

# ATHLETES' SELF PERCEPTIONS OF OPTIMAL STATES IN KARATE: AN APPLICATION OF THE IZOF MODEL

Montse C. Ruiz\* and Yuri L. Hanin\*\*

**PALABRAS CLAVE:** Estado óptimo, emoción, meta-experiencia, modelo IZOF, kárate.

**RESUMEN:** El estudio examinó las percepciones sobre los estados óptimos de 63 karatekas españoles de alto nivel. Se utilizaron preguntas abiertas para examinar las experiencias situacionales (estados), los patrones emocionales relativamente estables y las meta-experiencias de los karatekas. Como se esperaba, los estados óptimos estuvieron caracterizados por estados positivos (confianza, tranquilidad), además de negativos (ansiedad, ira). Las descripciones de los karatekas reflejaron los siete componentes de un estado psicobiosocial siendo el afectivo y el cognitivo los componentes más salientes de sus estados óptimos. Los karatekas percibieron sus estados óptimos como transitorios y dinámicos, y utilizaron distintas estrategias para producir y mantener estos estados. Los resultados sugieren que las intervenciones individualizadas no sólo deben limitarse a la reducción de la ansiedad. Se sugieren futuras líneas de investigación e implicaciones prácticas.

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Correspondencia: Yuri L. Hanin, PhD, DSc. Professor and Senior Researcher. Research Institute for Olympic Sports. Research Institute for Olympic Sports. Rautpohjankatu 6, FIN-40700 Jyväskylä, Finland. E-mail: yhanin@kihu.jyu.fi / juri.hanin@kihu.fi

\* Department of Psychology, University of Jyväskylä, Finlandia.

\*\* Research Institute for Olympic Sports, Jyväskylä, Finlandia.

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ABSTRACT: This study examined self-perceptions of optimal states in 63 high-level Spanish karate athletes. Open-ended questions were used to examine athletes' situational experiences (states), relatively stable emotional patterns and meta-experiences. As expected, optimal states were characterized by pleasant (confidence, calmness) and unpleasant (anxiety, anger) emotions. Athletes' self-descriptions reflected all seven form-components of a psycho-biosocial state with affective and cognitive modalities being the most salient components of their optimal states. Athletes perceived their optimal states as temporary and dynamic and actively used different strategies to produce and maintain these states. The results suggest that individualized interventions should not be limited to the reduction of anxiety. Directions for future research and practical implications are suggested.

## Introduction

In the context of sport, being aware of one's optimal state and being able to reproduce it is important for achieving consistent successful performance. Thus an accurate description of such a state is relevant to athletes, coaches, and sport psychologists focused on performance enhancement and consistent excellence. An optimal state is defined as a state that provides the best internal conditions, resulting in total task-involvement and the best possible recruitment and utilization of resources (Hanin, 2000). According to this definition, athletes of different skill levels can experience optimal state.

The notion of an optimal state is not entirely new. For instance, qualitative studies have examined athletes' experiences related to exceptional performances. These include experiences often described metaphorically as *peak* experiences (Privette, 1981, 1982; Ravizza, 1977, 1984), *flow* states (Csikszentmihalyi, 1975, 1990; Jackson, 1996), and *ideal* performance states (Loehr, 1982; Uneståhl, 1986). Peak exceptional experiences, usually reported by athletes as temporary, involuntary, and unique, involve feelings of joy, clear focus leading to total task involvement, and transcendence of the self (Ravizza, 1977). Flow states, as intrinsically enjoyable experiences, are character-

ized by a skill-challenge balance, action awareness merge, clear goals, unambiguous feedback, total concentration on the task, sense of control, loss of self-consciousness, time transformation, and autotelic experience (Csikszentmihalyi, 1975, 1990), and are usually related to peak performances (Jackson, 1996). Finally, an ideal performance state, compared to a hypnotic state (Uneståhl, 1986), is characterized by enjoyment, physical and mental relaxation, low anxiety, high energy, optimism, effortless and automatic performance, alertness, mental focus, self-confidence, and control (Loehr, 1982). Interestingly, all these concepts describe exceptional and mainly positively toned (pleasant and enjoyable) episodes that athletes sometimes experience during performance.

Quantitative studies have examined the relationship between optimal performance and emotions focusing mainly on the intensity of a negatively toned emotion, such as competitive anxiety and arousal. For instance, it was assumed that high intensity of arousal, for well-learned tasks (Hull, 1943) or moderate intensity arousal (Yerkes and Dodson, 1908) was facilitative for performance. Multidimensional approaches have distinguished between cognitive and somatic components of anxiety and attempted to predict performance on the basis of either separate (Martens et al., 1990) or interactive

(Fazey and Hardy, 1988) effects of both components of anxiety on performance.

Other approaches have also examined the effects of positive and negative emotions. For instance, Morgan (1985) using the *Profile of Mood States* (POMS, McNair, Lorr, and Droppleman, 1971) proposed that successful athletes exhibited what he called an iceberg profile characterized by high scores on vigor and low scores on tension, confusion, depression, anger and fatigue. However, all these approaches usually focused on the intensity of arousal and pre-competition anxiety or on emotion (negative or positive) intensity rather than on its content.

Recently, the directionality hypothesis (Jones, 1995; Jones and Swain, 1992, 1995) proposed to go beyond the intensity dimension and to examine the extent to which athletes perceived cognitive and somatic symptoms of anxiety as facilitative or debilitating for performance. According to this hypothesis, one athlete might rate his or her anxiety level as facilitative for performance whereas another athlete might rate his or her anxiety level as debilitating. In other words, the concept of optimality is implied; however, in none of these approaches it has been defined.

As an alternative to nomothetic approaches, the *Individual Zones of Optimal Functioning* (IZOF) model (see Hanin, 1997, 2000, 2003 for a review) was developed to examine individually optimal intensity of competitive anxiety. As applied to anxiety, the IZOF model states that each athlete has an individually optimal level and intensity zone of anxiety (high, moderate, or low) within which the probability of successful performance is high (Hanin 2000). The IZOF model was later extended to the study of positive and negative emotions (Hanin and Syrjä, 1995a, 1995b, 1996), moti-

vational states (Hanin, 1999), and bodily symptoms (Robazza and Bortoli, 2003; Robazza, Bortoli and Hanin, 2004) related to successful and unsuccessful performances. Emotion content is conceptualized within a framework of four global emotion categories that combine global affect (Watson and Tellegen, 1985) and discrete emotion (Lazarus, 2000) approaches. These four global emotion categories are derived from the hedonic tone (pleasant-unpleasant) and functionality (optimal-dysfunctional) distinctions. These categories are pleasant and functionally optimal emotions (P+), unpleasant and functionally optimal emotions (N+), pleasant and dysfunctional emotions (P-), and unpleasant and dysfunctional emotions (N-). These four-category framework provides a robust structure that can accommodate a wide range of individually relevant and task-specific emotions experienced prior to, during, and after successful and poor performances. These performance-induced emotions can be then re-categorized using a discrete emotion approach (Ruiz and Hanin, 2004).

In the IZOF model, emotions are conceptualized as a component of performance-related states. Performance-related experiences, defined as the totality of past and present characteristics making up the particular quality of a person's performance, are reflected in situational states, relatively stable patterns of experience and meta-experiences (Hanin, 2000, 2003, 2004; Hanin and Stambulova, 2004). Mayer and collaborators claim that emotional meta-experiences as the self-knowledge and attitudes about emotional experiences are involved in the evaluation and regulation of emotions (Mayer and Gaschke, 1988; Mayer and Stevens, 1994). According to Mayer and Gaschke (1988), meta-experiences include

cognitions that monitor, evaluate and try to change emotional experiences and which may be directly under the individual's control.

Performance-related states can be described within the framework of at least five interrelated dimensions: form, content, intensity, time, and context. The form, content, and intensity dimensions describe the structure of subjective experiences, whereas the time and context dimensions characterize the dynamics of athletes' subjective experiences. Thus, the concept of optimality relates not only to the intensity (high, moderate or low) or content (i.e., anxiety) dimensions but also to the time, and context dimensions of performance-related states.

Therefore, the purpose of this investigation was to examine an optimal performance state from the perspective of karate athletes, focusing on the content, form, and temporal dimensions of that state. It was hypothesized that optimal states would be different from peak experiences, flow or ideal states. On the basis of the theoretical framework of the IZOF model, an optimal state was expected to include both positive and negative emotions reflecting athletes' idiosyncratic strategies and skills in the recruitment and utilization of their resources (Hanin, 2000). This study also explored athletes' emotional experiences, patterns, and meta-experiences, thereby extending previous research on performance-related states.

## Method

### Subjects

Participants in this study were 63 (41 male, 22 female) Spanish karate athletes competing in kumite (N=43) and kata (N=20). These athletes were divided into three groups. Group 1 contained 29 athletes with a mean age of  $14.7 \pm 1.3$  years and

average sporting experience of  $8.2 \pm 1.1$  years. Group 2 consisted of 12 athletes with a mean age of  $17.6 \pm 1.44$  years and average sporting experience of  $10.17 \pm 2.62$  years. Finally, Group 3 comprised 22 athletes with a mean age of  $19.7 \pm 1.7$  years and average sporting experience of  $13.5 \pm 2.6$ . Athletes in the three groups had achieved good results in major national or international (i.e., European or World Championship) competitions.

To examine athletes' experiences, relatively stable emotional patterns and meta-experiences, three types of open-ended questions proposed by Spradley (1979) for use in ethnographic interviews were used. Descriptive questions elicited information about athletes' experiences (e.g. what is your optimal (helpful) state when you perform your best?). Structural questions asked about athletes' use of their knowledge and / or experiences (e.g. how do you get into this optimal state?). Contrast questions were used to examine similarities-dissimilarities between situations or states (e.g. how is your optimal state different from (or similar to) your usual working state?).

Finally, this study focuses on athletes with impressive sporting experiences; therefore, their self- descriptions had high face validity and credibility (Hanin, 2003; Hanin and Stambulova, 2002).

### Procedure

The participants were contacted during training camps for highly skilled athletes (Group 1 and 2) and at their practice facilities (Group 3). The purpose of the study was explained, volunteer participation was emphasized, and assurances of the confidentiality of the results were given. An informed consent was obtained from the older athletes and coaches in charge of the younger athletes. Athletes in Group 1 were asked to complete 12 open-ended questions related to

their optimal states. Athletes in Groups 2 and 3 were individually interviewed using the same 12 open-ended questions.

### Data Analysis

All interviews were transcribed verbatim. Raw-data themes including themes that captured the same meaning, quotes or paraphrased quotes, were identified for the athletes' written responses and the interview transcripts. Raw-data themes were deductively analyzed using the notion of multiple-form (cognitive, affective, motivational, bodily, kinesthetic, operational and communicative) components of a performance state and the notion of resources recruitment and utilization (Hanin, 1997, 2000, 2003). Hierarchical content analysis was used with raw-data themes related to athletes' barriers to identify patterns of greater generality (Patton, 1990). Consensus at all stages of the analysis was reached by using an independent investigator familiar with qualitative methodology.

All in all, athletes identified 225 independent themes. Cross tabulations of all independent themes were carried out across the three groups. Results revealed that in 204 cases (90.7%) the differences between athletes' responses across the three groups were non significant. Therefore, the results are reported for the entire sample (N=63).

## Results

### Athletes' Optimal Situational Experiences

Table 1 reports athletes' descriptions of their optimal states related to the seven components of performance states. Affective and cognitive components were most frequently reported in athletes' descriptions of their optimal state, representing 33% (for N=63) and 24% of all raw-data themes, respectively. Positively toned states repre-

sented the affective component most often mentioned by the athletes included: feeling confident, certain, optimistic, superior or having fun, feeling euphoric, and happy. As one athlete reported, *«I feel confident... if I am not prepared, and I'm not feeling well, then, I won't do it well, but [in an optimal state] you feel confident ...you feel very good... it's as if you felt superior to the others, and you are there and say wow, I'm very well and you feel the difference between you and your opponent»* (athlete #34) However, athletes' descriptions also included negatively toned states such as being nervous or anxious, and angry. The following quote exemplifies such mixed feelings: *«[in an optimal state] you are nervous, you are angry when you look at your opponent... and I think that how you feel mentally in a combat is 60%...»* (#33)

Being focused was the most often-mentioned theme representing the cognitive component of athletes' descriptions of their optimal states. The following quote exemplifies this characteristic: *«I don't know, when you are there ... you know what the score is, you are aware of almost everything that surrounds you, but it's like a state where you are so focused ... it's as if you weren't there, you know? You don't think... it's as if you were isolated, you don't hear the noise, the people... sometimes this is bad because you don't hear the coach telling you what to do... it's being isolated from the world, only seeing the opponent that you have in front of you»* (#33)

Athletes' descriptions were also related to the operational (16.8%): (fast, good reaction, effective techniques), motivational (10.8%): (willing, eager for victory), bodily (6.9%): (excellent physical conditions, strong), and kinesthetic (6%): (agile, smooth, relaxed muscles) components. In contrast, the communicative component (feel supported) was less often (2.4%) mentioned by the athletes.

Athletes' descriptions	N	Components of a state
focused, not getting distracted	40	Cognitive (24%)
not perceiving tiredness or pain	9	
without negative thoughts or worries	8	
willing to try difficult or different techniques	7	
capable of doing well or winning	6	
clear minded, mentally agile	6	
alert	3	
fearless	1	
motivated, willing, daring, eager	33	Motivational (10.8%)
eager for victory	3	
confident, certain, optimistic, superior	37	Affective (33%)
having fun, euphoric, happy	18	
mentally and physically well	18	
calm, no pressure	14	
comfortable, not forced	8	
nervous, anxious	7	
aggressive, furious	4	
nervous but confident	2	
mistakes do not affect my state	1	
angry and nervous	1	
excellent physical conditions	14	Bodily (6.9%)
strong	8	
at the right weight	1	
agile, smooth, light	9	Kinesthetic (6%)
relaxed muscles	4	
comfortable with own body	2	
tense	2	
feeling the kata	2	
free movements	1	
fast, very good reactions	16	Operational (16.8%)
effective, precise techniques	12	
stronger, more aggressive	8	
performing effortlessly, easy, automatic	8	
in control of distance, combat	4	
many technical resources	3	
doing more difficult techniques	2	
good kata expression, rhythm	2	
attacking more	1	
supported by significant others	7	Communicative (2.4%)
paying attention to coach	1	

Table 1. Athletes' descriptions of their optimal state related to the components of a state.

Athletes' self-perceptions of their optimal states were different from their usual or customary states. Specifically, an optimal state was characterized by higher motivation or attitude (31.7% of 63 athletes), higher concentration (28.6%), and greater confidence (17.5%). Here again, athletes described their optimal states as not always being positively toned but also characterized by negative states such as feelings of anxiety and fury (9.5%) and a more aggressive performance (7.9%) compared to their customary states.

Additionally, athletes used different expressions or labels to describe their optimal states reflecting high readiness. Specifically, 40 (63.5% of 63) athletes used the terms «motivation, going flat out» (N=11), «feeling at 100%» (N=7), «concentration» (N=6), «being tuned» (N=3), «effective» (N=3), «maximum level» (N=2), «maximum performance», «perfection», «highest peak», «ideal or maximum state», «unique», «culminating point», «the most» and «being outside oneself».

### Temporal Patterns of Athletes' Optimal States and Emotional Experiences

Most athletes' perceived their optimal states as transitory and dynamic. Specifically, 41 (65.1% of 63) athletes reported that their optimal state could last as long as a combat or kata (no more than two minutes) or the entire competition. The following quote exemplifies the transitory characteristic of an athlete's optimal state during a competition: «*[an optimal state] lasts the entire competition but after one kata and before the next one, there is break... I breathe, forget everything, and go for the next, it's like a moment of relaxation, in which you free your mind of the good and bad things that come out of the previous kata*» (athlete #47). Other athletes (17.5%)

reported maintaining their optimal states for a few days or even months prior to a competition.

In some cases, athletes' responses reflected their relatively stable repeated emotional patterns. Such emotional patterns mostly concerned experiences of anxiety (72.2% of cases). The following quote serves as an example: «*I am always feeling a little bit tense, well, you are going to feel like this in all competitions even if you don't want to, it's as if your brain is telling you that you are in a competition and there are people looking*», (#50). Another athlete reported «*...you are always going to be nervous, I'm always anxious at the beginning and at the end of a competition, but after having got through the first rounds the anxiety is different... you know that it's working, you're more confident*» (#62).

### Athletes' Meta-Experiences and Regulation of Their Optimal States

Athletes' descriptions also manifested their beliefs and attitudes towards their performance-related emotional experiences. The following quote is an example of an athletes' meta-experience: «*[in a competition] you have to be nervous to get your adrenalin... when I am nervous that means a competition is important*» (#52). Similarly, another athlete reported «*I need to feel a little bit mad, otherwise I relax... it helps me to be more alert, to anticipate what is coming, so I can block all the attacks*» (#60).

Meta-experiences also reflected athletes' awareness of the barriers to, preparation for, and regulation of their optimal states.

**Barriers to Athletes' Optimal Performance States.** Athletes identified different factors as distracting from or impairing their optimal performances (Figure 1). Hierarchical content analysis revealed that the most-

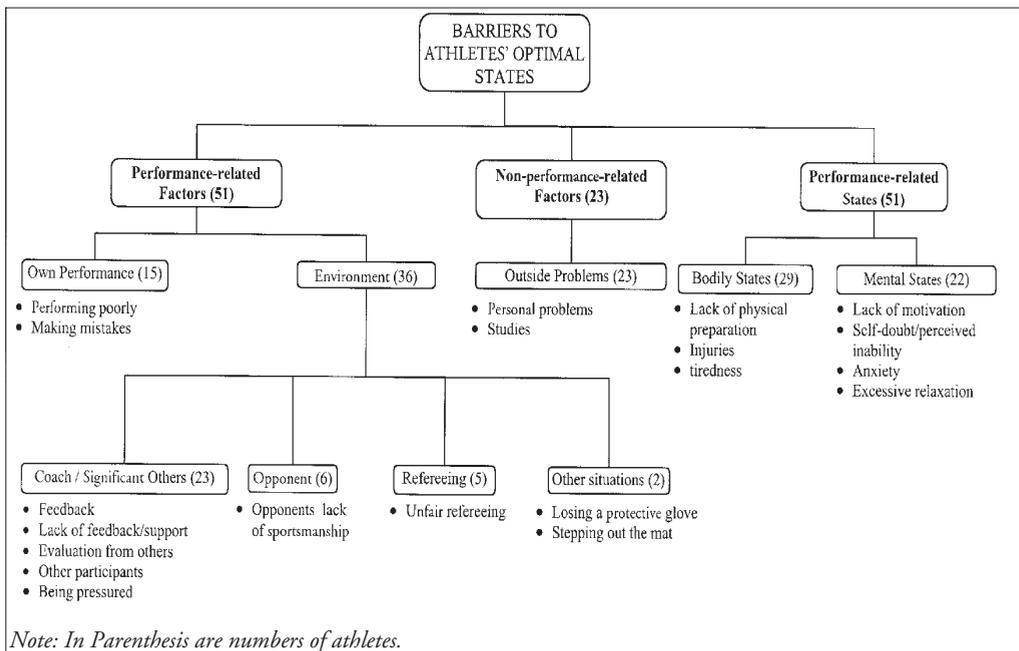


Figure 1. Barriers to athletes optimal states.

often reported barriers to athletes' optimal states included states or factors related to performance. Specifically, performance-related states in this respect included both bodily (e.g. poor physical condition) and mental (e.g. lack of readiness) states. Such states reflected a lack of resources (e.g. physical and mental). Performance-related factors included athletes' own poor performance or other environmental factors contributing to poor performance such as ineffective relationships with their coach or significant others, their opponent, referees, or other events that happened during the competition. These factors were reflected in athletes' poor or ineffective utilization of their resources (e.g. making mistakes). Other external problems (e.g. personal problems) were

also identified by some athletes as barriers to their optimal state.

*Preparation for an Optimal Performance State.* About half of the athletes (47.6% of 63) reported that their preparation for an optimal state prior to a competition included physical, technical and tactical training. Mental preparation consisted of imagining the competition situation (e.g. feelings of tension, anxiety), having a clear idea of what to do, and controlling for excessive anxiety or possible distracters. Athletes' preparation for an optimal state at the competition site included heightening their concentration (27.0% of athletes), practicing specific karate techniques with a partner (20.6%),

increasing their energy or motivation (19%) (e.g., using cue words such as «come on» or talking to the coach), regulating their anxiety (17.5%) (e.g., relaxing, minimizing importance of the competition), enhancing their confidence (12.7%) (e.g., positive thinking), visualization (7.9%) (e.g., mental rehearsal, visualizing a perfect combat), and having a clear picture of what to do (4.8%). For instance, as one athlete reported: *«I start preparing mentally a month before the competition... I know that everything is at stake on the competition day, and maybe in one combat... I practice something different every day ... I work on different techniques and then I prepare myself mentally so I am very focused during the training... for instance, to train specific situations my coach makes me imagine that I'm already in the competition ... if I'm winning or losing, so I learn what to do to control the situation all the time.» #55*

#### *Entering an Optimal Performance State.*

Although being physically well prepared was perceived as a pre-condition of entering one's optimal performance state, athletes actively used different strategies. Such strategies aimed at pre-competitive preparation, heightening feelings of confidence, being focused, increasing motivation, or regulating energy. Most of the athletes' strategies focused on pre-competitive preparation (27.9% of 104 strategies), including a thorough warm-up, imagining effective techniques, recalling other successful performances, or mental rehearsal. Some athletes increased their feelings of confidence (22.1%), for instance, by thinking that they were able to do it. Being focused or avoiding distractions (20.2%), and increasing their motivation (16.3%) were also useful strategies that brought athletes into their optimal states. Finally, athletes reported entering their

optimal states by regulating their energy level (13.5%). Some of these strategies aimed at mobilizing their energy, including feeling aggressive, tense, or psyched up. Such strategies were used by the athletes themselves or, sometimes by coaches who, for instance, encouraged athletes to get angry. Other strategies, such as breathing techniques or calming down, were used to relax.

#### *Re-Entering the Optimal Performance State.*

For most athletes (57.1% of 63 athletes), re-focusing or re-concentrating during a competition and ignoring distracters or problems were the strategies used to re-enter their optimal state when they had lost it. Motivating themselves or psyching up was used by 17.4% of the athletes. Again, in two cases negative states, such as getting angry were used to re-enter the optimal state. Some athletes (9.5%) used positive thinking in attempts to increase their confidence. For other athletes (11.1%), relaxing and breathing techniques were found useful to re-enter their optimal state. The following quote exemplifies the strategies used by a kata athlete to re-enter her optimal state: *«I try to isolate myself, I forget what is happening near me... I focus on what I have to do because there is nobody behind you who can note that you have lost your head for some time, so you have to remind yourself» (#47)*. Similarly, another kata athlete reported, *«when you make a mistake... that always brings you down ... it affects you because you are the first to notice it ...but what you have to do is to forget it as fast as possible and continue, going to the next movement and doing the rest stronger to try to compensate» (#49)*.

*Emotion Regulation.* Athletes found both negative and positive emotions difficult to regulate. Most athletes (89% of 63 athletes)

indicated more often difficulties in the regulation of negative emotions than positive ones. Specifically, athletes perceived it difficult to regulate their anger (40% of 63 athletes), anxiety (34.9%), fear of losing (9.5%), sadness (7.9%), feelings of confidence (7.9%), and disappointment (3.1%). The following comments by one athlete serve as an example: «... for instance, a while ago I was competing for the final and the opponent was at home... and the referee did not give me any points. I felt very angry... that anger was so difficult to control and I even twisted my ankle. While the doctor was coming I talked to my coach ... and eventually calmed down a little and won the combat, but with that anger I felt before, that would have been impossible!» (#56) Sometimes, athletes also perceived positive emotions such as happiness (11%) and pride (1.6%) as difficult to regulate.

Athletes reported 72 situations in which they found difficult to regulate their emotions. Most situations occurred prior to and during (88.9% of 72) a competition. Specifically, prior to a competition, athletes reported finding it difficult or being unable to focus during a warm-up (N=11), feeling too anxious before very important contests (N=11), feeling unable to beat their opponent or to do so well (N=5), feeling unprepared (N=4), feeling pressured by the coach (N=2), and being afraid of losing (N=1). All these situations reflected a lack of resources or a perceived inability to recruit them. During the competition, most of the situations athletes perceived as difficult to regulate were related to ineffective or poor utilization of their resources (15 of 28 situations) (i.e. losing, not being able to score, losing control of a blow). Other situations also included unfair refereeing (N=7) or an opponent's lack of

sportsmanship (N=3). After a competition, athletes also perceived difficulties in controlling situations in which they had lost a combat (N=3), the coach was not satisfied with their work (N=2) or sometimes, situations in which they had actually won an important championship (N=3).

**Dealing with Successful and Poor Performances.** After successful performances, athletes reported positive states such as feeling happy, enthusiastic and nice (31% of 116 themes) or proud of themselves (8.6%). Athletes also reported feeling more willing or motivated to train (18.1%), setting higher goals (13.8%) or even eager to train harder (3.4%). Some athletes said that they tried not to get too enthusiastic about success and manifested their concerns about how difficult it is to stay successful (18.1%). Other athletes even avoided thinking about successful performances or tried to forget them (3.5%). The following quote serves as an example of how one athlete reported dealing with success: «I don't give it too much importance... I think that if you start thinking wow I'm European or World champion you lose your head, you go up into the clouds... I'd better come down again and try to motivate myself... forgetting and giving it the least importance possible... I like to think that I have enjoyed the competition... and go back to the gym to train with my team-mates» (#50). However, sometimes, athletes experienced negative states, such as fear of not being able to maintain their level of achievement or feeling more anxious about the next competition (3.5%).

In contrast, after poor performances, most athletes reported feeling sad (16.6% of 127 cases) or angry with themselves (13.4%). Motivation increased for 27 athletes (42.9%), who reported being eager

to train harder or with more courage. However, eight athletes (12.7%) said they felt unmotivated or felt the need for a break in training. Most athletes' ways of coping with these performances included attempts to accept the results (15.7%) learn from their mistakes (11%) or attempts to forget the results and carry on, not worrying too much or focusing more on positive experiences in their lives (6.3%). The following comments exemplify two athletes' ways of coping with failure: *«you get very down... you think after all that training! ... but you try to overcome it right? ... I avoid doing karate, I try to have fun doing other things, doing other sports... so when you start having fun doing something different, then you forget failure, because that's life, and then you carry on with new energy...»* (#54); *«I like to have some time off, I don't go training, I try to forget... well, if I do badly in a friendly competition then I don't stop, I train harder, but if it is an important competition, then I take a week off, then when you go back, you have forgotten what you did a little»* (#36).

## Discussion

The purpose of this study was to examine athletes' perceptions of their optimal states in the context of karate. All 63 karate athletes were aware of and able to describe their optimal states. This finding lends partial support for the contention that athletes across different skill levels can experience an optimal state (Hanin, 2000). As expected, athletes' descriptions of their optimal states reflected both, positively and negatively toned experiences. Optimal states were mostly described as characterized by high concentration, motivation, high self-confidence, optimism, euphoria, fast reaction, and effective and effortless performance (see Table 1). However, in some cases, optimal

states were also characterised by anxiety or anger. Therefore, the results confirm the hypothesis that the concept of an optimal state is different from the concepts of peak experience (Privette, 1981, 1982; Ravizza, 1977, 1984), flow state (Csikszentmihalyi, 1975, 1990) or ideal performance state (Loehr, 1982; Uneståhl, 1986) in that an optimal state is not limited solely to positively toned experiences. The results are consistent with previous studies on athletes' states related to successful performances in different sports which have found that positive and negative experiences have facilitating and debilitating effects on athletic performance (Hanin and Syrjä, 1995a, 1995b; Robazza, Bortoli, and Nougier, 1998).

Athletes generated different expressions and labels to refer to their optimal states. Such expressions reflected the specifics of an optimal state characterized by high motivation, energy or concentration. The results are consistent with other studies that have found that metaphoric descriptions of athletes' states in their best-ever performances reflected high readiness for action (Hanin and Stambulova, 2002; Ruiz and Hanin, 2004). However, the athletes were not familiar with well-known expressions, such as «in the zone», «in the groove», «in the cocoon» used in English speaking countries.

Athletes' optimal states were perceived as dynamic and transitory in most cases, lasting the length of a combat / kata or the entire competition. These results emphasize the need for the self-regulation, production and maintenance of such states. Findings, revealed that, although a favourable physical or technical condition was perceived as necessary to enter an optimal state, athletes used different self-generated strategies or techniques to regulate such optimal states.

Preparation for an optimal state included strategies aimed at increasing athletes' focus, confidence, the regulation of their energy (mobilization and relaxation), and/or visualization. Athletes also identified strategies that they actively used to enter their optimal states during competitions. Such strategies included pre-competitive preparation, techniques to increase their feelings of confidence, concentration, motivation, and/or energy regulation. Again, negative states such as anger were used sometimes by athletes or coaches to generate additional energy, a finding that accords well in line with a previous study on situational anger on karate performance (Ruiz and Hanin, 2004). These findings provide support for the resources matching hypothesis, according to which an optimal performance reflects a match between the availability and effective utilization of resources and the task demands, while a dysfunctional performance reflects a mismatch between resources (recruitment and utilization) and the task demands (Hanin, 2000, 2003, 2004). On the basis of these results and previous research (Hanin and Syrjä, 1995a; Ruiz and Hanin, 2004) it can be argued that negative optimal states could indicate insufficiency in existing resources and a need to cope with the task demands. Moreover, strong negative emotions such as anger or anxiety actually reflect the recruitment of additional resources in emergency situations, therefore compensating for the apparent lack of complete readiness. These findings suggest that available resources can be categorized as *normal* (providing for standard performance), *spare* (available but not used), and *emergency resources*, which are recruited and used in extremely demanding or «life threatening» situations.

From the research and applied perspectives, we argue that the functionality (optimal or dysfunctional) and hedonic tone

(pleasant or unpleasant) of athletes' experiences should be distinguished and identified separately.

The dynamic nature of situational optimal states was also reflected in athletes' awareness and identification of different barriers negatively affecting their optimal states (Figure 1). Such barriers included factors related to performance, performance-related states, or other non-competition-related problems. The barriers to athletes' optimal states were related to their ineffective recruitment and ineffective utilization of resources. Athletes also perceived a need to re-enter such optimal states. The strategies that athletes actively used to re-enter their states, once out of them, included re-focusing on the task, energy regulation and positive thinking. From the applied perspective, these findings indicate that it is important that athletes are able to enter their optimal states and maintain them during performance until the task at hand is successfully executed. These results accord well with the notion that optimality is multidimensional and can be applied to the dimensions of time or context (Hanin, 2000, 2004). For instance, it can be suggested that what might be optimal for an athlete prior to a competition, might not be optimal during the competition (time), or that what is optimal in training might not be optimal in competitions (context).

This study examined athletes' situational experiences, their relatively stable emotional patterns, and meta-experiences. Although most athletes reflected patterns of anxiety during competitions, the meaning of the situation or such experiences (meta-experiences) were not always perceived in the same way. For instance, experiencing anxiety might be perceived by one athlete as an indicator of the importance of the competition. However, another athlete might experience anxiety «mixed» with feelings of confidence

during the competition perceiving it as facilitating for performance. These results accord well with the notion that the interacting effects of a cluster of positive and negative emotions might be more effective in predicting performance than examining the separate effects of «pure» emotions (Hanin, 2000). Moreover, it can be suggested that approaching the measurement of performance-related states across a wide range of positive and negative emotions at the individual level might contribute more to understanding emotion-performance relationships than using normative scales with «fixed» emotion content.

Thus, this investigation extends previous studies on performance-related states and provides support for the distinction between athletes' situational (currently experienced or anticipated) states, their relatively stable repeated patterns, and their meta-experiences or knowledge about their own experiences (Hanin, 2000; 2003; Hanin and Stambulova, 2004). From the applied perspective, the study of athletes' meta-experiences is especially important in the regulation of emotions, given that such meta-experiences reflect the knowledge, attitudes or personal significance of athletes' emotional experiences (Hanin, 2003; Mayer and Gaschke, 1988; Mayer and Stevens, 1994). Therefore, by identifying athletes' reflections on their experiences, self-knowledge and relatively stable attitudes, sport psychologists and coaches can help athletes to substitute ineffective beliefs or attitudes with more optimal ones. Thus, interventions could focus on the athlete's interpretation of or attitudes about his or her emotions instead of focusing on directly changing the emotions. Future research on the development of such experiences is clearly needed.

Interestingly, athletes' descriptions of their optimal states were manifested in all

seven forms, i.e., cognitive, affective, motivational, somatic, kinesthetic, operational and communicative (Table 1). Affective (confident, euphoric) and cognitive (focused, capable) components were most salient in athletes' descriptions (57% of all themes) while communicative (supported), kinesthetic (relaxed muscles) and bodily (strong) components were the least often mentioned (15.3%). These results are consistent with metaphoric descriptions of athletes' states in their best-ever competitions (Hanin and Stambulova, 2002, Ruiz and Hanin, 2004) where affective and cognitive components emerged as the most salient. Although the present findings do not explain why such cognitive or affective components are more common in athletes' descriptions of their optimal states, we can speculate that coaches or athletes reflect on the importance of affective or cognitive states and that these reflections become part of athletes' vocabularies as well. The specifics of karate, as an individual sport, might also explain the low number of descriptions related to the communicative component. These results provide empirical support for the multimodal description of performance-related states proposed in the IZOF model (Hanin, 1997, 2000, 2003).

These results also indicate that the athletes' descriptions did not only manifest an emotional component alone (33% of all themes), a finding that accords well with a previous study, which revealed athlete-generated non-emotion (i.e., focused, eager, strong) labels describing athletes' states in their best-ever performances (Ruiz and Hanin, 2004). The findings also concur well with other lines of research that have examined specific modalities of performance states such as motivational (Hanin, 1999) or bodily and operational (Robazza and Bortoli, 2003; Robazza, Bortoli and Hanin, 2004)

components. Future research on emotion and non-emotion components of performance-related states is clearly indicated.

This study also examined the emotional experiences and the situations that athletes perceived as most difficult to regulate. Results indicated that athletes' self-generated strategies were sometimes ineffective in regulating negative states such as anger or anxiety. The situations in which emotion regulation was difficult were related to an athlete's lack of resources, inability to recruit resources or the ineffective utilization of resources. Interestingly, those situations were different from the items included in the cognitive anxiety subscale of the Competitive State Anxiety Inventory-2 (CSAI-2; Martens et al, 1990).

Finally, the study explored the consequences of successful and poor performances, and found that athletes' responses to success and failure were individual. Athletes reflected on the difficulties of consistent excellence and staying at the top, and their individual ways of coping with success and failure. The results also revealed that positive emotions might not always be beneficial, having a de-motivating effect after successful performances in some individuals.

These results suggest that intervention programs should be based on each athlete's specific and unique resources and needs rather than been limited to the simple reduction of negative states such as anxiety or anger.

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