completion of this project, all data will be filed and archived, and destroyed after ten years.

Participant's Agreement:

I am aware that my participation in this study is voluntary. If, for any reason, at any time, I wish to withdraw from the study, I may do so without having to give an explanation. I understand the intent and purpose of this research.

I have read the above form, and, with the understanding that I can withdraw at any time, and for whatever

reason, I consent to participate in the current study.

Participant's signature

Place/Date

Interviewer's signature