CHAPTER 2

Emotions in Sport

Current Issues and Perspectives

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Selected issues and perspectives on pleasant and unpleasant emotions experienced by athletes and how and why these emotions affect athletic performance are reviewed in this chapter. A balanced view of emotion-performance relationships requires an overview of a sequence involving three groups of individual difference variables: defining characteristics of emotional experiences, antecedents of emotional experiences, and consequences of emotions for athletic performance. Kuhl (1994) used such a sequential framework for description of a theory of action and state orientations, whereas Vallerand and Blanchard (2000) proposed an "antecedents-consequences" sequence for an integrative analysis and review of emotion theory and research in sport and exercise.

The chapter is based on an individual-oriented and sport-specific framework grounded in extensive research, the individual zones of optimal functioning (IZOF) model (Hanin, 1995, 1997, 2000). A detailed description of the IZOF model is beyond the scope of this chapter; readers are referred to reviews updating the recent developments of the model (Cerin, Szabo, Hunt, & Williams, 2000; Crocker, Kowalski, Graham, & Kowalski, 2002; Hanin, 2000, 2003, 2004; Raglin & Hanin, 2000; Robazza, 2006; Ruiz, 2004: Woodman & Hardy, 2001). The main emphasis here is on defining characteristics of emotional experiences, their antecedents (determinants), and consequences (outcomes, impact). Finally, directions for future research as well as practical implications are suggested.

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TERMINOLOGY

Terminology issues in emotion research involve attempts to find a more precise definition of emotion (and related affective phenomena) and to provide a detailed description of defining characteristics of emotional experiences. Both aspects are briefly reviewed in the sections that follow.

Defining Emotion

The definition of *emotion* remains ambiguous (Vallerand & Blanchard, 2000). It has even become a common practice to state that it is intuitively clear what emotion is, but difficult or even impossible to define. According to Parkinson (1994), there are several ways of approaching the definition of emotion: (a) by giving examples of items belonging to the category of emotion; (b) by looking at the different aspects and components of emotional experience (Crocker et al., 2002; Vallerand & Blanchard, 2000); and (c) by considering how various aspects combine with one another and how they interact to make an emotion episode what it is, and (d) by relating and contrasting it with other psychological functions. It is also possible to examine the dozens of already suggested definitions of emotion and select the one that best encompasses all or most of the research. However, the problem with such an ideal definition of emotion is that it requires a statement of the necessary and sufficient conditions for application of the term, and that is usually not an easy task (Plutchik, 1980). Therefore,

> an attempt to define emotion is obviously misplaced and doomed to failure. . . . To ask today what is emotion is old-fashioned and likely to lead to semantic hairsplitting; to construct systems that unequivocally explain, predict, and make understandable parts of the range of human experience and

> behavior may, in the long run, be the best or only reply. (Mandler, 1975, pp. 10–11)

Interestingly, in current practice, researchers recognize the fact that there is no perfect term and simply sidestep the search for *the* definition, instead discussing dimensions, categories, and components of emotion (Vallerand & Blanchard, 2000). Additionally, terms describing different affective phenomena (emotion, mood, affect, temperament) are often contrasted (Crocker et al., 2002), although this does not seem to be an effective strategy. Whatever the general definition of emotion proposed, it is important to distinguish among its *defining characteristics, antecedents,* and *consequences* (outcomes). Also important is that "we might start not with the aim of *explaining* emotions but rather with describing a system that has as its product some of the observations that have been called 'emotion' in common language" (Mandler, 1975, p. 4).

This is especially true in sport, as is evident in Martens's (1987, p. 51) comment:

> Sport psychology is theory poor. . . . We have been so eager to test theories of the larger field of psychology in order to confirm our scientific respectability that we have not adequately observed, described, and theorized about our own thing—SPORT. We clearly need to spend more time observing behavior in sport and building our own theories unique to sport.

Unfortunately, this concern remains current in sport psychology research, and a need for an accurate and detailed description of emotional experiences is often underestimated or simply ignored. This results in a premature theoretical speculation in the absence of an adequate database (Hanin, 1997; Raglin & Hanin, 2000). To summarize, one option is to continue a search for a more precise definition of emotion; the other option is to focus on an accurate and detailed description of defining characteristics of emotion and relating it to some specific category.

Emotion as a Category of Experience

Traditionally, emotion as a category is defined as an organized psychophysiological *reaction* to ongoing person-environment (P-E) relationships. For instance, Deci's (1980, p. 85) working definition conveys at least the meaning of emotion:

> An emotion is a reaction to a stimulus event (either actual or imagined). It involves change in the viscera and musculature of the person, is experienced subjectively in characteristic ways, is expressed through such means as facial changes and action tendencies, and may mediate and energize subsequent behaviors.

Another working characterization views emotions as valenced reactions to events, agents, or objects, with their particular nature being determined by the way the eliciting situation is construed (Ortony, Clore, & Collins, 1988). In this approach, there are three broad classes of emotions that result from focusing on one of three salient aspects of the world: events and their consequences, agents and their actions, or objects, pure and simple (p. 13). Finally, a widely accepted proposal of an emotion as a set of stages or a process (Izard, 1977, 1993) was made by Frijda (1986). It includes the following sequence: Appraisal → Context evaluation → Action readiness → Physiological change, expression, action (see Oatley & Jenkins, 1992, for review).

In most cases, the definition of emotion as a reaction captures only one aspect of the P-E interaction. The person's response is related to, but still separate from, the environment. Moreover, a descriptive definition of emotion is somewhat limited because it does not include the causal cognitive, motivational, and rational variables and processes involved in arousing and sustaining an emotion (Lazarus, 2000, p. 230). The cognitive-relational motivational theory of emotion elaborates the notion of P-E interaction as applied to stress-related emotions and later to pleasant and unpleasant emotions.

To study something as an *indivisible unity,* according to Vygotsky (1926/1984), it is necessary to find a construct that appropriately captures the characteristics of both interacting elements. In psychology, *experience* is a relevant construct to study P-E interactions because it reflects a person's attitude toward different aspects of the environment and the meaning of the environment for the person. Experience has a biosocial orientation as every experience is always someone's experience of something and, as such, is best represented as a unit of consciousness. Thus, the analysis of any difficult situation should focus not so much on the situation or on the person per se but on *how this situation is experienced by this person.*

Emotional experience as an indivisible component of total human functioning reflects the nature of past, ongoing, or anticipated P-E interactions. Vygotsky (1926/1984) identified at least three types of P-E interactions: the predominance of an organism over the environment, the P-E balance, and the predominance of the environment over an organism. These notions were applied to performance emotions in sport (Hanin, 1989, 1997), and it was proposed that P-E interactions are best represented by the relationships between task demands and a person's resources (Hanin, 2003, 2004). From this perspective, emotion research in sport should describe, predict, and explain an athlete's optimal and dysfunctional *experiences* accompanying indi-

vidually successful and poor performances. A working definition of experience includes the totality of past and present characteristics that determines the particular quality of a person's performance (Hanin, 2003).

In the sport context, there are three interrelated types of performance-related experiences: *state-like experiences*, or emotional states, as a component of situational, multimodal, and dynamic manifestations of total human functioning; *traitlike experiences*, or relatively stable emotion patterns (emotionality, dispositions, qualities) reflecting a repeated nature of athletic activity; and *meta-experiences* (awareness, attitudes, preferences/rejections of one's experiences; Mayer & Stevens, 1994), which are lessons learned or reflected experiences in successful and less than successful performances (Hanin, 2004).

In contrast to situational states and repeated patterns of experience, meta-experiences reflect how an athlete feels about his or her past, present, or anticipated emotional experiences and the perceived effects of these emotional experiences on performance or general well-being. For instance, an athlete may feel nervous and uncertain prior to a competition. That characterizes his or her situational emotional state as triggered by a specific meaning of the particular situation for this athlete. On the other hand, feeling nervous can be a typical (repeated) pattern of this athlete's emotional response in similar situations. Therefore, in this particular case, trait competitive anxiety would indicate how often the athlete experiences elevated anxiety and feels nervous, tense, or apprehensive prior to or during competition. However, an athlete's meta-experience (attitude to experiencing a high level of competition anxiety and awareness of its helpful or harmful effects on performance) is even more important to estimate. Meta-experiences are formed when athletes (and coaches) spontaneously and deliberately reflect on the conditions leading to their successful, and less than successful, performances. Meta-experiences determine an athlete's perception and a choice of coping and self-regulation strategies, and therefore should be a major target of interventions.

Interestingly, most research in sport psychology during the past 2 decades has focused mainly on situational emotional states (such as competition anxiety) and relatively stable emotion patterns (e.g., trait anxiety). Meta-experiences in sport, although undefined as a separate parameter (Hanin, 2003), were actually implied in the assessment of optimal and dysfunctional zones of emotion intensity (Hanin, 1978, 1986; Hanin & Syrjä, 1995) and in the ratings of "directional" anxiety (or perceived impact) on performance (Jones, 1995). On the other hand, in practice, emotion regulation is often based on reframing an athlete's attitude toward specific emotional experiences. For instance, it is difficult to imagine how an athlete can constructively use high anxiety without a positive attitude and expectation of its helpful effects. In other words, meta-experience adds a special meaning and a new quality to perceived situational state, which is interpreted (or reinterpreted) as facilitating or debilitating. Therefore, the role of meta-experiences as determinants of appraisal and coping processes should be reemphasized, especially in intervention studies. Based on Vygotsky's suggestion, emotion is construed not as a reaction, but as experience (situational and repeated) and meta-experience reflecting the dynamics of P-E interactions.

DEFINING CHARACTERISTICS OF EMOTION EXPERIENCE

A comprehensive analysis and understanding of emotion experiences in sport requires an accurate description of their basic dimensions or defining characteristics. What are these basic (i.e., sufficient and necessary) dimensions? Apparently, emotion experiences are complex phenomena requiring multidimensional characterization.

For decades in emotion research, typical dimensions were *valence* (i.e., hedonic tone) and *intensity*. Both were used in conceptualizing global emotion content (pleasure/displeasure and high and low activation). On the other hand, historically, emotion *components* have been characterized by three parameters derived from measurement methods rather than from the conceptualization of emotion dimensions. These include physiological concomitants, introspective (verbal) self-reports, and behavioral observation (Eysenck, 1975). From this perspective, typical dimensions are emotion intensity, emotion valence, and emotion manifestation as assessed by cognitive labels, bodily response, and behavioral displays (expression or suppression). A need to go beyond these widely accepted dimensions to capture a more complete picture of emotional experiences is clearly indicated (Hanin, 1995, 1997, 2000, 2003). In the sections that follow, a brief description of the five basic dimensions characterizing emotion experiences is provided.

Multidimensionality of Emotion Experiences

An alternative multidimensional approach was proposed in the IZOF model (see Hanin, 1997, 2000, for a review). It was derived from the *method of bases* developed for the systems description of complex phenomena (Ganzen, 1984). In the systems description, a multitude of elements of the object under investigation is contrasted with the elements of the basis (the logical foundation). Ganzen, having analyzed the descriptions of different objects and phenomena, proposed

that "spatiality, time, information and energy were the basic characteristics of any object that typically functions as their integrator" (p. 44). These separate concepts (space, time, energy, information, and a substrate) were suggested as a conceptual basis (pentabasis, or a five-element foundation) to integrate existing concepts and empirical research findings. This descriptive framework makes it possible to (a) examine the completeness of description of the phenomenon, (b) better organize the components, (c) compare different descriptions, and (d) discover the similarity in the objects or phenomena of different natures (pp. 41–42).

This approach has been theoretically substantiated and empirically validated in the systems descriptions of psychological subdisciplines, general characteristics of the nervous system, and the description of human personality and individuality (Ganzen, 1984). In the sports setting, the pentabasis and the idea of systems description were used in the longitudinal study of communication patterns in top sport teams (Hanin, 1980, 1992), in sports career and athlete crisis research (Stambulova, 2000), and in investigations of performance-related emotions (Hanin, 1993, 1995, 1997, 2000).

In its current form, the IZOF model posits five basic dimensions that capture defining characteristics of emotion experience as a component of different psychobiosocial states related to performance (Hanin, 2000, 2003). I argue that emotional experience is always manifested in some *form* (subjectively perceived or observable); it has specific *content* (or quality); it is characterized quantitatively by its *intensity* and as a process that unfolds over *time* (Folkman & Lazarus, 1985) in a particular *context.* Thus, the multilevel and system description of emotion as a component of performance-related states should include at least five interrelated dimensions: form, content, intensity, time, and context. Three of these dimensions (form, content, and intensity) describe the structure and function of the subjective emotional experiences and meta-experiences; time and context characterize dynamics of performers' subjective experiences in a specific social setting. Actually, these five basic dimensions include traditional emotion components (implied form, valence, and intensity) and provide a tool for a systems description of emotional experiences (for more detail, see Hanin, 1997, 2000, 2003, 2004; Robazza, 2006). The following sections focus mainly on emotion form, content, and intensity.

Situational Emotion and Nonemotion Experiences

An athlete's performance state manifests itself in the form dimension, which consists of seven basic components or modalities: cognitive, emotional (affective), motivational, bodily, behavioral, operational (action tendencies), and communicative (see Hanin, 1997, 2000, for a review). From this perspective, situational emotional experience (e.g., anxiety or anger) is a component of the *psychobiosocial state* related to nonemotion components.

Current individual-oriented research focuses on emotional, motivational, and bodily components of performance state and their interactive effects. Recent empirical evidence indicates that to describe performance-related experiences, athletes use their own vocabulary of idiosyncratic labels. However, an athlete's vocabulary describing performance-related states usually includes not only self-generated emotion words but also labels describing nonemotion experiences: cognitive, motivational, bodily, motor-behavioral, operational, and communicative (Hanin, 1997; Hanin & Stambulova, 2002; Ruiz & Hanin, 2004a, 2004b). For instance, Hanin and Stambulova examined emotional experiences prior to, during, and after personally best and worst competitions in 85 skilled Russian athletes using a metaphor-generation method. Each athlete had to complete a sentence, "Prior to my best competition I felt like . . . ," that generated a metaphor (e.g., "I felt like a *tiger*") as a symbolic representation of a feeling state. Completing a paraphrased sentence, "In other words, I felt myself . . . ," elicited an interpretation (e.g., "I felt strong and focused") of an athlete's state as symbolized in the metaphor. Then athletes generated metaphors and interpretative descriptors for competition situations during and after performance. The same procedure was repeated to describe how they felt prior to, during, and after worst-ever competitions. These six situations elicited 510 idiosyncratic and functionally meaningful metaphors and 922 interpretative descriptors. As predicted, metaphors and descriptors reflected high action readiness in best-ever competition and low action readiness in worst-ever competition. Athletes also used different metaphors to describe, symbolically, their experiences prior to, during, and after performance as the meaning of these situations changed. Interestingly, the accompanying idiosyncratic labels described not only emotional experiences but also the multiple connotations of nonemotion components of the psychobiosocial states. Similar findings based on self-generated metaphors and accompanying interpretative descriptors were obtained in studying a sample of top Spanish karate athletes (Ruiz & Hanin, 2004b).

Because emotion, as a concept, remains largely undefined, it is not surprising that distinctions between emotions and nonemotions are sometimes not quite clear, especially in assessments. For instance, an inspection of the 10 global affect scales described by Watson and Telle-

gen (1985) shows that some of the items are "conceptually faulty and would not be considered emotions by appraisal-centered theorists" (Lazarus, 2000, p. 239). In other words, emotion descriptors in existing emotion scales often represent not only "pure" emotions, but also nonemotion components of a state (cognitive, motivational, bodily, and behavioral). Apparently, research-wise, it is important to clearly distinguish among emotion, nonemotion, and borderline modalities of a state (Lazarus, 2000). From the applied perspective, however, a more holistic description of the performance-related state, including emotions and nonemotion experiences, could be equally important and sometimes perhaps even more appropriate.

Recently, Robazza, Bortoli, and Hanin (2004) showed that athletes are well aware of several nonemotion modalities of their performance state (motivational, bodily, sensory-motor, and behavioral). In another study (Hanin, 1999), seven positively toned items (*motivated, willing, desirous, hopeful, keen, daring,* and *interested*) and seven negatively toned descriptors (*unmotivated, unwilling, reluctant, hopeless, bored, compelled,* and *uninterested*) discriminated quite well the motivational states of 29 highly skilled ice hockey players before their successful and less than successful games (see Figure 2.1).

In contrast, motivational domains in this sample had multiple and diverse connotations. Table 2.1 provides a summary of responses of these players to a question about what motivates (and what does not motivate) them before the game.

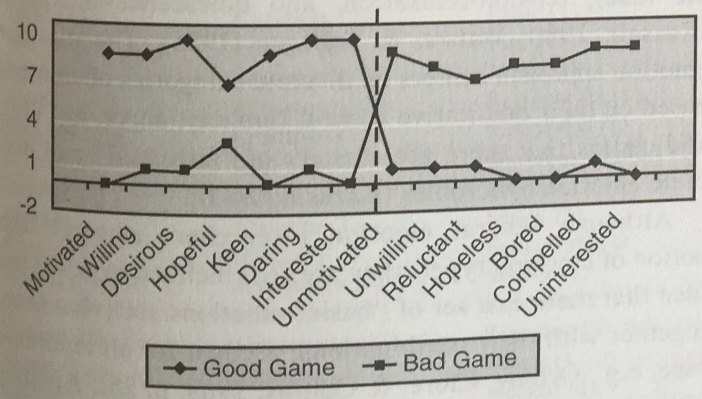


Figure 2.1 Individualized motivational profile of ice hockey players ($N = 29$). Adapted from "Sports-Specific Emotion-Motivational Profiling: An Individualized Assessment Program" (pp. 238–240), by Y. Hanin, in *Psychology of Sport: Enhancing the Quality of Life,* V. Hosek, P. Tilinger, and L. Bilek (Eds.), 1999, proceedings of the 10th European Congress of Sport Psychology: Part 1, Prague, Czech Republic: Charles University Press. Adapted with permission.

Table 2.1 Enhancing and Detrimental Motivational Domains for Ice Hockey Players

Enhancing Motivational Domains

"I'm motivated if . . . "

Focus on:
- Winning
- Fighting
- Doing my best
- Learning

Ice hockey:
- My serious hobby
- My future profession
- My life

Feeling state:
- Self-confident
- Trust myself
- Enjoying the game
- Psyched up

Opponent:
- Tough
- Good
- Strong

Our game:
- Important
- Challenging
- Tough
- Well started

Own team:
- I play for my team
- I work for team's success
- Good climate in the team

Detrimental Motivational Domains

"I'm not motivated if . . . "

Preparation:
- Insufficient recovery
- Poor shape
- Poor planning

Outside sport:
- Family
- School
- Other concerns

Feeling state:
- Too tired
- Health problems
- Dissatisfied
- Too satisfied

Opponent:
- Too easy
- Clearly weaker

Our game:
- Too easy
- "Meaningless"
- Nothing works
- Clearly lost
- Bad start

Own team:
- Repeated losses
- Poor team climate

Note: $N = 29$ Finnish ice hockey players.

Adapted from *Emotions in Hockey,* by Y. L. Hanin, May 2000, paper presented at the IIHF International Coaching Symposium: Building a Hockey Base for the 21st Century, St. Petersburg, Russia. Adapted with permission.

Numerous athlete-generated bodily descriptors are examples of another component in the form dimension. These idiosyncratic bodily labels included different experiences located in face, legs/feet, arms/hands, neck/shoulders, and stomach (see Table 2.2). Also mentioned were characteristics of movements, heart rate, and feeling thirsty, hungry, cold, and pain (Robazza, Bortoli, et al., 2004). Interestingly, these symptoms are more diverse compared to researcher-generated items, for instance, in the Competitive State Anxiety Inventory (CSAI-2). Future research might identify idiosyncratic bodily descriptors of different emotional experiences related to successful and poor performances across different sports and groups of athletes.

Although "reading the players" is an important social psychological skill for a coach, especially in team sports, behavioral indicators of specific emotional experiences have not yet become a focus of systematic studies in sport psychology. Several attempts to examine this modality suggest that coaches and athletes are well aware of the behavioral symptoms of certain emotions. For instance, in an unpublished

Table 2.2 Idiosyncratic Bodily Experiences

Face	*Legs/feet*	*Arms/hands*	*Neck/shoulders*	*Stomach*
• Tense/relaxed	• Tense	• Tense/relaxed	• Tense	• Tense
• Nervous tics	• Loose	• Sweaty/cold		
• Yawns	• Cold			
• Dry mouth				
Movements	*Heart rate*	*Feeling*	*Pain*	
• Energetic	• Perceived	• Fresh	• Physical pain	
• Vigorous	• Irregular	• Thirsty	• Headache	
• Sharp	• Accelerated	• Hungry/no appetite	• Back pain	
• Smooth		• Exhausted/tired	• Stomachache	
• Slow		• Cold/warm	• Lack of pain	
• Stiff		• Sweating		
		• Urinary pressure		
		• Lightness		

Adapted from *Emotions in Hockey* by Y. L. Hanin, May 2000, paper presented at the IIHF International Coaching Symposium: Building a Hockey Base for the 21st Century, St. Petersburg, Russia; and "Pre-Competition Emotions, Bodily Symptoms, and Task-Specific Qualities as Predictors of Performance in High-Level Karate Athletes," by L. C. Robazza, Y. Bortoli, and Hanin, 2004, *Journal of Applied Sport Psychology, 16*(2), pp. 151–165. Adapted with permission.

exploratory study, Hanin (2005) asked 16 ice hockey coaches to describe behavioral markers of a player who feels self-confident. According to these coaches, such a player

> *looks purposeful, relaxed, calm, certain, focused, determined, happy and willing to go on ice. His body language is active. He stands up tall; his nose is not facing the ground; his voice is very sure; he radiates energy; he smiles and talks but stays focused; he looks forward to the situation; he enjoys playing (expressive movements); he makes eye contact with the coach and does not rush.* In contrast, a player with low self-confidence prior to the game, is *silent; thinks a lot; wants to be alone; sometimes talks too much to forget the game; tries to relax by laughing; worries a lot; asks when to go on the ice.* [italics added for emphasis]

These coaches were also able to describe, in much detail, observable behaviors of the players who feel high or low anxiety, complacency (satisfaction), and anger. There is clearly a need for development of behaviorally anchored scales enabling controlled observation of athletes' displays (expression or suppression) of emotional experiences prior to, during, and after successful and poor performances. In team sports, the major focus and concern of the coach are the emotional states of the goal keeper and the key players (leaders and subleaders), who affect the emotional dynamics of the entire team.

Emotion Content

Emotion content as a qualitative characteristic includes such general categories of emotional experiences as positive-negative (Russell, Weiss, & Mendelsohn, 1989; Watson & Tellegen, 1985), functionally optimal-dysfunctional (Hanin, 1978, 1993), and facilitating-debilitating (Alpert & Haber, 1960; Jones, 1991, 1995). Therefore, content is one of the basic dimensions in the systematic study of emotional experiences. It is difficult to imagine an emotion without a distinctive content and intensity (Lazarus, 2000). Both quality and intensity determine the functional impact of emotions on performance and well-being.

Two traditional approaches to categorizing emotion content are the *dimensional* (global affect) approach and the *discrete* (basic) emotion approach. The global approach emphasizes pleasantness-unpleasantness (valence or hedonic tone), tension-relaxation, and quiescence-activation (Russell, 1980; Watson & Tellegen, 1985). The discrete emotion approach centers on discrete categories of emotion based on their qualitative content (anxiety, anger, joy, etc.) and claims that there are clusters of "universal" and discrete emotion syndromes (Lazarus, 2000).

Although several emotion researchers embrace the notion of emotion types, they are still inclined to reject the idea that there is a set of "basic" emotions such that they, together with their combinations, account for all emotions (see, e.g., Ortony, Clore, & Collins, 1988, p. 25). Another objection is that any list of basic (discrete) emotions, ranging from 3 (Spinoza) to 6 (Ekman), 10 (Izard), and 15 (Lazarus), remains arguable. Hanin (1999) compared basic emotion labels proposed by 23 investigators representing eight different approaches to emotion research. It was found that, all in all, there were 47 labels of basic emotions.

(with 32 negatively toned and 15 positively toned emotion descriptors). The most selected emotion labels were *fear* (19 researchers), *anger* (18), *sadness* (9), *and disgust* (7); 23 labels were proposed only once, and 10 labels were selected twice (see Table 2.3).

Although any list of discrete emotions is arguable, at least two important aspects were clearly identified by Lazarus (2000). First, the list should include both negatively toned emotions (e.g., anger, anxiety, fright, sadness, guilt, shame, envy, jealousy, disgust) and positively toned emotions (relief, hope, happiness/joy, pride, love, gratitude, compassion). Second, regardless of the exact list, "a primary empirical and theoretical concern is to identify the *most important emotions*, their distinctive characteristics, antecedent causal variables and consequences, and *how they might influence competitive performance* in sports" (Lazarus, 2000, p. 232, italics added).

In competitive and high-achievement sports, the most important emotions are usually personally relevant, task-specific, and functionally helpful or harmful emotions really experienced by athletes. This assumption has received strong empirical support (Hanin, 1997, 2000, 2004; Robazza, 2006) and is based on the notion that "under similar environmental conditions, people perceive themselves differently, think differently, cope differently, and experience and display emotions differently" (Lazarus, 1998, p. 213). Thus, the functional importance of emotional experiences is associated with their goal relevance and with the extent that each athlete is able to perform up to his or her potential using effectively available resources.

In contrast, the usual laboratory study of emotion assumes that if the stimulus conditions are equal for all subjects, then the average of all subjects' responses best represents the group for the variable measured. Implicit in this assumption is the idea of equivalent life and performance histories, which obviously cannot be met in studies with humans. Lacey (1967) has demonstrated that different subjects tend to respond by activating different major physiological response systems, and that within any large group of subjects, several types of responders always exist. Obviously, this is true not only for bodily responses, but also for emotional experiences described by athletes' self-generated idiosyncratic labels (see Hanin, 2000, for a review).

Table 2.3 Basic Emotions: Frequencies of Label Selection

Fear (19)	Anxiety (2)	Pain (1)
Anger (18)	Curiosity (2)	Panic (1)
Sadness (9)	*Elation* (2)	Pity (1)
Disgust (7)	*Enjoyment* (2)	*Pride* (1)
Joy (6)	*Expectancy* (2)	Resignation (1)
Happiness (5)	Loneliness (2)	Sleepiness (1)
Interest (5)	Rage (2)	Sensuous comfort (1)
Surprise (5)	Contempt (2)	Sex-lust (1)
Love (4)	Appetite (1)	Shock (1)
Pleasure (3)	Grief (1)	Subjection (1)
Satisfaction (3)	*Acceptance* (1)	Succor (1)
Shyness (3)	*Amazement* (1)	Tenderness (1)
Distress (3)	Anticipation (1)	Tension (1)
Shame (3)	Boredom (1)	Want (1)
Guilt (2)	Despair (1)	Wonder (1)
Sorrow (2)	*Quiet* (1)	

Note: $N = 23$ researchers. Positively toned emotions are in italics.

Adapted from *Emotions in Hockey* by Y. L. Hanin, May 2000, paper presented at the IIHF International Coaching Symposium: Building a Hockey Base for the 21st Century, St. Petersburg, Russia. Adapted with permission.

Idiosyncratic Emotion Content

To identify person-relevant and functionally important emotional experiences, the IZOF model proposes that athletes use their own vocabulary of self-generated idiosyncratic labels. These self-generated emotion labels describe athletes' subjective pleasant and unpleasant experiences prior to (or during) their successful and poor performances. The implication is that success-related experiences are helpful for (or at least do not disturb) an athlete's performance, whereas failure-related experiences are detrimental (harmful) for individual performance. Although the main emphasis of the IZOF model is on emotion effects on athletic performance, the functionality-dysfunctionality of emotions is not limited to perceived (anticipated) helpful/harmful effects on performance. For instance, the functionality of emotions can be based on anticipated emotion effects on postperformance recovery (Hanin, 2002), performance-induced injuries (Devonport, Lane, & Hanin, 2005; Würth & Hanin, 2005), or an athlete's general well-being (Diener, 2000). Moreover, empirical findings suggest that the functionality of emotions relevant with respect to one criterion, for instance, performance, is not necessarily relevant for other outcomes, such as leisure quality, postinjury recovery, or general well-being in healing or educational settings. In other words, in each particular setting, functionality-dysfunctionality should be clearly specified as a set of intrapersonal, interpersonal, health, or well-being consequences (see Oatley & Jenkins, 1992, for a general discussion of emotion function and dysfunction).

In the IZOF approach developed for the high-achievement setting, emotion content is conceptualized within the framework of two interrelated factors: *hedonic tone*, or valence (pleasure-displeasure), and *performance functionality*

(optimal-dysfunctional effects on performance processes and outcomes). Both factors reflect qualitatively different aspects of emotional experiences related to individually successful and poor performances (Hanin, 1997). Selected idiosyncratic emotion labels are classified into one of the four global emotion categories derived from hedonic tone and performance functionality: pleasant and functionally optimal emotions (P+), unpleasant and functionally optimal emotions (N+), pleasant and dysfunctional emotions (P–), and unpleasant and dysfunctional (N–) emotions. Optimal (P+ and N+) emotional experiences accompany successful performances, whereas dysfunctional (N– and P–) emotional experiences are usually related to poor performance.

These four emotion categories provide an initial structure that is sufficiently broad and robust to generate a pool of idiosyncratic, individually relevant, and task-specific emotions experienced by athletes prior to, during, and after their successful and less than successful performances. It is important that athlete-generated labels describe idiosyncratic and experientially grounded emotions. Moreover, the individualized framework provides an opportunity for athletes to reflect on and report their most significant pleasant and unpleasant emotional experiences related to their individually successful and poor performances. Self-generation of idiosyncratic personally relevant labels, assisted by an emotion stimulus list (Hanin, 1997, 2000, 2003; Robazza & Bortoli, 2003), is a feature that makes the IZOF approach different from both global affect and discrete emotion approaches.

In the individualized approach, the pleasure-displeasure distinction is similar to a global dimensional approach, which, however, does not have the functionality-dysfunctionality distinction. Additionally, the four-category global framework does not limit, in any way, selection of the most appropriate idiosyncratic emotion descriptors. Therefore, athletes reconstruct their performance-related experiences by generating their own idiosyncratic labels. They are not forced to squeeze their unique subjective experiences into researcher-generated descriptors of preselected discrete emotions (anxiety, anger, joy, etc.). Moreover, self-generated labels reflecting an athlete's perspective, when aggregated across athletes and sport events, identify prototype (most often selected) emotional experiences that can be recategorized using a selected discrete emotion framework (Hanin, 2000, 2004; Hanin & Syrjä, 1995; Robazza, 2006; Ruiz & Hanin, 2004a).

It is reasonable to ask about the extent to which the content of athlete-generated emotion labels are similar to (or different from) researcher-generated emotion labels used in existing standardized scales. Conversely, how are self-generated idiosyncratic emotion labels related to the existing lists of discrete emotions? To answer these questions, emotion experiences of individual athletes should be contrasted with standardized group-oriented emotion scales that are currently used to describe how athletes feel before, during, or after performance. The most popular scales developed in nonsport settings are Spielberger, Gorsuch, and Lushene's (1970) State-Trait Anxiety Inventory (STAI), McNair, Lorr, and Droppleman's (1971) Profile of Mood State (POMS), and Watson and Tellegen's (1985) Positive and Negative Affect Schedule (PANAS). Sport-specific scales include Martens, Vealey, and Burton's (1990) CSAI-2 and Smith, Smoll, and Schutz's (1990) Sport Anxiety Scale (SAS).

One problem with most group-oriented scales is that they use a pool of researcher-generated items with "fixed" emotion content (global or discrete). These similar emotion items usually imply the same psychological meaning of emotion descriptors for all athletes. However, in most cases, it is not known to what extent emotion content assessed with the group-oriented scales reflects emotion content really experienced by individual players in their successful and poor performances. Two studies involving 50 skilled soccer players and 46 ice hockey players compared the content of emotion items in STAI, POMS, PANAS, and CSAI-2 scales and individual emotional experiences assessed by athlete-generated labels (Syrjä & Hanin, 1997, 1998). The findings revealed that 80% to 85% of self-generated emotion labels were not included in the selected standardized scales. In other words, the scales with researcher-generated items did not assess 80% to 85% of the emotional content of athletes' performance-related subjective experiences. These findings received additional empirical support in another study involving Spanish elite karate athletes who expressed individual preferences in the selection of idiosyncratic labels describing their anger states of varying intensity (Ruiz & Hanin, 2004a).

In another study (Ruiz & Hanin, 2004b), idiosyncratic emotion labels generated by 16 high-level Spanish karate athletes were compared with the list of 15 discrete emotions proposed by Lazarus (2000). In individualized emotion profiling, these athletes generated 98 idiosyncratic, symbolic, and functionally meaningful metaphors and 167 interpretative labels describing how they felt prior to, during, and after their best and worst performances. As expected, self-generated interpretative emotion descriptors were highly idiosyncratic and context-specific. These self-generated idiosyncratic labels were related to three

pleasant discrete emotions (happiness, pride, and relief) and three stress-related unpleasant emotions (anger, anxiety, and sadness). Additionally, athletes' experiences in worst performance were related to fright and shame. Interestingly, the athletes' self-generated labels had no content overlap with seven other discrete emotions (love, hope, compassion, gratitude, envy, jealousy, and guilt) proposed by Lazarus (1991, 2000). These findings suggest a specificity of emotion content in high-achievement settings, especially if the emphasis is on such extreme and qualitatively different situations as success and failure.

Pure or Mixed Emotions

Systematic assessment of the idiosyncratic emotion content of athletes' experiences provides an answer to the question about pure and mixed emotions. Most of the research in sport psychology during the past decades has focused on selected stress-related emotions, such as anxiety. As a result, the complex picture of actual emotional experience was oversimplified and incomplete at best. Research into pleasant and unpleasant idiosyncratic emotions has made it increasingly clear that in real-life situations, athletes' experiences are better described by mixed rather than pure selected emotions (Diener & Emmons, 1985; Gould & Tuffey, 1996; Hanin, 1997, 2000, 2003; Hanin & Syrjä, 1995; Jones & Hanton, 2001; Morgan, 1984; Plutchik, 1980; Schimmack, 2001).

To illustrate this notion, idiosyncratic emotion labels generated by a junior international-level tennis player describing his emotional experiences prior to, during, and after his best and worst games are presented in Figure 2.2a and 2.2b. Prior to his best-ever game (Figure 2.2a), the player felt high intensity of pleasant optimal emotions (P+): He felt highly *determined, confident, excited, dynamic,* and *comfortable.* He also felt moderately *aggressive, alarmed,* and somewhat *uncertain* (N+) at the same time. Moreover, his unpleasant dysfunctional emotions (N–; *nervous, afraid, worried, and intense*) were of low intensity. This pattern was similar during that game, except that he felt *alert* and *quick* but not too *excited* and had no premature *satisfaction.* In contrast, prior to his worst-ever game (Figure 2.2b), this player felt highly *nervous* and *worried* (N–), and these experiences were even more intense during the game. Interestingly, at the same time, his optimal pleasant emotions prior to and during the game were of moderate and low intensity, respectively. If only the anxiety level in this player in his best and worst games were measured, the entire profile of his emotional experiences and their impact on his performance would be missed.

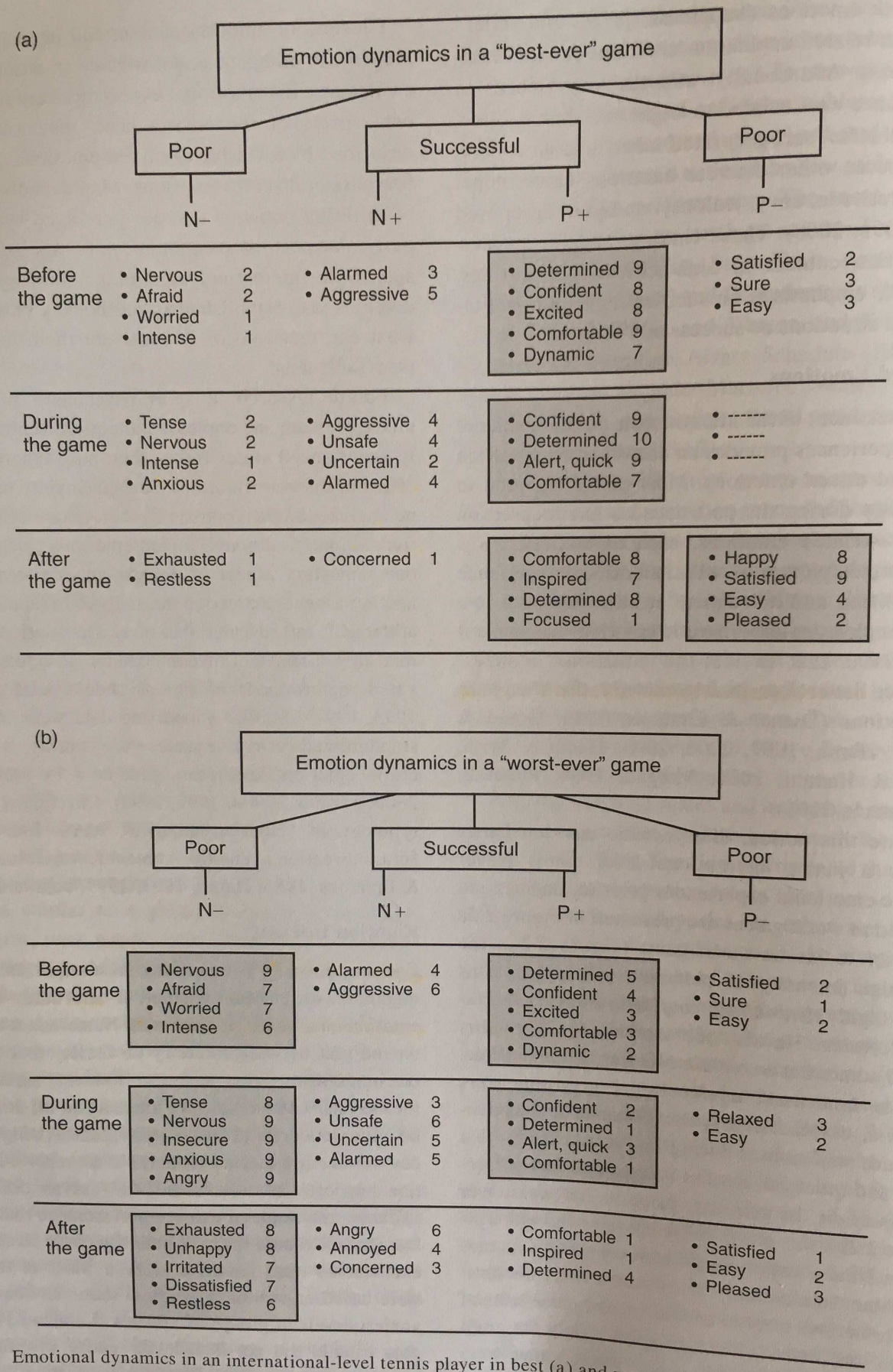
Clusters of emotion content and intensity change from pregame to midgame and postgame situations for this player. Because his emotional experiences are related to different aspects of the environment, they are, again, better described by a cluster of mixed emotions rather than by a few pure or discrete emotions. Mixed emotions reflect a set of different domains that are perceived by an athlete in a particular performance situation or significant events outside sport. Interestingly, a similar mixture of motivational domains was established in ice hockey players describing what can motivate or de-motivate them before the game (see Table 2.1).

Future research in sport psychology should focus on mixed pleasant and unpleasant emotions representing actually experienced states rather than pure emotions. Also, the effect of discrete emotions, such as anxiety or anger, should be analyzed in the context of other, potentially related emotions. Finally, although mixed emotions certainly represent one important aspect of performance-related experiences, another aspect emerged in the analysis of labels generated by athletes. It was revealed that there are emotion mixtures and mixtures of nonemotion components (alert, energized, motivated, determined) of the psychobiosocial state (Hanin, 1993, 1997). Similar supporting data were obtained when standardized normative scales were contrasted with idiosyncratic emotion descriptors generated by athletes (Hanin, 2000; Syrjä & Hanin, 1997, 1998). Developing an empirical typology of "emotion mixture" seems like a promising future direction in emotion content research in sport (Diener & Emmons, 1985; Hanin, 1993, 1997; Schimmack, 2001).

Emotion Intensity

Emotion intensity is one of the most important dimensions; together with emotion content, it determines the effect of emotion on athletic performance. Numerous studies focused on the link between intensity of anxiety and performance outcomes in different athletes. However, assumptions that the optimal level of anxiety intensity in all athletes should be either moderate (U-inverted hypothesis), high (drive theory), or low (quiescence model) did not receive much empirical support. In most cases, the curves describing, for instance, the shape of anxiety-performance relationships in the zero-maximum range of intensity (from sleep to extreme excitement) were tentative at best. Most of these curves were based on two or three cross-sectional comparisons of anxiety levels in groups of athletes (Landers, 1994). These data usually did not include the entire working range of intensity because under laboratory conditions it is quite a challenge to manipulate the intensity level along the entire

(a)



(b)

Figure 2.2 Emotional dynamics in an international-level tennis player in best (a) and worst (b) games. Adapted from "Performance Related Emotional States in Sport: A Qualitative Analysis" [48 paragraphs, Online journal], by Y. L. Hanin, February 2003, *Forum Qualitative Sozialforschung, 4*(1), available from http://www.qualitative-research.net/fqs-texte/1-03/1-03hanin-e.htm. Adapted with permission.

range of intensity. Interestingly, Yerkes and Dodson (1908) were not sure if the levels of intensity of the stimulus used in their experiments with mice were "most favorable."

The problem becomes even more complicated when separate and interactive effects of different components of anxiety, or multiple pleasant and unpleasant emotions, are examined. Applied research and practice in high-achievement sport, however, require a more individualized approach that can predict an individual performance. One strategy to solve the problem was proposed by Hanin (1978, 1995, 1997, 2000), who argued that it is unproductive to focus only on actual anxiety and corresponding levels of performance, matters that are difficult to compare across athletes. For instance, what one athlete would consider a good or even excellent performance could be perceived by another athlete as poor. Therefore, the emphasis should be on analysis of past performance history and estimation of intensity of emotions accompanying individually successful and unsuccessful performances.

Because the "moderate anxiety for all" assumption did not work in practice, a more intraindividual focus and individualized criteria in the evaluation of current anxiety intensity were needed (Hanin, 1978, 1995; Raglin & Hanin, 2000). Several studies have reported the percentage of athletes performing their best when experiencing high, moderate, or low anxiety (see Jokela & Hanin, 1999). The distribution of athletes in these categories was surprisingly well balanced across different studies: high ($M = 34.2$; 26% to 50%), moderate ($M = 34.6$; 22% to 44%), and or low ($M = 35$; 25% to 48%). Moreover, Jokela and Hanin (1999) were unable to identify a single study in their meta-analysis that demonstrated that different athletes had the same (or similar) optimal levels of anxiety.

The individual-oriented strategy proposed by Hanin (1978, 1986, 1989) to predict the effects of anxiety on athletic performance emphasized a need to analyze an athlete's past performance history to identify emotions accompanying individually best performances. The main emphasis in this approach is on predicting individual performance by contrasting, for instance, current anxiety level with the previously established success-related anxiety level (high, moderate, or low). The concept of zones of optimal functioning (ZOF) initially proposed in precompetition anxiety research was a tentative optimal range of intensity scores predicting individually successful performance. Later, the ZOF concept, extended to pleasant and unpleasant emotions, was later termed IZOF (individual zones of optimal functioning) to emphasize the within-individual focus of the model (Hanin, 1995, 1997, 2000).

Probability of successful performance was high when current precompetition anxiety was near or within the previously established individually optimal intensity zones. When precompetition anxiety fell outside the zones (i.e., higher or lower), individual performance usually deteriorated. The interest in individually oriented optimal zones of anxiety intensity reflected the fundamental fact that each athlete has a unique set of resources that are situationally available (or unavailable) for coping with the demands of an environment. Recently, similar results were obtained in studies of optimal and dysfunctional effects of situational anger on athletic performance (Ruiz & Hanin, 2004a, 2004b).

There were several advantages of the individualized approach to precompetition anxiety based on the realities of high-achievement sport and an accurate description. First, the step-by-step methodology for establishing the IZOFs was proposed. Second, an athlete's past performance history was considered, and individually optimal anxiety level and zones were established. Third, testable predictions of individual (and group) performance based on current anxiety and IZOFs were available. Fourth, the approach was empirically tested using different anxiety measures (STAI, CSAI-2, POMS, and the Body Awareness Scale; Koltyn & Morgan, 1997; Wang & Morgan, 1987) across different samples, different sports, and different countries.

Numerous studies provided strong empirical support for the approach and the recall methodology of assessing optimal levels and zones of individually optimal anxiety (Hanin, 1995; Jokela & Hanin, 1999, meta-analysis). However, initially, the IZOF anxiety model focused on precompetition anxiety as a discrete stress-related emotion syndrome with "fixed" emotion content, and the main emphasis in the IZOF anxiety research was on identifying the individually salient intensity of state anxiety (Raglin & Hanin, 2000).

The IZOF notion was proposed as an experience-based, individualized criterion to predict individual performance. The concept was derived from observations of real emotional experiences of athletes that were optimal in individually successful performances. When an athlete's anxiety was out of the optimal zone, his or her performance clearly deteriorated. Empirical findings consistently demonstrated high interindividual variability of optimal precompetition anxiety across different samples of elite and competitive athletes (Hanin, 1978, 1995; Raglin, 1992; Raglin & Hanin, 2000; Raglin & Turner, 1993). Therefore, the IZOF concept became a guiding principle in

the assessment, prediction, and optimization of an individual's performance.

Despite encouraging empirical support for the validity of individual-oriented performance predictions based on the IZOF anxiety hypothesis, many questions arise: Do optimal and dysfunctional intensity levels and zones change during a season? And if they do, how are these changes related to an athlete's available resources and readiness for a competition? Does the accuracy of recall change with an athlete's increased self-awareness? What is the validity and reliability of the empirical method of intensity zone estimation (direct observations)? Can it be used without a recall method? How are the intensity levels and zones related to the optimal and dysfunctional impact of emotion on performance? How and why, for instance, is high anxiety helpful or harmful to individual performance? Finally, how can we enhance the accuracy of intensity zone estimation based either on categorical (either in or out of the optimal zone) or continuous measures along the entire working range of intensity? These and other questions provide directions for future work.

For instance, the empirical (direct) method of estimation of intensity zones consists of repeating actual assessments in several successful and unsuccessful competitions, plotting emotion intensity levels, and evaluating the distribution of optimal intensity scores (Hanin, 2000, p. 164). Traditionally, optimal intensity levels and zones are based on either the mean ±0.5 standard deviation range or on the interquartile range (IQR), which includes the range of scores from the 25th percentile to the 75th percentile. The IQR is one of several interpercentile measures of variability that tell how the middle 50% of the distribution is scattered. The clear disadvantages of the direct assessment method are that it requires many data points, it ignores an athlete's past performance history, and it is usually limited to pre- and postperformance assessments and is cost- and time-ineffective (Hanin, 2000; Raglin & Hanin, 2000). Finally, the direct method, if used without recall of individually best and worst performances, has a very limited and sometimes dubious value in prediction. On the other hand, it is important to explore the accuracy of zone estimation in direct assessments using different methods.

Kamata, Tenenbaum, and Hanin (2002) proposed a probabilistic approach to zone estimation based on frequencies of different performance levels related to corresponding perceived or objective measures of emotion intensity. This exploratory study aimed to improve the categorical approach to zone estimation using two hypothetical cases with 50 and 33 data points, respectively, and laboratory data (105 trial observations) from a single individual (Freeman, 1940). The relationships between reaction time (performance) and palmar skin resistance (anxiety) were examined. To determine the IZOFs and their associated probabilistic curve thresholds, observable performance outcomes were categorized into four levels (poor, moderate, good, and excellent), and then intensity scores were regressed onto the corresponding performance categories using logistic ordinal regression. The regression coefficients were used to establish emotion-related probability curves associated with each performance category. Thus, for each performance category, a range of arousal/affect level was determined so that within this range the probability of performing at this level was higher than in the other performance categories. It was also revealed that the probabilistic method of zone estimation had wider zones than in the traditional method of estimation. Additionally, more correct classifications within the zones and fewer incorrect classifications outside the zones were obtained.

These findings and the subsequent replication studies (Cohen, Tenenbaum, & English, in press; Golden, Tenenbaum, & Kamata, 2004) provide preliminary evidence of how to improve the accuracy of categorical assessments of performance-related emotion zones. These results should be accepted with caution, however, because the Kamata et al. (2002) study used only hypothetical and laboratory data. Again, many questions arise: What is the minimum number of observations in each performance category required to estimate the probability-based zones? This method of estimation of intensity zones requires a large number of direct observations, which is often impractical and ineffective in terms of cost or time. On the other hand, too few observations in a particular performance category (optimal or poor) preclude the possibility of establishing the optimal or dysfunctional zones. Can the probability curves be used to predict future performance? At this point, there is no empirical evidence to suggest that the probability curves for different performance levels based on observations of only actual (but not the best ever) performance can predict future performance. Classification of observations using frequencies of observed performance categories seems circular. Considering a high variability of athletic performance in each season, how often (during the season and across several seasons) should the probability-based zones of intensity (and performance ranges) be estimated? How are the probability zones related to direct emotion effects on performance? What are the practical implications of these probability-based zones? This method

in its present form has a strong categorical focus and what is beyond the zones of intensity is still not assessed. These and other questions provide directions for future work. A more radical approach involving the estimation of emotion impact on performance along the entire range of working intensity ("intensity-impact" contingencies; Hanin, 1997, 2000; Robazza, Bortoli, & Hanin, in press) is briefly described later in the chapter.

From Anxiety to Multiple Emotions

There is a growing consensus in applied sport psychology that prediction of athletic performance should be based on multiple pleasant (positively toned) and unpleasant (negatively toned) emotions rather than only on precompetition anxiety (Cerin et al., 2000; Crocker et al., 2002; Gould & Tuffey, 1996; Hanin, 1993, 1997, 2004; Jones & Hanton, 2001; Kerr, 1997; Lane, Terry, & Karageorghis, 1995; Lazarus, 1993; Raglin & Hanin, 2000; Robazza, 2006). Substantial empirical evidence indicates that unpleasant emotions do not always harm athletic performance. For instance, such emotions as anger, anxiety, and tension can sometimes be beneficial in competition (for reviews, see Hanin, 1978, 1995; Jones, 1995; Raglin, 1992; Raglin & Hanin, 2000). These findings are in accord with the earlier observations and anecdotal evidence indicating that highly skilled and experienced athletes can deliberately use relatively high anxiety to their advantage (Hanin, 1978; Mahoney & Avener, 1977). As a result, these expert performers often perceive anxiety as facilitating their performance (Jones, 1995).

On the other hand, the findings indicate that pleasant emotions are not always beneficial for successful performance (Hanin, 1997, 2000). Too much of some pleasant emotions can sometimes lead to a poor performance due to complacency and underestimation of task demands and insufficient focus and dysfunctional energy levels (too high or too low). Therefore, although some athletes perform up to their potential when they are stress-free, others deliberately generate and use competitive stress to their advantage as an additional resource and a tool for mobilization in emergency situations.

Much of the earlier research proceeded from a nomothetic perspective with the aim of making predictions regarding athletes and exercise participants in general (Smith, 1996; Vallerand, 1997). Recent numerous studies, however, have begun to reflect an idiographic perspective with the aim of making predictions about individuals or subsets of athletes (Hanin, 1995, 1997, 2000, 2004; Robazza, 2006; Vallerand & Blanchard, 2000).

Although precompetition anxiety is an important stress-related emotion, it is still only part of the emotional mix that influences athletic performance. Determining the interactive effects of emotions enhancing and impairing sporting activity is crucial for an accurate prediction of emotion-performance relationships. In this case, a high probability of individually successful performance is expected when combined maximum enhancing and minimum impairing effects are observed. On the other hand, a high probability of individually average and poor performance is expected when a combination of high enhancing and high impairing effects or low enhancing and low inhibitory effects are observed. Finally, a high probability of poor performance is expected when low enhancing and high inhibitory effects are observed.

In the case of pleasant-unpleasant and optimal-dysfunctional emotion intensities, it is important to assess interactive effects of four different categories of emotions: P+ (pleasant optimal), N+ (unpleasant optimal), P– (pleasant dysfunctional), and N– (unpleasant dysfunctional). Therefore, the IZOF principle was further developed to account for these interactive effects. With the development of individualized emotion profiling (Hanin, 1997, 2000; Hanin & Syrjä, 1995, 1996), the extended IZOF concept is used to describe separate and interactive effects of both pleasant and unpleasant emotions using athlete-generated items. Specifically, the individual zone of optimal intensity is identified for each functionally optimal emotion, and the individual zone of dysfunctional intensity is identified for each dysfunctional emotion. In both cases, recall is used to examine past performance history rather than wait and see when successful and extremely poor performances occur. Past experiences were used to predict present and future performances.

It is assumed that there are IZOFs in some emotions (P+, N+) within which the probability of successful performance is the highest. There are also dysfunctional zones in other emotions (P–, N–) within which the probability of poor performance is the highest. Optimal and dysfunctional intensity levels can be low, moderate, or high and vary for the same and different emotions in different athletes (Hanin & Syrjä, 1995). Moreover, it is possible to estimate functionally optimal and dysfunctional effects, separately and jointly, only when these emotions are near or within these previously established individual zones. In other words, the total effect of pleasant and unpleasant emotions on performance appears to be determined by the interaction of optimal and dysfunctional effects. Although functionally optimal emotions are important predictors of

Emotion effects		Harmful effects (N–P–)	
		High	Low
Helpful effects (P+N+)	High	Average performance	Successful performance
	Low	Poor performance	Average performance

Figure 2.3 Interactive effects of enhancing and harmful emotions.

successful performance, they alone may not be sufficient due to the fact that emotional experiences involve mixed feelings. Therefore, potential detrimental effects of dysfunctional emotions should be considered as these emotions are sometimes experienced at the same time as optimal emotions. Four quadrants in Figure 2.3 illustrate this principle in a matrix form, and the IZOF iceberg, or bell-shaped emotion profile, visually represents interactive effects (Hanin, 1997, 2000, 2003). Therefore, the notion of a zone, as applied to a wide range of pleasant and unpleasant emotions, seems appropriate in providing individualized criteria to evaluate both optimal and dysfunctional effects separately and jointly.

Empirical research revealed a high degree of *interindividual variability* in the intensity and content of idiosyncratic optimal and dysfunctional emotions related to individually successful and poor performances. It was also shown that different athletes perform up to their potential experiencing emotions of different content and intensity, and there is no universal intensity level and zone that are similar and optimal or dysfunctional for all athletes.

Beyond Optimal Intensity Zones

Prediction of individual performance based on contrasts of precompetition emotional states with previously established IZOFs in multiple emotions received fairly good empirical support (Annesi, 1998; Hanin, 2000, 2004; Robazza, Pellizzari, & Hanin, 2004). In most cases, the optimal and dysfunctional zones were established using the focused recall procedures described earlier (Hanin, 2000, 2003; Hanin & Syrjä, 1995, 1996). This proved to be effective with highly skilled and experienced athletes, who are usually well aware of their personally significant experiences, and meta-experiences, related to successful and poor performances. Therefore, previously established zones were useful as individualized criteria to predict individual performance.

In earlier research on optimal anxiety, the main emphasis was on personally best and worst performance and emotions accompanying these two personally significant situations. However, it was not known if experienced emotions represented also an optimal or dysfunctional (repeated) pattern. All other performance levels were assumed to be between these two extremities. When the focus of research shifted from anxiety to pleasant and unpleasant emotions, a new construct was proposed: a notion of *individual performance range* with distinctions between personal best and personal worst categories, including personally standard and substandard performances. Although the initial approach was based on categorical assessments (in or out of the zone), a more comprehensive approach (Hanin, 1997, 2000) required continuous (along the entire working range of intensity) estimation of what was beyond the zones of intensity and performance ranges. Such an assessment strategy is important when multiple items of emotion and nonemotion experiences are used to estimate the partial and total impact of emotional experiences on performance.

The IZOF-based research in performance anxiety has also indicated that if intensity was closely out of the zones, performance deteriorated, but in some cases, performance did not deteriorate when intensities were further from the zones (Turner & Raglin, 1996). Finally, several IZOF emotion studies revealed that different emotions can be optimal or dysfunctional or both. These findings suggest that each emotion (in each of the four emotion categories) may have a different effect (optimal or dysfunctional) depending on its intensity level. In other words, a categorical approach, as a practical tool for a rough estimate of optimal and dysfunctional intensity, is practically acceptable when we have a total intensity score. But what is the impact of emotion on performance when the intensity is well beyond the zones or even along the entire range of working intensity? To answer this question, a continuous approach in establishing intensity-impact contingencies for each emotion (partial effect) and for all emotions (total effect) was needed. The multiple emotion assessment requires the assessment of partial effects continuously rather than categorically and the use of the principle of being in or out of the zone for total scores.

In an exploratory study, 12 top Finnish cross-country skiers estimated perceived effects of each self-generated emotion on their performance along the entire range of

intensity (Hanin, 1997, 2000). As a result, the intensity-impact contingency for each idiosyncratic emotion generated by the athletes was created. This study provided initial empirical support for a more detailed estimation of the interactive effects of different emotions on athletic performance. Specifically, it was shown that being outside the optimal zones may indeed produce a less enhancing effect, or even have a detrimental effect (e.g., an absence of motivation or energy), on individual performance.

Similarly, being out of the dysfunctional zones in performance-inhibiting emotions can be not only less detrimental but sometimes can even enhance individual performance effects (e.g., an absence of fatigue or depression). Therefore, a more accurate estimation of total emotion impact on performance was possible, providing it was based on individualized intensity-impact contingencies developed by athletes for each emotion. The development of intensity-impact contingencies is based on an athlete's awareness and ability to report his or her own experiences. Additional research is needed to estimate how accurately athletes of varying skill and experience are able to do such estimations and how accurate are the predictions that are based on these contingencies.

A recent study by Robazza et al. (in press) examined the perceived effect of idiosyncratic emotions and bodily symptoms on athletic performance along the entire emotion-intensity range. The participants were 35 elite Italian athletes (16 females and 19 males) competing in either figure skating or gymnastics. Idiosyncratic emotional descriptors were rated on Borg's Category Ratio (CR-10) scale to estimate the perceived impact on performance and hedonic tone for each level of emotion intensity range. The findings revealed large interindividual variability in the content of emotions as well as in the shape of the curves representing the intensity-impact contingencies. At the group level, the emotion-performance link was positively linear for optimal-pleasant emotions, bell-shaped for optimal-unpleasant emotions, and negatively linear for both dysfunctional-unpleasant and dysfunctional-pleasant emotions. Future research should focus on how intensity-impact contingencies can be used in the estimation of total impact to predict individual performance.

By definition, emotion is an unfolding process (Folkman & Lazarus, 1985). Its dynamics involve two basic dimensions: *context* and *time* (Hanin, 1997). The context dimension is an environmental characteristic reflecting the impact of situational, interpersonal, intragroup, and organizational factors on emotion intensity and content in sport settings. Emotional experiences of varying form, content, and intensity are usually observed in different settings (context). Situational impact is manifested in emotions experienced in practices and competitions during athletes' anticipated or real contacts and interactions with significant others (a partner, a coach, and teammates). Context dimension also includes culturally coded and culturally determined beliefs of participants about the expected impact of specific emotions on their performance and about the rules of emotion display (expression or suppression) in a particular subculture.

Current emotion research in sport psychology focuses on several contexts, such as successful and unsuccessful competitions of varying significance (local, national, international), and different practices. Additionally, there are a number of individually difficult situations, or specific performance episodes, that have a special meaning for athletes and teams (weather conditions, competition sites, good and bad memories of past performances). These situations may also include qualifications, performance in the finals, play-offs, meeting a weaker opponent, and performing after repeated success or a series of slumps.

As for the *time* dimension, traditionally it is associated with a short-term situational emotion dynamics across three interrelated situations: prior to an action, during task execution, and after performance in a single competition (or practice; Cerin et al., 2000; Hanin, 1993, 1997, 2000; Jones, 1991; Syrjä, Hanin, & Pesonen, 1995). The time dimension, however, is not limited to what is going on cross-sectionally in a single competition. Moreover, cross-sectional assessments do not usually reflect the specifics of transitions of emotional experience from pre-event to midevent to postevent situations (Hanin & Stambulova, 2002; Ruiz & Hanin, 2004a). Thus, to reflect a real dynamics of emotional experience as a process, cross-sectional measures should be supplemented by qualitative methods, such as narratives or video-assisted self-confrontation interviews (Hanin, 2003; Sève, Ria, Poizat, Saury, & Durand, in press).

Long-term temporal dynamics are related to emotion-performance relationships during a competitive season (seasons), the 4-year Olympic cycle, or an athlete's sports career. The best indicators of long-term development of emotional experiences are relatively stable emotion patterns and especially meta-experiences. In the assessment of temporal patterns of emotional experiences, future researchers should include both *topological* (phases, cycles, sequencing, periodicity, timing) and *metric* (duration, frequency) characteristics. Research on topological characteristics of temporal patterns in the dynamics of emotions in sport remains nonexistent.

Finally, emotion-performance relationships are dynamic and bidirectional: pre-event emotions produce beneficial or detrimental effects on performance and ongoing performance process (successful or unsuccessful) affects an athlete's emotional state. Thus, to describe emotion-performance relationships, it is important to establish the patterns of emotion impact on performance and performance impact on emotions. This latter aspect of performance-emotion relationships is especially important in research into temporal patterns of emotions across several game episodes, especially in ball games and combat sports (Sève et al., in press).

Most sport events are continuous, and in long duration sports, much happens between the start and the finish. Therefore, temporal patterns are important to consider in explaining how emotion affects performance and performance-induced emotions. For instance, preperformance situations can be explained by the "anticipated gain-loss" appraisals involving challenge and threat and related emotions (Lazarus, 2000). However, what happens when "occurred gain-loss" appraisals involving benefit and harm are triggered? And how do intermediate occurrences during performance affect appraisals and emotional experiences? All these are promising directions for future researchers.

EMOTION-PERFORMANCE RELATIONSHIPS

A detailed description of defining characteristics of emotional experiences based on systematic observations of athletic performance is an important starting point. However, to explain emotion-performance relationships in sport, it is also necessary to look at the antecedents and consequences (effects) of emotions relating to athletic performance. After that, a tentative explanation of individual differences in emotion response is possible. In this section a brief overview of antecedents and consequences of emotional experiences and two interconnected explanations of their effects on performance are suggested.

Antecedents of Emotions in Sport

According to Vallerand and Blanchard (2000), theory and research on antecedents of emotions deal with psychological processes eliciting emotions with the aim to understand and predict how an individual will feel in a given sport situation. Several existing cognitive theories and research on antecedents of emotion in sport illustrate well past research and recent trends potentially important in sport settings. Vallerand and Blanchard provide a detailed review of the early contributions to theory on emotion, selected appraisal theories, goal and motivational theory, and research. Readers are also referred to another excellent review of selected cognitive theories and sports-specific models by Crocker et al. (2002) that deals with emotion antecedents.

Most of these approaches emphasize the role of a variety of *intrapersonal* determinants of self-directed emotions, including individual differences in traitlike characteristics. These are achievement needs, anxiety, mastery orientation, cognitions (expectancy of success), efficacy beliefs, causal ascriptions, and incentives related to goal orientations and their sources or locus (Hareli & Weiner, 2002). Weiner's extension of his previous attribution-emotion model suggests that *interpersonal* context gives rise to a variety of socially related emotions and personality inferences that have far-reaching consequences. Specifically, a good deal of individuals' self-definition and emotional experiences are derived from how they are perceived and the feelings they elicit from others in achievement settings (p. 183). For instance, just as the player is experiencing different emotions based on the task outcome and the perceived cause of the outcome, involved observers (teammates, coach, fans) also are experiencing different emotions. *Self-directed* emotions include pride, gratitude, shame and guilt, and hopelessness; *other-directed* emotions are pride, envy, admiration, schadenfreude (joy at the shame of another), sympathy and contempt, anger, arrogance, modesty, and deceit.

Potentially interesting as a future research direction in sport is an emphasis on self- and other-directed social emotions. This is a neglected area of research both in general and sport psychology. This direction focuses on *interpersonal* and *intragroup* determinants of emotional experiences. For instance, several earlier studies of interpersonal and intragroup anxiety in sports setting are examples of how emotions can reflect an athlete's interactions and communication with partners or coach or how an athlete feels in different groups, including the team, study group, family, and friends (Cratty & Hanin, 1980; Hanin, 1980, 1989, 1992; Hanin & Bulanova, 1981).

It is important to distinguish intrapersonal, interpersonal, and intragroup antecedents of emotional experiences. Intrapersonal factors include those that affect a person's perception of person-environment interaction. Person-environment interactions are important, and a psychosocial perspective is central in the functional interpretation of the

dynamics of emotion-performance relationships. As discussed earlier, emotion is conceptualized as an unfolding process reflecting person-environment interactions. Ongoing appraisals of these interactions result in a change in the personal meaning of a situation, which exerts influence on emotional experiences related to performance. Changes in personal meaning as well as in a situational mind-set reflecting the dynamics of the performance process can trigger considerable functional shifts in emotion content and intensity.

In Lazarus's (1991, 2000) emotion theory explaining the dynamic, unfolding nature of emotion, the notion of personal relational meaning is especially useful. Lazarus conceptualized this in terms of two basic performance outcomes: gain and loss. These outcomes are either anticipated (challenge and threat) or occurred (benefit and harm). As a two-factor categorization of relational meaning and time, these four basic appraisal patterns can partly explain the dynamics of emotion-performance relationships. Specifically, functionally optimal pleasant and unpleasant emotions (P+, N+) prior to and during activity are usually anticipatory and are triggered by the appraisals of challenge and/or threat. These appraisals activate strong action tendencies prior to and during performance and help to recruit available resources and to use them effectively. In other words, these emotions, if interpreted from the goal reprioritization approach (Carver, 2003; Simon, 1967), seem to signal a call for even greater investment of resources and effort. In contrast, situationally dysfunctional pleasant and unpleasant emotions (P–, N–), prior to and during performance, are usually triggered by premature perception of already achieved or occurred outcomes (appraisals of benefits and harm) before the task is completed. These appraisals activate weak or distracting emotions, sending a signal that the main goals have already been achieved (P–) or could not be achieved (N–), and there is no need for (or no sense in) further exertion. These dysfunctional emotions signal either a call for less investment (P–) or a failure to maintain efforts due to a lack of resources.

Finally, most of these approaches emphasize *distal,* or traitlike and relatively stable, antecedents that function across repeated typical situations. In a single situation, more attention is required for *proximal* antecedents that act as *situational* determinants of concrete emotional experiences (Kuhl, 1994). Table 2.1 illustrates this distinction by listing different situational motivational domains generated by the players. Thus, proximal antecedents of a highly motivated state include a special focus (winning and fighting), trying to do one's best, a specific feeling state, and perception of the game (as important, challenging, tough, and well started) and perception of the opponent (as tough, good, strong). Important but more distal antecedents include perception of ice hockey (as a serious hobby, future profession, life) and one's own team (playing for the team and team climate). In contrast, Figure 2.2b lists antecedents of negative motivation (or a lack of motivation) along the same domains; most of these have proximal and direct de-motivational effects.

Consequences of Emotions

In discussing the consequences (functional impact, effects) of emotional experiences, several aspects should be considered. First, emotion functional effects observed in sport settings could be either *facilitating* (helpful, beneficial, optimal, useful, positive) or *debilitating* (harmful, detrimental, dysfunctional, negative) or *neutral* (nondisturbing, having no impact). Second, a target (or direction) of emotion impact could be the situational *performance* (process or outcomes) or a psychobiosocial *state* (and its cognitive, motivational, bodily, behavioral, or communicative components) or *relationships* (interpersonal or intragroup) or general *well-being* and *health,* or *multitarget* combined effects. Third, due to the social nature of emotional experiences reflecting person-environment interactions, emotion consequences are usually both self-directed and other-directed (see Hareli & Weiner, 2002, for a more detailed discussion). Emotion functional effects therefore include not only intrapersonal but also interpersonal and intragroup consequences. Fourth, as in the case with antecedents, emotion consequences can also be distal (long term or accumulated) or proximal (more immediate, situational, and short term; Kuhl, 1994). Here I limit discussion to functional effects of emotion on athletic performance. These effects are apparently different from the functional (or dysfunctional) effects of emotions, for instance, in educational or clinical settings as compared to high-achievement sport.

The basic question in performance-related emotion research is how to define and describe emotion functionality or the effect of emotion on performance (or well-being, health, leisure). The notion of functional effect is not new. It has been around in psychology for some time under different labels: most favorable stimulus (Yerkes & Dodson, 1908), optimal arousal (Berlyne, 1960; Schlosberg, 1954), and facilitating-debilitating anxiety (Alpert & Haber,

1960; Jones, 1991; Liebert & Morris, 1967). Initially, optimal (or dysfunctional) effects were simply assumed. The main focus, for instance, in test anxiety research and in clinical psychology was on contrasting anxiety intensity and performance and on alleviating debilitative consequences of high anxiety. In elite sports, however, it was clear that state anxiety does not necessarily impair athletic performance and, in some circumstances for some athletes, can enhance it. Moreover, experienced and elite athletes were usually well aware of the impact of various emotional states on their performance (Hackfort & Schwenkmezger, 1993; Hanin, 1978, 1986, 1995; Jones, 1995; Mahoney & Avener, 1977).

As was shown earlier, the interaction of specific emotion content (anxiety, anger, etc.) with emotion intensity (high, moderate, or low) produces specific optimal or dysfunctional effects on athletic performance (Emotion content X* Intensity = Emotion impact). Several strategies exist in the practice of sport psychology to assess emotion effects on performance. First, the *emotion-based* strategy involves the collection of multiple measures of emotion intensity in a sample of athletes and contrasting them with the corresponding performance outcomes. Current models of competitive anxiety are examples of such an approach. Second, the *performance-based* approach identifies personally best and worst performances and focuses on accompanying success-related and failure-related emotion content and intensity of individual athletes (Hanin, 1986, 1997, 2000; Raglin, 1992; Raglin & Hanin, 2000; Robazza 2006). Here, functional effects of emotions are established by identifying individually successful performance (personal best) and accompanying emotions that were helpful or at least not detrimental to an individual athlete's performance. In other words, in both strategies, functionality of emotions is implied but not assessed directly as a special construct. Third, the *perception-based* strategy focuses directly on assessment of the functional and dysfunctional effects of emotions using athletes' subjective experiences (or rather, meta-experiences) and self-ratings of anticipated or already experienced impact on performance. One option here is that athletes simply rate the magnitude of facilitating or debilitating effects (called the "directional" approach; see Jones, 1995), or they can report qualitative characteristics of specific emotion effects on their performance (Hanin, 1993, 1997, 2000, 2003; Hanin & Syrjä, 1995; Sève et al., in press; Syrjä, 2000). In the perception-based approach to emotion impact estimation, athletes' experiences and especially meta-experiences (self-awareness) are important. Finally, direct emotion effects on performance process can be estimated in controlled observations of changes in movement patterns, muscular tension, or frequency of preliminary or performance movements under different emotion intensity levels (e.g., Pijpers, Oudejans, Holsheimer, & Bakker, 2003; Weinberg, 1978; Weinberg & Hunt, 1976).

Direct Rating of Emotion Effects

In early test anxiety literature, Alpert and Haber (1960) were among the first to assess whether test anxiety was facilitative, debilitative, or had no effect on subsequent performance. They proposed the "direction of effect" dimension, operationalized in two independent constructs of facilitating and debilitating anxiety as *response tendencies* in test situations. The Achievement Anxiety Test (AAT), with two separate subscales as trait-specific measures of facilitating and debilitating anxiety, was constructed. The facilitating scale of nine items was based on a prototype of the item "Anxiety helps me to do better during examinations and tests." The debilitating scale of 10 items was based on a prototype of the item "Anxiety interferes with my performance during examinations and tests." Although the AAT did not assess the specific effects of test anxiety (in what way it was helpful or harmful) on the individual performance process, relatively stable "facilitating anxiety added significantly to the prediction of grade-point average (performance outcomes) when it was combined with a measure of debilitating anxiety" (p. 215).

In sports, the concept of facilitating-debilitating effects of anxiety on performance with some modification was introduced by Jones (see Jones, 1995, for review), who proposed using a single-item bipolar direction scale to rate the degree to which the situationally experienced intensity of each symptom on the Martens et al. (1990) CSAI-2 was either facilitative or debilitative to subsequent performance. The response scale ranged from –3 ("very debilitative") to +3 ("very facilitative"), so that possible direction scores on the CSAI-2 subscales ranged from –27 to + 27. The major emphasis in the "directional perception" approach is on rating perceived effects of situational anxiety symptoms on performance within the sequence of *anxiety intensity → perceived effects → performance outcomes.* In contrast, earlier approaches focused on the *anxiety intensity ≥ performance outcomes* relationships did not assess anxiety effects directly.

Research provides reasonable empirical support for the validity and potential utility of the direction construct in the assessment of situational states and relatively stable patterns of anxiety. However, it should be recognized that optimal and dysfunctional effects of high and low anxiety on athletic performance are well-known in competitive and especially in elite sports (Hanin, 1978, 1986, 1995; Mahoney & Avenir, 1977; Raglin, 1992). Moreover, it is not surprising that elite athletes sometimes experience lower anxiety intensity and rate its effects as more facilitating than do nonelite and less experienced athletes.

Although directional research seems intuitively appealing, in its present form it has several limitations. First, the construct of emotion effect (direction) has been neither defined nor adequately described. Second, similar to test anxiety studies, current research is limited to rating only the extent to which anxiety is either helpful (facilitating) or harmful (debilitative) to an athlete's performance. These ratings fail to indicate the way a specific anxiety intensity affects (or does not affect) an athlete's performance process positively or negatively. Third, in most cases, researchers failed to collect performance data directly to examine anticipated and actual impact of anxiety intensity on performance (see, e.g., Jones & Hanton, 2001). Therefore, it is still not clear if athletes who rated anxiety as facilitating really succeeded and those who rated anxiety as debilitating really failed to perform up to their potential. Fourth, it is also not known if the direction ratings of similar anxiety intensity are stable over time or if they change from competition to competition. Fifth, it is not clear how direction scores, in their present form, can be used for prediction of individual performance. Finally, although the directional approach begins to consider different feeling states (pleasant and unpleasant), the anxiety-oriented framework does not estimate the functional impact on performance of a wide range of pleasant and unpleasant emotions.

Two questions are relevant to the discussion of emotion functionality: Are negatively toned emotions invariably detrimental to sporting performance? Are positively toned emotions always beneficial for performance? Numerous IZOF-based studies (Hanin, 1978, 1986, 1995, 1997, 2000; Hanin & Syrjä, 1995, 1996; Jokela & Hanin, 1999; Raglin & Hanin, 2000; Robazza, 2006; Ruiz, 2004; Ruiz & Hanin, 2004a, 2004b; Syrjä, 2000) provide strong empirical evidence suggesting a clearly negative response to both questions. In other words, unpleasant emotions can sometimes be helpful for performance (see Hanin, 1978, 1986; Hardy, 1990; Jones, 1995; Jones & Hanton, 2001; Ruiz, 2004), and pleasant emotions are sometimes harmful for performance (see Carver, 2003; Fredrickson, 2001; Fredrickson & Losada, 2005; Hanin, 1993, 1997, 2000). Thus, the view that emotion valence is the only or a major predictor of the effect of emotion or its regulation is oversimplistic at best (Cole, Martin, & Dennis, 2004).

Therefore, attempts to propose the notion of positive and negative anxiety based on its perceived effects seem questionable at best. Much confusion in this positive-negative anxiety debate (Burton & Naylor, 1997; Hardy, 1997; Jones & Hanton, 2001) comes from a failure to distinguish between emotion content, emotion intensity, and emotion functionality (helpful or harmful effects). For instance, Jones and Hanton argue that anxiety by definition is a negative (unpleasant) feeling state but claim that the CSAI-2 does not measure competitive anxiety directly, but only the symptoms associated with the response. They believe that "if a negative score on the direction scale is revealed then this signifies a state of anxiety. If a positive direction score is found, this points to another state previously mislabeled as anxiety" (p. 393). This assumption is actually true if it suggests that there are mixed emotions, besides pure anxiety, that add to positive impact on performance. However, this assumption is not true, and is even contradictory, if labeling of anxiety state depends entirely on a negative direction score. Qualitatively, anxiety is a negatively toned unpleasant state reflected in several specific symptoms (feelings of tension, apprehension, nervousness, etc.). Actually, anxiety and nonanxiety labels describe fixed or conventionally defined emotion content, whereas functional effects represent a different characteristic. Thus, using an athlete's own vocabulary of emotion labels along with researcher-generated items could be instrumental in the partial solution of this problem.

The main issue in emotion research now is not only to rate the perceived impact of emotions, but to identify, for instance, in what way high, moderate, or low anxiety (or any other emotion) is helpful or harmful to athletic performance. Hanin and coworkers (Hanin & Syrjä, 1995; Syrjä, 2000) collected qualitative data describing how highly skilled ice hockey and soccer players perceive the functional effects of facilitating and debilitating emotions for their performance. Two major functions emerged in the content analysis of players' interpretations of perceived emotion effects: enhancing or detrimental to effort and skill. For instance, a player who experiences

dissatisfaction perceives it as a helpful emotion because this emotion helps him or her to try harder, to maintain a fighting spirit, to be better than his or her opponent, to put more effort into the game, and to be more alert. Harmful effects of too much satisfaction (complacency) are reflected in being too concerned with success, not trying to play better, being too arrogant, not careful, and too risky; as result, skating becomes difficult (Hanin & Syrjä, 1995, pp. 180–181). A more detailed description of perceived functional effects of selected emotions across four global categories (P+, N+, P–, and N–) is found elsewhere (Ruiz, 2004; Syrjä, 2000).

Explaining Individual Differences

Numerous empirical studies revealed large interindividual variability of emotion intensity and emotion content in athletes performing similar and different sporting tasks. How can these findings be explained? Why do some athletes perform well while experiencing high anxiety, whereas others fail to cope with competitive stress? Why is emotion content different in different athletes performing the same task? I propose two possible explanations to account for these differences: a *resource-matching hypothesis,* based on the construct of internal and external resources, and two constructs, *energy mobilization* and *energy utilization* (Hanin, 1997, 2000, 2004).

The construct of internal and external resources proposed here is not new. For example, it is used in the conservation of resources (COR) model proposed by Hobfoll (1989) to define and explain psychological stress. Examples of broadly defined resources include not only personal characteristics (self-esteem, mastery, and well-being) but also interpersonal, material, and work-related resources. The basic tenet of the COR model is that people strive to retain, protect, and build resources because the potential or actual loss of these resources is a threat and a source of psychological stress. From this perspective, psychological stress is defined as a reaction to the environment in which there is (a) the threat of a net loss of resources, (b) the net loss of resources, or (c) a lack of resource gain following the investment of resources. There is a clear overlap of these ideas with the relational themes and appraisal patterns (anticipated and occurred) proposed by Lazarus (2000). Hobfoll also proposed an instrument to measure a gain and a loss of resources that was used in empirical studies with different populations outside the sport setting.

The life span model of developmental challenge proposed by Hendry and Kloep (2002) employs the constructs of resources and challenges to explain the processes of human growth. Examples of potential resources include *biological dispositions* (health, personality, "talents," intelligence, body shape, attractiveness); *social resources* (trust, attachment, size and quality of network); *skills* (basic, learning, social, psychomotor); *self-efficiency* (self-efficacy appraisals, experience with success, assurance from others, locus of control); and *structural resources* (country, race, class, family, income, gender).

To explain intraindividual and interindividual variability of emotion content and intensity in similar and different performance situations, a *resource-matching hypothesis* was proposed (Hanin, 2000, 2004; Hanin & Stambulova, 2002, 2004). Based on the idea that emotional experiences reflect person-environment interaction, it was suggested that it is not so much the task requirements per se that determine optimal and dysfunctional content and intensity of situational emotional experiences but an interaction (match or mismatch) between task demands and an athlete's resources (available, recruited, and utilized).

In competitive sport, resources are defined as psychobiosocial assets that determine athletes' ability to perform consistently up to their potential. Here the emphasis is on how available resources are identified and then systematically and effectively recruited, used, recuperated, and further developed. Thus, for instance, a complex task can be very easy for an athlete with sufficient resources that can be recruited when needed and utilized effectively. In contrast, a task generally considered relatively easy can be very demanding and difficult if an athlete is unable to recruit available resources or not ready to use them efficiently (Hanin, 2003, 2004; Hanin & Stambulova, 2002, 2004; Ruiz & Hanin, 2004a, 2004b).

The resource-matching hypothesis proposes three potential causes of intraindividual and interindividual variability in optimal emotion content and intensity. These include interindividual differences in (a) *available* resources, (b) the ability to *recruit* them at the right time and place, and (c) the skill to *use* them *efficiently*. Finally, there are clear intraindividual and interindividual differences in situational *readiness* to recruit, utilize, and recuperate these resources.

The four categories of emotion content proposed in the IZOF model and derived from the interaction of two factors (hedonic tone and performance functionality) also reflect a resources-based interpretation of emotion function and provide important signals. Specifically, pregame or midgame optimal pleasant emotions (P+) reflect a state

of being in the *challenge zone*, when an athlete is well prepared (ready for the game) and his or her available resources are sufficient, can be recruited when needed, and can be used effectively, matching well the task demands. It is also suggested that these emotions are essential elements of optimal functioning as vehicles for individual growth and social connection, building people's personal and social resources. These emotions can broaden thought-action repertoires, undo lingering negative emotions, fuel and build psychological resilience, and enhance emotional well-being (Fredrickson, 2001). Pregame or midgame optimal unpleasant emotions (N+) reflect a state of being in the *emergency zone*, when an athlete's normal resources are not sufficient for the task at hand or task demands exceed available resources, producing a threat to goal achievement. Additionally, there can be situational problems with the recruitment or utilization of available resources. Thus, an athlete is not completely ready for the task and there is a need to compensate for the lack of resources or their insufficient use.

Pregame or midgame dysfunctional pleasant emotions (P–) reflect a state of being in the *comfort zone*, or excessive complacency, when an athlete tends to underestimate task demands and overestimate his or her own resources, usually after successful performance or playing with a weaker opponent. Situational complacency and too much confidence result in failure to recruit and use needed resources (insufficient mobilization), and an athlete is actually not ready for the game. Pregame or midgame dysfunctional unpleasant emotions (N–) reflect a state of being in the *dejection zone*, when an athlete, for some reason, overestimates task demands and underestimates his or her resources, especially after a series of unsuccessful performances, a performance slump, or overtraining. In this situation, there is a clear lack of resources, serious problems with their recruitment and utilization, and therefore inability to compensate situationally.

The resource-matching hypothesis suggests that emotional experiences related to athletic performance serve a very important regulatory function. Emotions are elicited by appraisals and produce a strong regulatory effect on performance. On the other hand, any unexpected change in performance process affects situational appraisals of ongoing person-environment interactions, which often result in emotion shifts or reversals (Kerr, 1997). Therefore, emotional experiences in athletic performance have not only a *regulatory* function, but also a *signal* function reflecting an athlete's perception of situational match or mismatch between task demands and available resources. From this perspective, in midevent situations emotions are indicators of effectiveness of ongoing action that correspond either to "rate of progress" or "error signal" (Carver, 2003, p. 243). Moreover, pleasant optimal emotions "represent a sign that things are going better than necessary and are presumed to induce coasting that facilitates the shift of attention and effort to other behavioral domains" (p. 241).

Two constructs and their opposites related to energizing and organizing effects of emotion account for the possible impact of emotions on the athletic performance process (Hanin, 1997, 2000, 2004): energy mobilization (and energy de-mobilization) and energy utilization (and misuse of energy). Optimal and dysfunctional emotion function can be conceptualized within the framework of two closely related but independent factors: energy mobilization (optimal effort, intensity) and energy utilization (efficiency, optimal information processing). The former is related to the situational resources available to an individual performer, whereas the latter characterizes the efficiency of using these resources. Based on these two factors, four relatively independent global effects of emotions are derived: (1) energizing or energy-mobilizing effects, (2) energy de-mobilizing effects, (3) energy utilization or regulation effects, and (4) energy misuse or deregulation effects. These four types of effects provide a framework for interpretation of separate and interactive impacts of pleasant and unpleasant emotions on individual performance. Based on the nature of these interactions, the total impact of emotions on athletic performance can be optimal (regarding effort and skill), para-optimal (with only effort or skill being optimal), or dysfunctional (both in effort and skill).

From the functional effect perspective, the constructs of energy mobilization-utilization (and their opposites) seem useful in explaining why, for some athletes, optimal emotions are predominantly pleasant, whereas, for other athletes, they are unpleasant. For instance, low-anxious athletes are typically smart users of available energy and are less distracted by task-irrelevant and energy-wasting concerns. In contrast, high-anxious athletes typically generate more energy, especially in stressful or emergency situations, because they are often less efficient in its use due to a narrow attention focus and an overload in information-processing function. Thus, unpleasant emotions, such as anxiety, are functionally useful for these athletes in that they help to generate additional energy to compensate for the apparent limitation in information processing or the use of energy.

Effectiveness of athletic performance is usually related to the amount of available energy and its efficient use. Different athletes can be successful by using different resources. In other words, the same level of performance may be achieved either through the increase of total effort or via skillful (smart) utilization of available resources (efficiency). However, usually optimal emotion regulatory function is manifested in an athlete's efficient recruitment (effort) and utilization (skill) of available resources, resulting in energizing and organizing effects on performance. In contrast, emotion dysfunction in self-regulation usually reflects a failure to recruit resources and their inefficient utilization, resulting in de-energizing and disorganizing effects of emotion on athletic performance.

Optimality of emotions, then, is related to their mobilizing function and getting ready for a task at hand by using either normal resources, as in the case of pleasant optimal (P+) emotions, or emergency resources, as in the case of unpleasant optimal (N+) strong emotions. In contrast, dysfunctional emotions (both unpleasant, N–, and pleasant, P–) are signals of inability to effectively use available resources or to compensate for their situational depletion. Too much satisfaction or celebration of intermediate success can be really distracting and demobilizational. Therefore, both positive and negative emotions can produce adaptive and maladaptive outcomes. Apparently, total effects depend on the interaction of mixed (pleasant and unpleasant) emotions and their ratio (of positive and negative).

There is evidence suggesting that high ratios of positive to negative affect would distinguish individuals who flourish (live within an optimal range of human functioning) from those who do not (Fredrickson & Losada, 2005). These investigators, applying the reformulated balanced-states-of-mind model (Schwartz, 1997), showed that positivity ratios at or above 2.9 are associated with human flourishing (Fredrickson & Losada, 2005, p. 685). Problems occur with too much positivity, and appropriate negativity may play an important role in the complex dynamics of human flourishing. Moreover, certain forms of negativity promote flourishing better than others (pp. 684–685). Although the positivity ratio was found to be one of the correlates of successful athletic performance (Hanin, Jokela, & Syrjä, 1998), both positivity and negativity of emotions should be appropriate or optimal for the task at hand, especially in high-achievement sports. Future research could also examine the role of the functionality-to-dysfunctionality ratio reflecting interactive effects of different emotion effects.

CONCLUSION

The main purpose of this chapter was to review selected issues and perspectives with a focus on defining characteristics, antecedents, and consequences of emotional experiences related to athletic performance. The emphasis on basic emotion dimensions (form, content, intensity, and partially time and context) seems especially appropriate. It provides conceptual and methodological tools to describe, predict, and partly explain situational emotional experiences and meta-experiences related to athletic performance. From the applied perspective, the major advantage of the individualized approach to studying emotion-performance relationships is in its ability to describe and explain findings that are often missed or ignored in group-oriented models. The resource-matching hypothesis was proposed to explain intra- and interindividual variability of optimal and dysfunctional emotion experiences. Future research may focus on relatively stable emotion patterns and meta-experiences that explain idiosyncratic preference in appraisals and coping processes.

There is ample empirical evidence that unpleasant emotions such as anxiety, anger, and tension are often situationally helpful for athletic performance. Such strong unpleasant emotions can help generate more energy and sustain effort; they often can compensate for a situational lack or depletion of needed resources, for instance, in the case of extreme fatigue. These emotions, if well channeled in the task process, can substantially postpone fatigue, sustain alertness, and maintain the right focus. In other words, coping with competitive stress involves not only alleviating it, but also using it to enhance performance.

There is also evidence that pleasant emotions are not always beneficial for performance, especially in sports requiring sustained focus, effort, and persistency for a relatively long time. Excessive complacency and satisfaction following unexpected or repeated successes can present a special problem in high-achievement settings because of the de-motivational impact. Moreover, high self-confidence can sometimes lead to excessive complacency and underestimation of an opponent, resulting in insufficient alertness, lack of focus, or carelessness and too much risk taking. These, in turn, can have harmful effects on performance, often leading to unexpected and season-ending injuries (Devonport, Lane, & Hanin, 2005; Würth &

Hanin, 2005). In such cases, self-generated labels of idiosyncratic emotional experiences are the best indicators of how an athlete can perform up to his or her potential (either stress-free or using competitive stress to advantage). These findings suggest that another promising area in emotion research in high-achievement sport is to establish the role of emotion in optimal recovery. Similar to identification of emotions that have optimal and dysfunctional effects on individual performance, it is possible to estimate which emotions are optimal for effective recovery after considerable training loads or important competitions (Hanin, 2002).

Research on emotional experiences related to athletic performance has direct practical implications. For instance, competitive athletes usually face three issues: how to identify emotional states related to individually successful and poor performances, how to predict emotion-performance relationships, and how to select person- and task-relevant techniques of self-regulation. Compelling empirical evidence described in this chapter provides several tentative guidelines on how to deal with these three issues.

First, to identify individually optimal and dysfunctional emotional experiences, establish the individually relevant cluster (constellation) of emotions and their intensities prior to, during, and after successful and less than successful (poor, average, or customary) performances. These qualitatively and quantitatively extreme situational experiences serve as individualized criteria in the evaluation of currently anticipated and experienced emotional states. Additionally, it is important to identify athletes' specific beliefs and attitudes about their emotion impact on performance (their meta-experiences). Are they aware of such effects? How do they usually cope with stress- and complacency-producing situations? Are these situational emotional experiences random or relatively stable patterns, which athletes can or cannot reproduce in important competitions? The main purpose of such individualized assessments is to enhance an athlete's awareness and acceptance of these experiences.

Second, prediction of emotion-performance relationships is based on the notion of being in or out of the zone, using categorical or continuous (intensity-impact contingencies) approaches. A categorical approach predicts performance based on the comparison between previously established individual zones and actual scores of intensity. A continuous approach is based on perceived intensity-impact contingencies along the entire working intensity range of each emotion. Here the emphasis is on an estimation of partial and total effects rather than only a selected optimal range of each emotion. In both cases, a decision about emotion regulation is based on the magnitude of deviations either from optimal and dysfunctional zones or from a total effect in the selected emotion modality. Furthermore, intervention should aim not only at helping athletes to enter or reenter their optimal zones, but also to stay away from the dysfunctional zones. Finally, predictions should also consider the total anticipated functional effects of emotion on performance that are usually manifested in an increase (or a decrease) of effort (energy) and efficiency (or inefficiency) in the utilization of available resources.

Third, emotion regulation refers to changes associated with activated emotions. These include changes in the emotion itself (e.g., changes in intensity, duration; Thompson, 1994) or in other psychological processes (e.g., memory, social interaction). However, emotion regulation is not defined by which emotions are activated but by systematic changes associated with activated emotions. Thus, evidence that one person is angrier than another does not by itself show that the first person is regulating anger differently from the second (Cole et al., 2004).

Although there are numerous techniques of emotion regulation in the practice of sport psychology, effective emotion regulation should be based on individualized assessments and predictions of emotion performance relationships. Moreover, a selected method or intervention strategy (technique) should match an athlete's resources and individual style, as well as the demands of the situation. In other words, the method should match previously established individual patterns of coping with emotion-inducing situations. Additionally, the effective intervention program usually includes not one but several appropriate methods of self-regulation. Finally, a focus on different modalities of psychobiosocial state with multimodal and intermodal orientation is another new research direction worth exploring in the future.

Cole et al. (2004) provide a detailed discussion of an emotion regulation construct that could be relevant in sport. For instance, it is suggested that the term *emotion regulation* can denote two types of regulatory phenomena: emotion as *regulating* and emotion as *regulated*. Emotion as regulating refers to changes that appear to result from the activated emotion. Emotion as regulated refers to changes in the activated emotion (in emotion valence,

intensity, or time course). These changes may occur within the individual (e.g., reducing stress through self-soothing) or between individuals (e.g., a player provides support for a teammate).

Finally, there are several directions for effective emotion regulation. Most focus directly on emotional response by using different mental skills. However, there are other options, such as a change in the current situation or its perception (personal meaning) by an athlete, or a special organization of athletic activity for an athlete or a team (role expectations and game tactics).

The performance focus in emotion research is central in high-achievement sport. However, it does not preclude seeing these results in a wider context. Specifically, emotion impact (outcomes) can have optimal and dysfunctional outcomes not only for performance but also for general well-being (Diener, 2000) of athletes and their health status, quality of leisure time, and other domains of their life. The emphasis on performance, however, is understandable, as sport and athletic achievement is one of the most important domains in the life of athletes.

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