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The Relationship Between Emotional Intelligence and Dispositional Flow State in Junior Team-Sport Athletes

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Although much research has investigated the characteristics and importance of emotional intelligence and flow state and their correlations with other psychological concepts, the relationship between these two keys to peak performance in sport has remained under-explored. Indeed, in whole literature there is only one study which examines this relationship among pianists. The aim of present study is to investigate the relationship between emotional intelligence and dispositional flow state among junior team-sport athletes.

Data were collected via google form questionnaire from 94 female and male athletes with age ranging from 13-19 years old, playing in Finnish national leagues and from various team sports including basketball, ice hockey and floorball. The athletes' scores of EI and dispositional flow sate and each of their subscales were analysed by SPSS to find correlations between them and also calculate any possible regression between the variables.

The results showed small statistically significant positive correlation between EI and dispositional flow state, moderate statistically significant positive relationship between EI and concentration on task and also unambiguous feedback, and moderate significant relationships between regulation and utilization of emotions with dispositional flow state. The results also showed that EI can be a predictor of dispositional flow state. In addition, regulation and utilization of emotions can predict dispositional flow state too. While EI can predict two elements of flow state including concentration on task at hand and unambiguous feedback, dispositional flow state can predict regulation and utilization of emotions in an athlete.

To the author's knowledge, this is one of the first studies to explore the relationship between emotional intelligence and dispositional flow state in the sport context. This study reveals the importance of improving emotional intelligence and specially the skills of regulation and utilization of emotions in athletes in order for them to experience higher rate of flow state and therefore peak performance and enjoyment during their participation in their sport.

Keywords
Relationship, Correlation, Predictor, Emotional Intelligence, Dispositional Flow State, Peak Performance

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1 Introduction

The will of human to be known to oneself and others makes performance, a creative expression of an inner drive, play a significant role in many areas of our lives. Whether it is sport, art, business or other domains, every day we execute as a performer. The more we attempt to optimize our performance, the more we manifest greater version of ourselves and the more happiness and satisfaction we can receive from what we are doing. Achievement of optimal performance which is influenced by physical, cognitive and emotional skills of the performer and the understanding of all these involved factors have become a growing demand parallel to evolutions of our world which brings opportunities for presenting our performance more widely and sophisticatedly.

There is consensus in literature in considering emotional intelligence and flow state as key factors for achieving optimal performance.“ If your emotional abilities aren’t in hand, if you don’t have self-awareness, if you are not able to manage your distressing emotions, if you can’t have empathy and have effective relationships, then no matter how smart you are, you are not going to get very far”. This is a quote from Dr. Daniel Goleman written in 1995 in his famous book “Emotional Intelligence: Why it can matter more than IQ”. In sport in which the involvement of different emotions is inevitable in most of the moments of participation of it, the necessity of having enough skills to understand and manage these emotions in order to utilize them to the benefit of participants are evident. Indeed, the set of skills for understanding and managing the emotions of self and others makes the concept of emotional intelligence which along with cognitive intelligence can lead the individual toward success and achieving high performance.

On the other hand, the experiencing of flow state, a state of complete immersion in an activity, by the performer in any area as well as sport is linked to performing optimally and feeling extreme happiness and enjoyment during the occurrence of it. Therefore, the more an athlete enter the flow state and stay on it, the more moments of peak performance she can achieve. Being at the present moment and having non-judgmental and acceptance approach are among important factors for achieving this state of mind.

The power of flow state is not a new concept. When the well-known 13th-century Persian poet and Sufi, Mawlana, the mystic spiritual practitioner of Sufi meditation known as Rumi, says in his poem “when you lose all sense of self, the bond of a thousand chains will vanish” or “sing like the birds sing, no worrying about who hears or what they think” he is indeed pointing out the power and some aspects of the flow state.

Throughout the literature also, there are enough evidence about the relationship between flow state and high performance. However, what if there is any relationship between these two key factors of high performance, emotional intelligence and flow state or between their components? Can one predict another? By improving emotional intelligence or any of its components, will the rate of experiencing flow state increase? Which elements of flow state can be predicted by emotional intelligence or any of its components? Finding answers to these questions in sport can provide us beneficial information to understand the characteristics of these factors more deeply and find out the ways to develop them in athletes for achieving extreme enjoyment, happiness, success and peak performance. This study aims to find above answers among junior team-sport athletes through assessing their EQ and dispositional flow state score and analyze the scores in order to examine the possibility of finding correlations and regressions among them and their subscales. Chapter 2 covers theoretical information needed to understand the concepts, chapter 3 presents the results of the study and chapter 4 discusses upon the results, makes conclusions and offers recommendations based on it.

2 Theoretical Background

2.1 Emotion

Emotions play an important role in the way human thinks and behaves. In fact, all the behaviours and actions of an individual are driven by emotions irrespective whether they are pleasant or unpleasant. As researches show, emotions as much as or even more than mind contain one's history - every chapter and verse of every experience, deep understanding of relationship in one's life (Cooper, 1997, 35). Engaged in all aspects of life, emotions are especially crucial to communication, problem solving and survival of human.

2.1.1 Definition of Emotion

The word "emotion" with Latin origin consists of two parts: "e" and "movere", where "e" implies "from", and "movere" means "to move" and in this context conveys concept of moving of something and suggests that a drive to act is implicit in every emotion (Goleman, 1995a,6). Webster dictionary, defines emotion as:

> "conscious mental reaction (such as anger or fear) subjectively experienced as strong feeling usually directed toward a specific object and typically accompanied by physiological and behavioral changes in the body"

In psychology, emotion is often defined as a multifarious state of feeling that results in physical and psychological changes that influence thought and behavior. Emotionality is associated with an array of psychological phenomena, including temperament, personality, mood, and motivation. In the other words, emotions are short-lived psychological-physiological phenomena that represent efficient modes of adaptation to changing environmental demands. (Levenson, 1994, 123) In facts, emotions are short-lived, feeling-purpose-expressive-bodily responses that help us adapt to the opportunities and challenges we face during important life events (Reeve, 2015, 340).

According to David G. Myers (2004, 500), a professor of psychology at Hope College of Michigan in United States, human emotion involves physiological arousal, expressive behaviors, and conscious experience.

2.1.2 Components of Emotion

Emotions are multidimensional. In fact, emotions have four-part character. In one part, they are subjective feeling making us feel a particular way such as angry or joyful. On the

other hand, emotions are biological reactions, energy mobilizing responses that prepare the body to adapt to facing situation. They are also agents of purpose. Hunger for instance, has a purpose. Anger creates a motivational desire to do what we might not otherwise do, such as fight an enemy or protest an injustice. And emotions are social phenomena. Through them we send recognizable facial, postural, and vocal signals communicating the quality and intensity of our emotionality to others. (Reeve, 2009, 299)

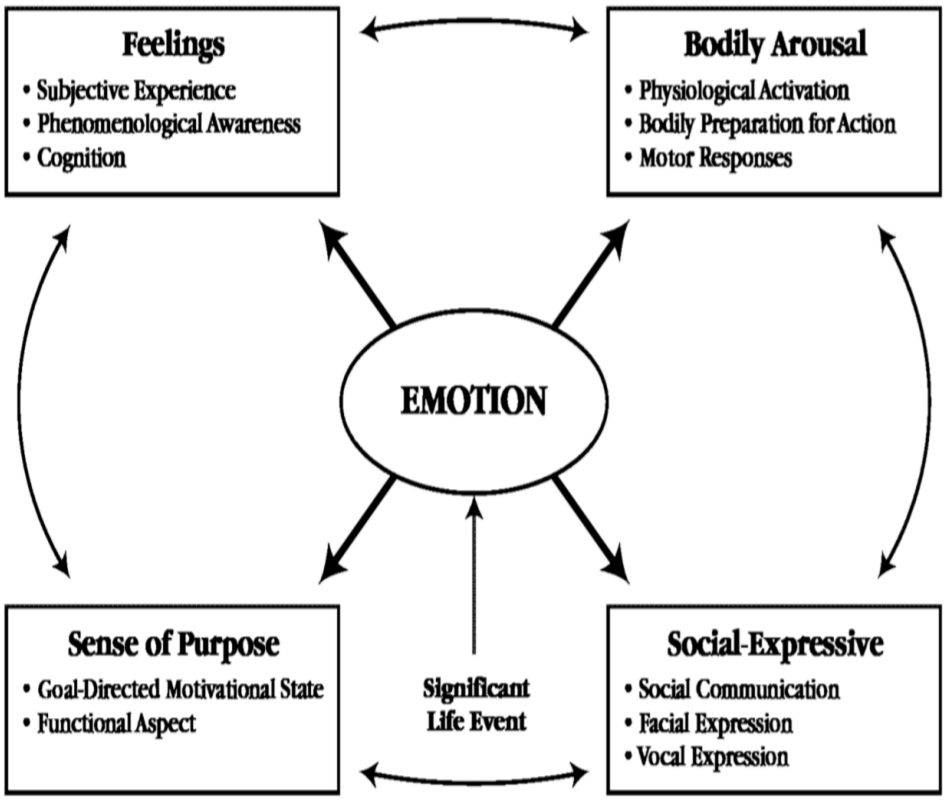


Figure 1. Four Components of Emotion (Reeve, 2009, 300)

Figure 1 shows four dimensions of emotion. Each box corresponds to a separate aspect of emotion. According to Reeve description of each component is as following:

Rooted in cognitive or mental process **feeling component** gives emotion its subjective experience with both meaning and personal significance. Emotion is felt and experienced at the subjective level in both intensity and quality.

The **bodily arousal component** consists of our neural and physiological activation, including autonomic and hormonal systems' activity while preparing and regulating the body's coping behavior during emotion.

The **purposive component** gives emotion goal-oriented characteristic in taking necessary action to cope with the circumstances at hands. It explains why people want to do what they do and why people benefit from emotions.

Finally, the **social-expressive component** is in fact communicative aspects of emotion. We publicly express our private experience through our postures, gestures, vocalizations, and facial expressions. During these expressions we can nonverbally communicate to others how we feel and how we interpret the present situation.
Therefore, emotions engage our whole person—our feelings, bodily arousal, sense of purpose, and nonverbal communications. (Reeve, 2009, 300)

2.1.3 Causes of Emotion

Cognitive processes of people's mind and biological processes of their body react adaptively, as shown in figure 2. This means that facing a significant life event, activates these processes to collectively activate the critical components of emotions mentioned above.

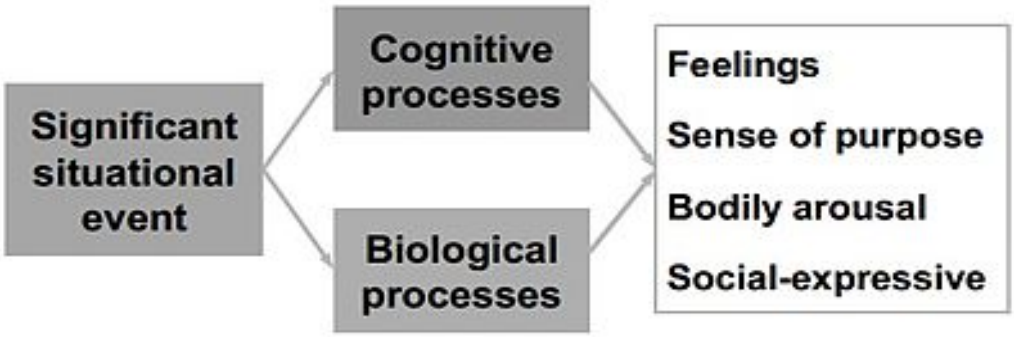


Figure 2. Causes of the Emotion Experience (Reeve, 2015, 334)

Therefore, both cognition and biology cause emotion. Buck (1984, in Reeve, 2009, 305) explains this as a two-system mechanism depicted on figure 3. According to him, one system is an innate, spontaneous, physiological system reacting involuntarily to emotional stimuli and the other one is an experience-based cognitive system reacting interpretatively and socially.

Biological system traces its origins to the ancient evolutionary history of species. Sensory information is processed rapidly, automatically, and unconsciously by subcortical structures and pathways. On the other hand, cognitive system depends on unique social and cultural learning history of the individual. Sensory information is processed evaluatively,

interpretatively, and consciously by cortical pathways. these two emotion systems are complementary and work together to activate and regulate emotions. (Reeve, 2009, 306)

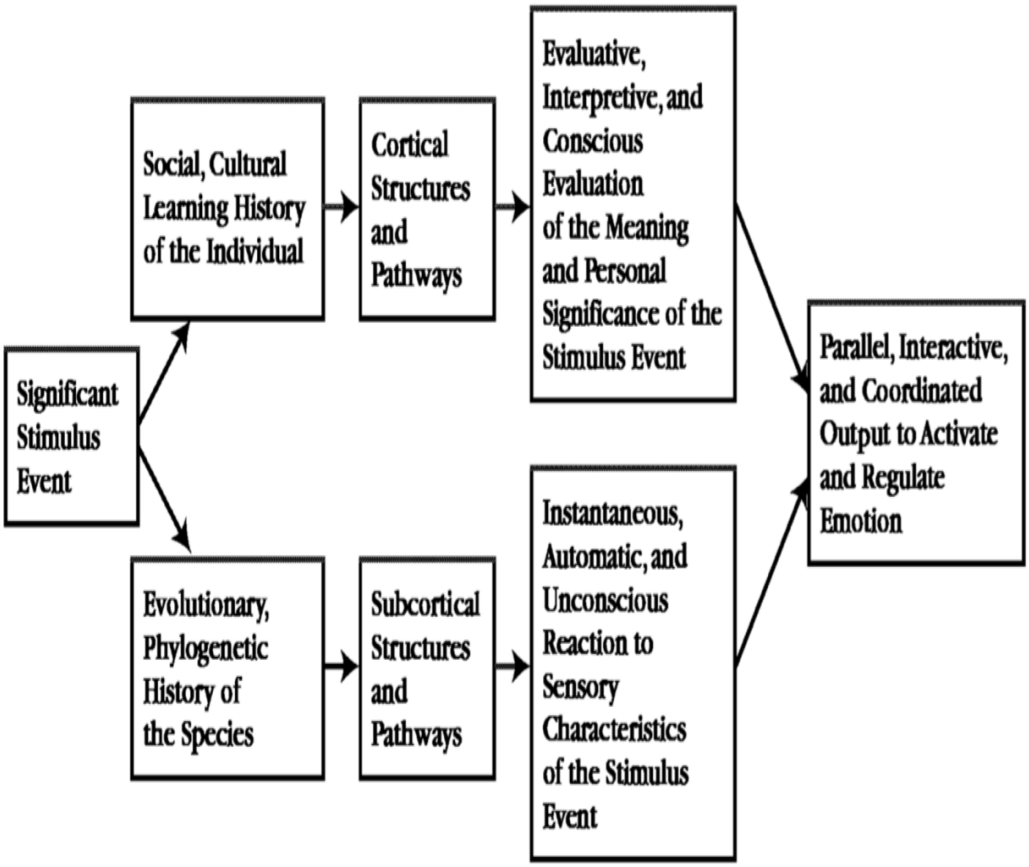


Figure 3. Two System Mechanism of Emotion (Reeve, 2009, 306)

2.1.4 Types of Emotion

All emotions have been developed in the course of biological evolution. And they have been developed to serve the need of survival purposes (Das, 2017, 2). Darwin (1872/1998) in his book entitled “The Expression of the Emotions in Man and Animals” argued that emotions are crucial for survival and thus they have distinctive expressions that should be accurately recognized by all humans. This suggestion led to many theories to classify emotions into Basic and Non-basic ones. (Piorkowska & Wrobel, 2017, 1) Although there is little agreement about how many emotions and which ones are basic emotions, but most theories share this view of basicness of some of the emotions (Ortony & Turner, 1990, 315).

The basic emotions are those that meet the following criteria (Ekman & Davidson, 1994, in Reeve, 2009, 312):

1. Being innate rather than acquired or learned through experience or socialization
2. Arising from the same circumstance for all people
3. Being expressed uniquely and distinctively (universal non-verbal facial expression)
4. Evoking a distinctive and highly physiological patterned response

Emotions which do not meet these criteria are considered non-basic emotions.

So far different lists of basic emotions have been made by various researchers, but all of them have six basic emotions of fear, anger, disgust, sadness, joy, and interest in common (Reeve, 2009, 313).

Among the different models available for emotion classification, one of the interesting models was proposed by Robert Plutchik, a professor emeritus at the Albert Einstein College of Medicine and adjunct professor at the University of South Florida, and he considered eight emotions of anger, fear, sadness, disgust, surprise, anticipation, trust, and joy as primary emotions. He also created a wheel of emotions to illustrate different emotions and the relationships among them.

As illustrated in figure 4, the cone's vertical dimension represents intensity. Emotions intensify as they move from the outside to the center of the wheel. The emotions with no color represent an emotion that is mixed of the two primary emotions. For example, anticipation and joy combine to be optimism. Joy and trust combine to be love. This shows that emotions are often complex with combination of two or more distinct feelings. (Donaldson, 2017, 2-3)

2.1.5 Functions of Emotion

All emotions occur for a reason. They are positive, functional, purposive, and adaptive organizers of behavior. In fact, emotions are produced to facilitate individual's adaptation to changing physical and social environments. There is no such thing as a "bad" emotion. In the other words, all emotions are beneficial by directing attention and channeling behavior to where it is needed, given the circumstances one faces. (Reeve, 2009, 318-19) Functions of emotions can be divided into two main groups:

Coping Functions of emotions are to prepare individual with an automatic, very quick, and historically successful response to life's fundamental tasks by serving at least eight distinct purposes of protection, destruction, reproduction, reunion, affiliation, rejection, exploration, and orientation as shown in table 1. As we can infer from this table, each emotion provides a unique readiness for responding to a particular situation (Reeve, 2009, 319).

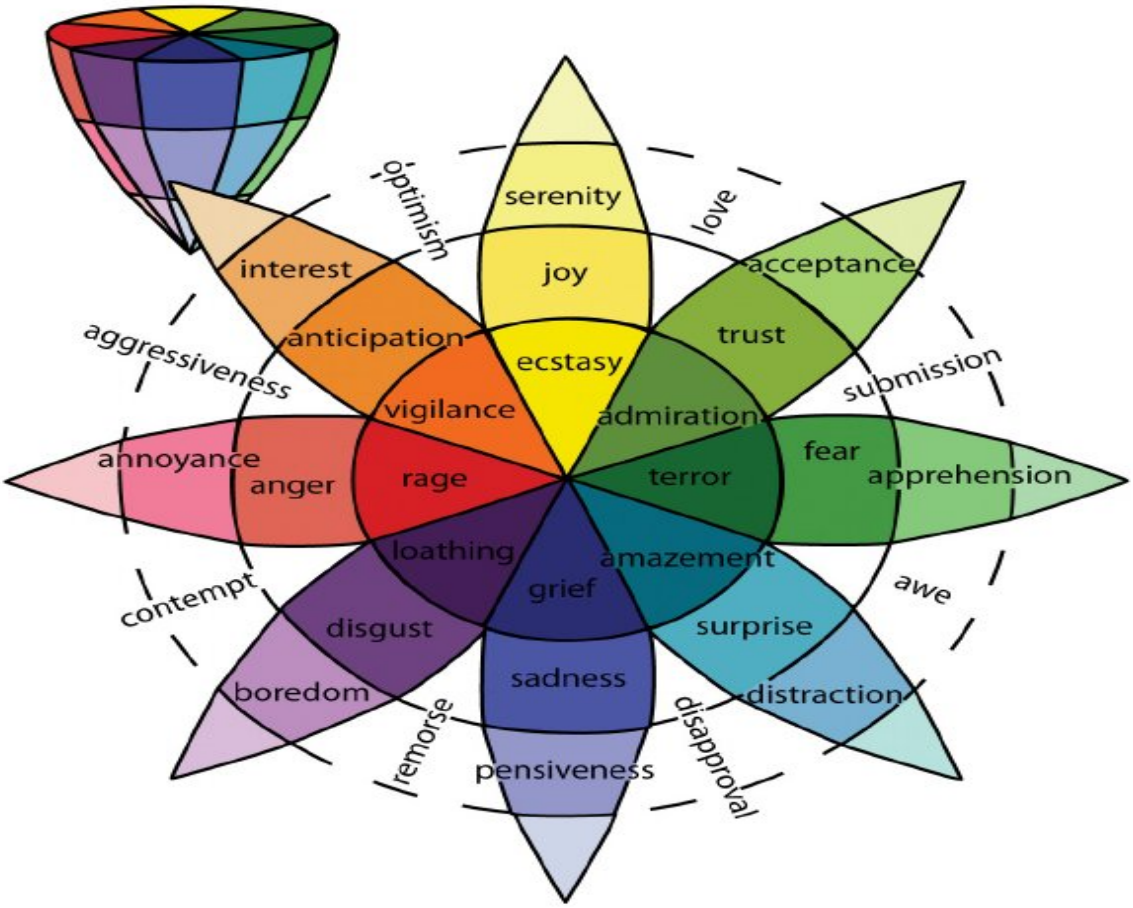


Figure 4. Plutchik's wheel of emotions with basic emotions and derivative emotions and cone-like, three-dimensional wheel of emotions demonstrating relationships between basic and derivative emotions (6seconds.org, 2020)

Table 1. Functional View of Emotional Behavior (Reeve, 2009, 318)

Emotion	Stimulus Situation	Emotional Behavior	Function of Emotion
Fear	Threat	Running, flying away	Protection
Anger	Obstacle	Biting, hitting	Destruction
Joy	Potential mate	Courting, mating	Reproduction
Sadness	Loss of valued person	Crying for help	Reunion
Acceptance	Group member	Grooming, sharing	Affiliation
Disgust	Gruesome object	Vomiting, pushing away	Rejection
Anticipation	New territory	Examining, mapping	Exploration
Surprise	Sudden novel object	Stopping, alerting	Orientation

Source: From "Functional View of Emotional Behavior," *Emotion: A Psychoevolutionary Synthesis* (p. 289), by R. Plutchik, 1980, New York: Harper & Row. Adapted with permission.

Social Functions are served by emotions through:

1. Communicating individual's feelings to others
2. Influencing how others interact with individual
3. Inviting and facilitating social interaction
4. Creating, maintaining, and dissolving relationships

Emotional expressions are potent, nonverbal messages communicating individual feelings to others. Emotional displays also influence how people interact, as the emotional expression of one person can prompt selective behavioral reactions from a second person. In the context of social interaction, emotions serve multiple functions including informative ("This is how I feel"), forewarning ("This is what I am about to do"), and directive ("This is what I want you to do") functions. Finally, emotional expressions communicate incentives (joy smile), social deterrence (angry face), unspoken messages (embarrassment face) that smooth and coordinate social relationships. (Reeve, 2009, 319-20)

2.1.6 Emotion in Sport

Emotions are integral part of sport activities. A sport event can generate highly demanding emotional environment for both participants and spectators. A range of emotions has been observed in sport, including anxiety, frustration, disappointment, happiness, and anger (Woodman, Callow, Davis & Glasscock, 2009, 169). Therefore, it is obvious that emotion which has the power of motivating and influencing thought, behaviors and decision-making, play an important role in the results of individual and team performances and has significant effects on the happenings in sports arenas during sporting events.

Not only the expression of emotion is highly prevalent on the sporting field, but also it is an essential aspect of performance in all sports (Stough & Downey, 2009, 3). Physiological responses as emotional reactions entail changes in heart rate, blood pressure, visceral functioning, and other autonomic nervous system reactions leading to energizing approach or withdrawal behaviors. In fact, the physical energy that accompanies emotions can enhance athlete's performance when properly channeled or can have detrimental effects when it becomes out of control. (Robazza, Pellizzari, Bertollo & Hanin, 2008, 1033)

According to Robazza (2006, 128) several conceptual models have been proposed to explain the emotion-performance relationship such as mental health model (Morgan, 1985), reversal theory (Apter, 1989, 2001), the directional approach (Mellalieu, Hanton, and Fletcher, this volume), and the individual zones of optimal functioning (IZOF) model

(Hanin, 1997). Here, a brief overview of IZOF as a useful model for describing the relationship between emotion and performance is provided.

The initial “zones of optimal functioning” (IZOF) model (Hanin, 1978, 1986, 1989) indicated the existence of an optimal level of anxiety and related zones (above and below this level) reflecting variability of emotion intensity (Ruiz, Raglin, Hanin, 2015, 2).

According to Robazza (2006, 135) “A central tenet in the model is that each athlete possesses an individually optimal preperformance bandwidth (zone/range) of anxiety intensity within which best performance most likely occurs. If, however, the performer’s anxiety level lies outside the optimal zone, performance will probably be impaired. Therefore, optimal or dysfunctional anxiety intensity–facilitating or debilitating performance–may be low, medium or high depending on the individual.”

Figure 5 shows that both the level of intensity and range are different across athletes. For optimal performance to occur, athlete A tolerates modest levels of intensity (from .5 to 2) of feeling worried, whereas for athlete F these levels of intensity are higher (from 5 to 10) (Robazza, 2006, 135). Figure 6 also graphs how IZOF may differ among individuals.

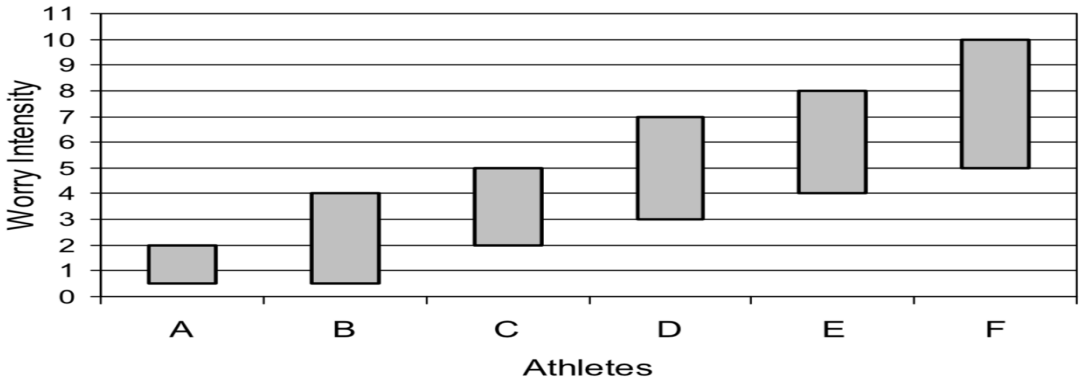


Figure 5. Zones of Optimal Worry in Six Athletes (Robazza, 2006, 135)

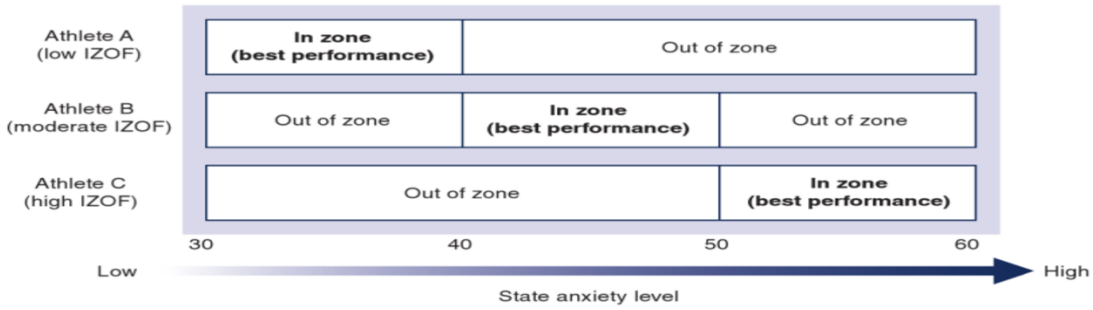


Figure 6. Individualized Zone of Optimal Functioning (Weinberg & Gould, 2015, 87)

Hanin (1997, 2000, 2007) expanded this model beyond anxiety showing how zones of optimal performance use a variety of emotions and other psychobiosocial states such as determination, pleasantness, and laziness. He also concluded that for optimal performance to occur, athletes need individualized optimal levels in variety of their emotions. (Weinberg & Gould, 2015, 87)

Hanin also include other features to the model including the conceptualization of emotion content within the framework of two interrelated factors, hedonic tone of pleasure-displeasure, and performance functionality of optimal-dysfunctional effect and proposed four emotion categories (Ruiz, Raglin, Hanin, 2015, 3):

1. Pleasant and functionally optimal emotions (P+)
2. Unpleasant and functionally optimal emotions (N+)
3. Pleasant and dysfunctional emotions (P-)
4. Unpleasant and dysfunctional emotions (-N)

This model also shows the importance of emotion regulation and control skills to maintain optimal emotion for optimal performance.

2.2 Intelligence

For better understanding of the concept of Emotional Intelligence, it is useful to offer some main knowledge about Intelligence. As a result, this chapter briefly goes through the relevant definitions and types of intelligence.

2.2.1 Definition of Intelligence

There are numerous definitions of intelligence available in the literature, nevertheless the definitions mentioned below are selective ones, pertinent to our current purpose.

In his book “The Meaning of Intelligence”, Stoddard (1943, 4) defines intelligence as “…the ability to undertake activities that are characterized by (1) difficulty, (2) complexity, (3) abstractness, (4) economy, (5) adaptiveness to a goal, (6) social values, (7) the emergence of originals, and to maintain such activities under conditions that demand a concentration of energy and resistance to emotional forces.”

Wechsler (1958, 7) defines intelligence as “the aggregate or global capacity of the individual to act purposefully, to think rationally, and to deal effectively with his emotions”.

Another useful definition of intelligence was proposed by Feldman (2011, in Swanepoel & Britz, 172) as the capacity to understand the world, think rationally, and use resources effectively when faced with challenges.

In the other words, intelligence is mainly an individual's ability or capabilities to understand complex ideas, effectively adapt to the environment, learn from experience, and engage in various forms of reasoning and overcoming obstacles by careful thought (Neisser & al. ,1996, 77). Webster dictionary defines intelligence as:

1. The ability to learn or understand or deal with new or trying situations
2. The ability to apply knowledge to manipulate one's environment or to think abstractly as measured by objective criteria

2.2.2 Types of Intelligence

Howard Gardner, an American developmental psychologist, presented his theory of multiple intelligences for the first time in 1983 in the book "Frames of Mind: The Theory of Multiple Intelligences". In fact, this theory is a critique of the standard psychological view of intellect which says there is a single intelligence, adequately measured by IQ or other short answer tests. Instead, the theory claims that human being have a number of relatively discrete intellectual capacities. (multipleintelligencesoasis, 2020)

Gardner initially proposed seven types of intelligence, however in 1999, he added two more types to this list. Therefore, there is a list of nine intelligences as following:

1. **Verbal/linguistic intelligence** involves well-developed verbal skills in oral and written forms of language.
2. **Logical/mathematical intelligence** refers to the capacity to solve problems, use numbers effectively, understanding cause and effect relationship and recognizing patterns.
3. **Musical intelligence** refers to the ability to recognize rhythm, pitch, melody, and musical composition and performance.
4. **Spatial/visual intelligence** corresponds to all aspects of spatial and graphical information, including drawing, painting, visual arts, architecture, navigation, and having well developed mental images.
5. **Bodily/kinesthetic intelligence** involves the ability to use one's body movement and body language to convey feelings and create things.

6. **Intrapersonal intelligence** is the ability to understand one's feelings, fears and motivations; i.e., self- awareness.
7. **Interpersonal intelligence** is the ability to understand and respond to other persons' feelings, emotions, attitudes and intentions effectively.
8. **Naturalist intelligence** deals with sensitivity to nature and environment; this is the capacity to recognize and categorize various kinds of living species.
9. **Existential intelligence** refers to the capacity and sensitivity to ultimate issues regarding the existence of human beings, significance and meaning of life and death.

Gardner believes that every human being has all types of intelligences but to different degrees, none of them is superior to others, and each of them can be developed to a higher level of performance, provided with the right learning context. (Ebadi, 2016,18-20)

2.3 Emotional Intelligence

Emotional Intelligence (EI) is a set of abilities for responses to events that constitute emotions (Mayer & Salovey, 1997).

First introduced by Wayne Leon Payne in 1985, the term emotional intelligence is relatively new term, not more that 35 years old. However, the existence of EI in science goes back to 1920, when Edward Thorndike describes the concept of “social intelligence” as the ability to get along with other people. In 1940s, David Wechsler suggested that affective components of intelligence are essential for success in life. Further in 1950 Abraham Maslow, a humanistic psychologist, explained that people can build emotional strength. In 1975, Howard Gardner mentioned this concept when introducing the multiple intelligence theory in his book “The Shattered Mind”. Two years after the introduction of EI by Wayne Payne, in 1987, the term “emotional quotient” was introduced by Keith Beasley in a published article. Peter Salovey and John Mayer in 1990 published their landmark article “Emotional Intelligence” in the journal “Imagination, Cognition, and personality”. Finally, the concept “Emotional Intelligence” get popularized after Daniel Goleman published his book “Emotional Intelligence: Why It Can Matter More Than IQ” in 1995. (Dhani & Sharma, 2016, 190-1)

2.3.1 Definitions of Emotional Intelligence

While there are different definitions of EI in the literature from various points of view, integrating Intelligence with emotion leads us to the famous definition proposed by Salovey & Mayer in 1990 stating EI as a “type of social intelligence that involves the ability

to monitor one's own and others' emotions, to discriminate among them, and to use the information to guide one's thinking and action". This was also the very first definition of EI which was then redefined into "The ability to perceive and express emotion, assimilate emotion in thought, understand and reason with emotion and regulate emotion in self and others" by the same authors in 1997. (Dhani & Sharma, 2016,192)

Reuven Bar-On (1997, 4) referred to Emotional-Social Intelligence as "a cross section of interrelated emotional and social competencies, skills and facilitators that determine how effectively we understand and express ourselves, understand others and relate with them, and cope with daily demands". Finally, Goleman (1998, 317) defined EI as "the capacity for recognizing our own feelings and those of others, for motivating ourselves and for managing emotions well in ourselves and in our relationships".

2.3.2 Models of Emotional Intelligence

To understand and explain the components, abilities and measurements of emotional intelligence, various theories have been proposed so far. Generally, there are three approaches toward modelling emotional intelligence including:

a. Ability approach
b. Trait approach
c. Mixed approach

In ability model emotional intelligence is considered as a pure form of mental ability and therefore as pure intelligence. On the other hand, trait model refers to the individual perceptions of their own emotional abilities. And mixed model of emotional intelligence combines mental capacity with personality traits. (Sfetcu, 2020, 38) In addition, different instruments for EI assessment have been developed based on these different models with each of them having its utility and efficacy in relevant fields.

So far, the only ability model of emotional intelligence is that proposed by Mayer and Salovey in 1997. Through this approach, EI is considered as a form of pure intelligence consisting of cognitive ability only. For mixed model two models conceptualize EI. In 1995 Daniel Goleman proposed a mixed model in terms of performance by combining an individual's abilities and personality implementing their corresponding effects in the workplace. On the other hand, Reuven Bar-On proposed a model in 1997 with personality dimensions, emphasizing the co-dependence of the ability aspects of emotional intelligence with personality traits and their application to well-being. (Dhani & Sharma, 2016, 193) For trait EI, there is a model introduced by Petride and Furnham in 2001.

2.3.2.1 Mayer-Salovey's Ability Model of Emotional Intelligence

In 1990, Peter Salovey and John Mayer drew together the existing psychological literature on general contributions of emotion and emotionality to personality and suggested a new idea of synthesizing intelligence and emotion (Neubauer & Freudenthaler, 2005, 33). They proposed a published framework for it and is shown in figure 7:

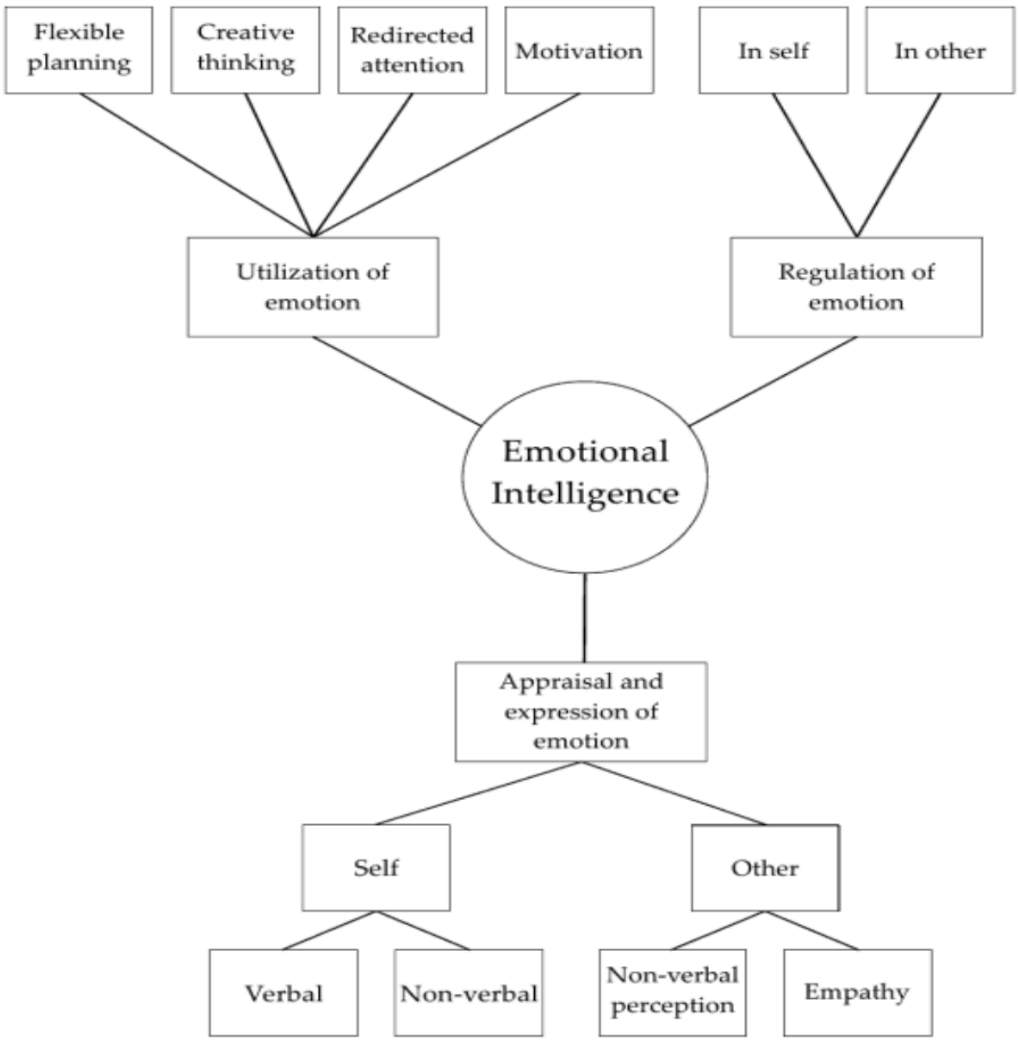


Figure 7. Salovey and Mayer's 1990 Model of EI (Neubauer & Freudenthaler, 2005, 34)

According to this framework, emotional intelligence comprises three conceptually related mental processes involving emotional information and including:

a. The appraisal of an expression of emotion
b. The regulation or control of emotion
c. The utilization of emotion in adaptive ways

According to Neubauer & Freudenthaler (2005, 33) and as we can notice in the figure 7, two branches of EI including regulation of emotion and appraisal and expression of emotion are further subdivided into self and other to distinguish between perceiving and regulating of individual's emotions or the emotions of another person. In the appraisal and expression branch the self and other are further subdivided based on content factor of verbal or nonverbal domain. In addition, this framework assumes that people with high EI are more flexible in their utilization of emotions due to flexible planning, more creative thinking, the ability to (re-)direct attention, and a tendency to motivate themselves and others. Other assumption of emotionally intelligent people in this model is their adaptation in certain areas including:

a) Perceiving and appraising their own emotions accurately
b) Expressing and communicating them accurately to others when appropriate
c) Recognizing the emotions in others accurately and responding to them with socially adaptive behaviours
d) Regulating emotions in themselves and others effectively in order to meet particular goals such as enhancing their own and others mood
e) Using their own emotions in order to solve problems by motivating adaptive behaviours

However, in 1997 Mayer and Salovey refined their conceptualization, constrained it to a mental ability concept and separated it from classical social-emotional personality traits (Neubauer & Freudenthaler, 2005, 35). The framework of this revised model has been shown in figure 8.

According to Neubauer & Freudenthaler (2005, 35-7) and as shown in the figure 8, in this framework the upper left branch of the previous model has been omitted. Instead, it includes a new, performance-related domain referred to as "thinking about emotions". Also, in this framework EI is considered as a collection of emotional abilities dividing into four classes arranged from more basic to higher-level skills. Within each class four representative abilities are described as following:

Class 1-Perception, Appraisal and Expression of Emotion

This class involves the receiving and recognizing of emotional data and comprising the most basic emotion-related skills ranging from the ability to identify emotions in one's self to the ability to discriminate between emotions

which are all necessary for problem solving by further processing of emotional data.

Class 2-Emotional Facilitation of Thinking

This class describes the use of emotions to enhance reasoning and suggests various emotional events assisting in intellectual processing. Emotions that direct attention to important information and different kind of moods to facilitate different forms of reasoning are also included in this class.

Class 3-Understanding and Analysing Emotions

This class involves cognitive processing of emotions and comprises four representative abilities involving abstract understanding and reasoning about emotions and ranging from the ability to label emotions and recognize relations among the words and the emotions themselves to the ability to recognize likely transitions among emotions.

Class 4-Reflective Regulation of Emotions

This class refers to the ability to manage emotions in oneself, and in others, in order to enhance emotional and intellectual growth and consist of most advanced skills, ranging from the ability to stay open to both pleasant and unpleasant feelings to the ability to manage emotions in oneself and others by enhancing pleasant emotions and moderating negative ones. In fact, this highest branch represents an interface of many factors including motivational, emotional, and cognitive ones which must be recognized and balanced in order to manage and cope with feelings successfully (Neubauer & Freudenthaler, 2005, 33-5)

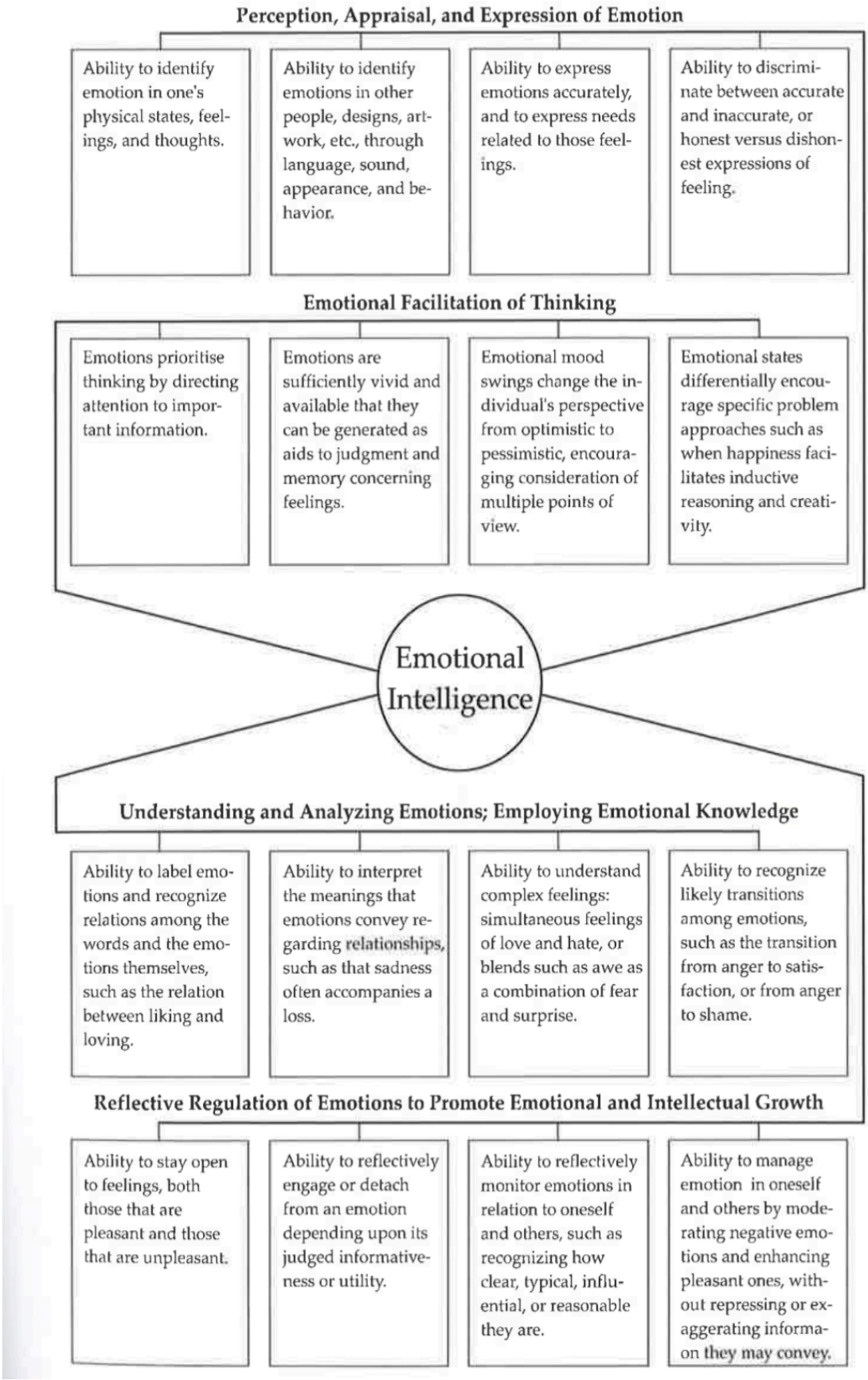


Figure 8. Mayer & Salovey's 1997 model of EI (Neubauer & Freudenthaler, 2005, 37)

2.3.2.2 Bar-On's Mixed Model of Emotional Intelligence

Bar-On (1997, 14) defined emotional intelligence as "an array of noncognitive capabilities, competencies, and skills that influence one's ability to succeed in coping with environmental demands and pressures". Indeed, he reviewed personality characteristics supposed to determine life success beyond cognitive intelligence, and identified five broad dimensions, subdivided into 15 subscales as demonstrated in figure 9. (Neubauer & Freudenthaler, 2005, 40-41)

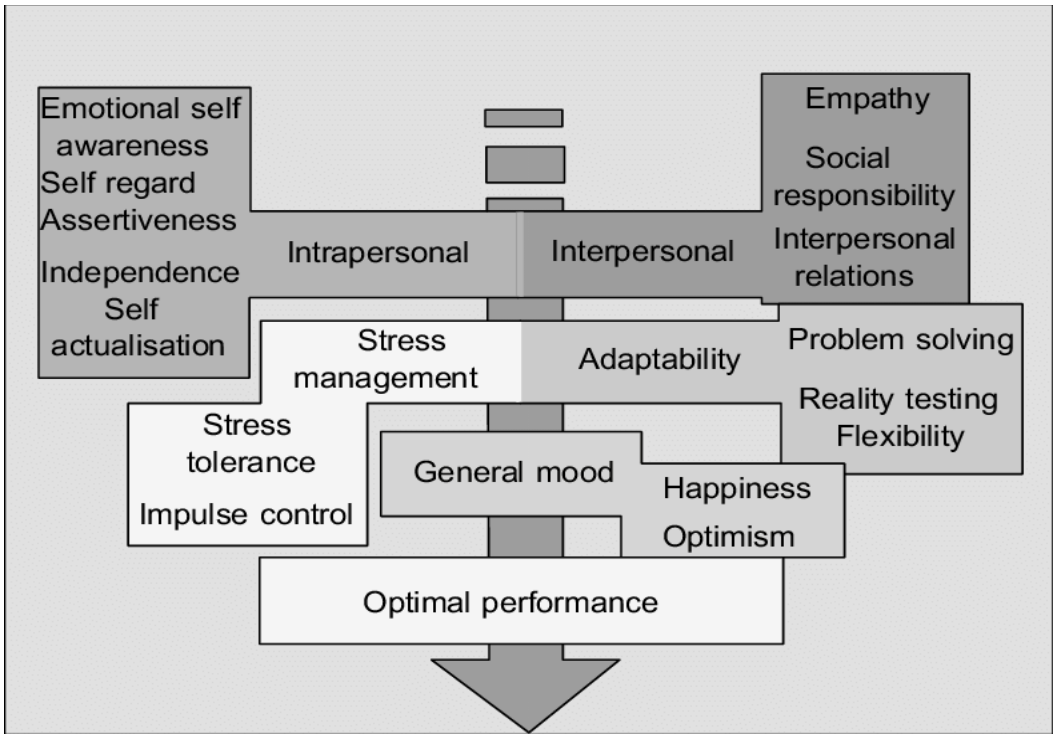


Figure 9. Bar-On EI Model (Westhuizen, 2005, 35)

These key factors of EI include (Neubauer & Freudenthaler, 2005, 41):

1. Intrapersonal skills, comprising
   - Self-regard (being aware of, understanding and accepting oneself)
   - Emotional self-awareness (being aware of and understanding one's emotions)
   - Assertiveness (expressing one's emotions, ideas, needs, and desires)
   - Self-actualization (realizing one's potential capacities)
   - Independence (being self-directed, self-controlled and free of emotional dependency)

2. Interpersonal skills, comprising
    - Empathy (being aware of and understanding other's emotions)
    - Social responsibility (demonstrating oneself as a constructive member of one's social group)
    - Interpersonal relationships (forming and maintaining intimate relationships)
3. Adaptability, comprising
    - Problem solving (solving personal and social problems constructively)
    - Reality testing (validating one's thinking and feelings)
    - Flexibility (adjusting one's feelings, thoughts, and behaviours to changing conditions)
4. Stress management, comprising
    - Stress tolerance (actively and positively coping with stress)
    - Impulse control (resisting or delaying an impulse or drive, and controlling one's emotions)
5. General mood, comprising
    - Happiness (feeling satisfied with one's life)
    - Optimism (maintaining positive attitudes)

Of course, in 2000, Bar-On proposed a revised model modified to comprising 10 out of these 15 components and includes self-regard, emotional awareness, assertiveness, empathy, interpersonal relationship, stress tolerance, impulse control, reality testing, flexibility, and problem-solving. This model is called "a model of emotional and social intelligence" and the omitted components are considered as facilitators of emotional and social intelligence indeed. (Neubauer & Freudenthaler, 2005, 41-42)

2.3.2.3 Goleman's Mixed Model of Emotional Intelligence

According to Sfetcu (2020, 39) in 1998 Daniel Goleman defined emotional intelligence as "the capacity for recognizing our own feelings and those of others, for motivating ourselves, for managing emotions well in ourselves and in our relationships" and his first model included five domains with 25 competencies including:

1. Self-awareness
2. Self-regulation
3. Social ability
4. Empathy
5. Motivation

The details of this framework with its competencies are shown in Figure 10. As shown in this figure, from these five dimensions, three of them (Self-Awareness, Self-Regulation, and Motivation) described personal competencies, that is, knowing and managing emotions in oneself and two of them (Empathy and Social Skills) described social competencies, that is, knowing and managing emotions in others (Goleman, 2001, 28-9). Further statistical analyses of Goleman's colleague, Richard Boyatzis led in collapsing of the twenty-five competencies into twenty, and five domains into four: Self-Awareness, Self-Management, Social Awareness, and Relationship Management as presented by figure 11. (Goleman, 2001, 29)

THE EMOTIONAL COMPETENCE FRAMEWORK		
Personal Skills (how we manage ourselves)	**Self-awareness**	**Knowing one's internal states, preferences, resources and intuitions**
	Emotional awareness	*Recognizing one's emotions and their effects*
	Accurate self-assessment	*Knowing one's strengths and limits*
	Self-confidence	*A strong sense of one's self-worth and capabilities*
	Self-regulation	**Managing one's internal impulses and resources**
	Self-Control	*Keeping disruptive emotions and impulses in check*
	Trustworthiness	*Maintaining standards of honesty and integrity*
	Conscientiousness	*Taking the responsibility for personal performance*
	Adaptability	*Flexibility in handling change*
	Innovation	*Being comfortable with novel ideas, approaches, and new information*
	Motivation	**Emotional tendencies that guide or facilitate reaching goals**
	Achievement drive	*Striving to improve or meet a standard of excellence*
	Commitment	*Aligning with goals of the group or organization*
	Initiative	*Readiness to act on opportunities*
	Optimism	*Persistence in pursuing goals despite obstacles and setbacks*
Social skills (how we manage relationships)	**Empathy**	**Awareness of other's feelings, needs, and concerns**
	Understanding others	*Sensing others' feelings and perspectives, and taking active interest in their concerns*
	Developing others	*Sensing others' development needs and bolstering their abilities*
	Service orientation	*Anticipating, recognizing, and meeting customers' needs*
	Leveraging diversity	*Cultivating opportunities through different kinds of people*
	Political awareness	*Reading a group's emotional currents and power relationships*
	Social Skills	**Adeptness and inducing desirable responses in others**
	Influence	*Wielding effective tactics for persuasion*
	Communication	*Listening openly and sending convincing messages*
	Conflict management	*Negotiating and resolving disagreements*
	Leadership	*Inspiring and guiding individuals and groups*
	Change catalyst	*Initiating or managing change*
	Building bonds	*Nurturing instrumental relationships*
	Collaboration & cooperation	*Working with others toward shared goals*
	Team capabilities	*Creating group synergy in pursuing collective goals*

Figure 10. Daniel Goleman's first model of EI (Nunes, 2003, 5)

	Self (Personal Competence)	Other (Social Competence)
Recognition	**Self-Awareness** • Emotional self-awareness • Accurate self-assessment • Self-confidence	**Social Awareness** • Empathy • Service orientation • Organizational awareness
Regulation	**Self-Management** • Emotional self-control • Trustworthiness • Conscientiousness • Adaptability • Achievement drive • Initiative	**Relationship Management** • Developing others • Influence • Communication • Conflict management • Visionary leadership • Catalyzing change • Building bonds • Teamwork and collaboration

Figure 11. A Framework of Emotional Competencies (Goleman, 2001, 28)

2.3.2.4 Petride's Trait Model of Emotional Intelligence

The trait model proposed by Konstantinos Vasilis Petrides is a constellation of emotional self-perceptions located at the lower levels of personality and focuses on one's perception of her emotional traits (Karibeeran & Mohanty, 2019, 123). In fact, the trait approach relates to emotional experiences and self-perceptions of participants, which is measured through self-report inventories (Brackett & Meyer, 2003). Trait approach of EI encompasses behavioral dispositions and self-perceived abilities and is measured by self-report, while ability approach refers to actual abilities which have proven highly resistant to scientific measurement (Karibeeran & Mohanty, 2019, 123). Illustrated in figure 12, this model comprises four factors including well-being, sociability, self-control and emotionality.

Figure 12. Four Factors of Trait Model of Emotional Intelligence (Psychology of Emotions, 2012)

2.3.3 Emotional Intelligence in Sport

Since emotions are enormously involved in sport, controlling and managing these emotions in order to gain their positive effects are also crucial matter in it and also in achieving high performance. On the other hand, because emotion can fluctuate during performance within performers and they might experience both positive and negative emotions (Hanin, 1997; Jones, 2003), according to Botterill and Brown (2002, in Gill, 2010, 49) athletes should critically reflect on their own emotional experiences and as Hanin (2000, in Gill, 2010, 49) suggests participants need to develop skills in order to recognise and manage their emotions. Therefore, it could be argued that these evidences closely align with the construct of emotional intelligence which is defined as the ability to perceive, monitor, employ, and manage emotions (Gill, 2010, 50) and show the significant role of EI in sport.

Founding's of researches so far have shown that EI positively enhance multiple psychological skills. Athletes with high level of EI demonstrated superior goal-setting (Bahrololoum, Hassani, Bandeli & Akbari, 2012), goal orientation (Ghazilli, Makvandi & Naderi, 2015), motivation for success (Kajbafnezhad, Ahadi, Heidarie, Askari & Enayati, 2012), self-confidence (Bahrololoum, 2012) and mental toughness (Cowden, 2016). Studies also emphasize the relationship between EI and negative emotions such as perceived cognitive anxiety (Lu, Li, Hsu & Williams, 2010), stress (Laborde, Brull, Weber & Anders, 2011; Tok, Binboga, Guven, Catikkas & Dane, 2013) and unpleasant emotions (Lane & Wilson, 2011) in athletes. In fact, higher levels of EI were associated with fewer negative emotions prior to and during competition. In addition, studies have shown significant negative relationship between EI and burnout (Saadati, Nikbakhsh & Afarinesh, 2014), and also sports injuries (Kalkhoran, Dasilbroon & Shariati, 2013). In total, evidence shows that EI is associated with psychological functions required for desirable sport experiences and seems to safeguard against undesirable psychological phenomena. (Magrum, Waller, Campbell & Schempp, 2019, 10)

According to Magrum, Waller, Campbell & Schempp (2019, 15) there is also link between team and individual performance with EI in sport throughout the literature (Ancuta, 2015; Crombie, Lombard, & Noakes, 2009; Hemmatinezhad, Ramazaninezhad, Ghezelsefloo, & Hemmatinezhad, 2012; Singh, 2015; Venera-Mihaela, C., 2012). Teams with high EI displayed (Crombie, Lombard, & Noakes, 2009):

a) Better emotional control under pressure
b) An improved ability to manage the emotional impact of in-game controversies
c) Greater understanding of negative emotions and their impact on performance

In addition, Magrum, Waller, Campbell & Schempp (2019, 15) points out that researches at the individual athlete level demonstrated that NCAA basketball players and professional gymnasts with high EI perform better than those with low level of EI (Ancuta, 2015; Singh, 2015). They also explain in their ten-year review of literature that the researchers Arribas-Galarraga, Saies, Cecchini, Arruza and Luis-de-cos in 2017 suggested that EI may serve as a mediator between autonomous motivation and performance and on the other hand the researchers Lane, Devonport, Soos, Karsai, Leibinger, & Hamar in 2010 suggested that EI may improve performance by enhancing pre-competitive emotional states.

In 2016 Can identified a relationship between EI and sportspersonship, suggesting that EI may help athletes avoid inappropriate behaviors such as cheating, violence, and aggression in sport (Magrum, Waller, Campbell & Schempp, 2019, 17).

Beyond the sport context, benefits of EI for athletes have been also appeared in the ten-year review of literature by Magrum, Waller, Campbell & Schempp (2019, 17). In 2014, Bai and Niazi reported that collegiate athletes with higher EI had increased levels of happiness due to possessing more skills for interacting with others. In addition, studies by Ardahan in 2012 and Ardahan & Mert in 2013 showed life satisfaction increased with an increase in EI. In 2009, Costarelli & Stamou indicated the association of EI with a healthier body image and also in 2010 Filaire, Larue & Rouveix pointed out this association with decreased levels of disordered eating. Totally, findings reinforce the importance of EI in life outside of sports too. (Magrum, Waller, Campbell & Schempp, 2019, 17)

2.4 Flow

While doing an activity, there can be moments of one's immersion when body and mind works smoothly together without any points of distraction. Throughout this complete absorption in the task at hand, one's thoughts and actions all occur fluidly and automatically as if being on automatic pilot; Senses, awareness of the the present and enjoyment are heightened while time slows down; Everything goes well and makes moments of optimal performance, being in the "state of flow", or being "in the zone". It is possible for everyone

to experience this ecstatic state while engaging in either physical activities, artistic activities, scientific activities, or even simple daily tasks if the required components are involved.

2.4.1 Definition of Flow

Mihaly Csikszentmihalyi developed the concept of flow, when sudying the creative process in the 1960s (Getzels & Csikszentmihalyi, 1976) and he was struck by the fact that when work on a painting was going well, the artist persisted single-mindedly, disregarding hunger, fatigue, and discomfort—yet rapidly lost interest in the artistic creation once it had been completed (Nakamura & Csikszentmihalyi, 2009, 89).

Csikszentmihalyi operationally defined flow as being a psychological state that can occur when challenges and skills in a situation are both high. In fact, flow occurs when the individual goes beyond his or her average experience of challenge and skill in a situation. Sport and the performing arts are environments conducive to the experience of flow, both involving a clearly defined structuring of performance around a graduated series of skills and challenges. (Jackson, 2012, 14)

Moneta and Csikszentmihalyi (1996, in Singh, Junnarkar & Kaur, 2016, 72) define flow as a “psychological state in which the person feels simultaneously cognitively efficient, motivated, and happy.” Asakawa (2004, in Singh, Junnarkar & Kaur, 2016, 72) defines flow as “the optimal state of mind in which individual feels cognitively efficient, deeply involved, and highly motivated, and also experiences a high level of enjoyment.”

2.4.2 Description of Flow

Using the term “optimal experience”, Csikszentmihalyi described this state as “occasions where we feel a sense of exhilaration, a deep sense of enjoyment, which we cherish for long and that becomes a landmark in our lives. These moments are often not passive, receptive relaxing times. They tend to occur when a person’s body or mind is stretched to its limits in a voluntary effort to accomplish something that is difficult or worthwhile” (Csikszentmihalyi, 1990, 1).

Csikszentmihalyi (1990, in Singh, Junnarkar & Kaur, 2016, 72) pointed out “in flow, we are in control of our psychical energy and everything we do adds order to consciousness. Following a flow experience, our self becomes more complex than that had been before, due to two broad psychological processes, differentiation and integration. The self becomes differentiated as the person after a flow experience feels more capable and skilled. Flow leads to integration because thoughts, intentions, feelings and the senses are focused on

the same goal. After a flow episode, one feels more together than before, not only internally but also with respect to other people and world in general. Differentiation promotes individuality while integration facilitates connections and security."

In addition, Csikszentmihalyi and Rathunde (1992, in Singh, Junnarkar & Kaur, 2016, 72) described the flow experience as "subjective state that people report when they are completely involved in something to the point of forgetting time, fatigue and everything else but the activity itself."

2.4.3 Components of Flow

The most widely accepted factors for flow to occur is based on nine dimensions as stated by Csikszentmihalyi (1990, 1993, in Singh, Junnarkar & Kaur, 2016, 73) and includes:

1. *Challenge-Skill Balance* - In flow, there is a feeling of balance between the demands of the situation and personal skills
2. *Action-Awareness Merging* – Involvement is so deep that there is a feeling of automaticity about one's actions
3. *Clear Goals* – A feeling of certainty about what one is going to do
4. *Unambiguous Feedback* – Immediate and clear feedback is received, confirming feelings that everything is going according to plan
5. *Concentration on Task at Hand* – A feeling of being really focused
6. *Sense of Control* – The distinguishing characteristic of this feeling in the flow state is that it happens without conscious effort
7. *Loss of Self-Consciousness* – Concern for the self disappears as the person becomes one with the activity
8. *Transformation of Time* – Time can be seen as passing more quickly, more slowly, or there may be a complete lack of awareness of the passing of time
9. *Autotelic Experience* – The end results of being in the Flow is a feeling of doing something for its own sake, with no expectation of future reward or benefit

To understand what the flow experience is like, it is helpful to translate these dimensions into how performers in flow describe their experience. The types of phrases used by performers to describe what being in flow is like (Jackson, 1996) include descriptors such as "felt easy", "complete task focus", "totally relaxed", "enjoying experience as it occurs", "totally absorbed in what I am doing", "endless supply of energy", "things happening automatically", "nothing else enters awareness", and "leaves you feeling great". Accompanied by positive experiential characteristics such as these, moments in flow remain etched in our memory, creating a blueprint of optimal experience. (Jackson, 2012, 14)

2.4.4 Models of Flow

The study of flow theory in order to understand the nature of flow state has been led to development of several models. All of the models of flow are designed to provide insight to the concept of flow and also to provide tools to measure it for further analysis. Here are some of the main models which have been proposed so far:

2.4.4.1 First Model of Flow State

Csikszentmihalyi noticed that experiencing flow is dependent upon the balance between two variables of the level of skills the participant brings into the action and the degree of challenge the participant meets in the moment of doing the action. In fact, flow occurs when there is adequate skill to meet the challenge (Zollars, 2017, 30). As shown in figure 13 in which skill is represented on the x-axis of a Cartesian map and challenge is represented by the y-axis, the impact of having an imbalance between skill and challenge is as following (Zollars, 2017, 31):

a. If the challenge of the activity is beyond skill level, then the participant experiences getting worried with increased self-consciousness followed by anxiety. Thus, participant begins to lose the experience of one or more of the components of flow such as a sense of control and falls out of flow.
b. When skills exceed challenges, the participant becomes bored, loses one or more of the component experiences of flow such as becoming acutely aware of the passage of time which is the opposite of “loss of time”, and falls out of flow. She might then experience anxiety and try to seek out challenges to regain the flow experience.
c. Maintaining the flow experience as represented by the Cartesian map appears as a diagonal channel that moves from bottom-left of low challenge and low skill to the upper right of high challenge and high skill.

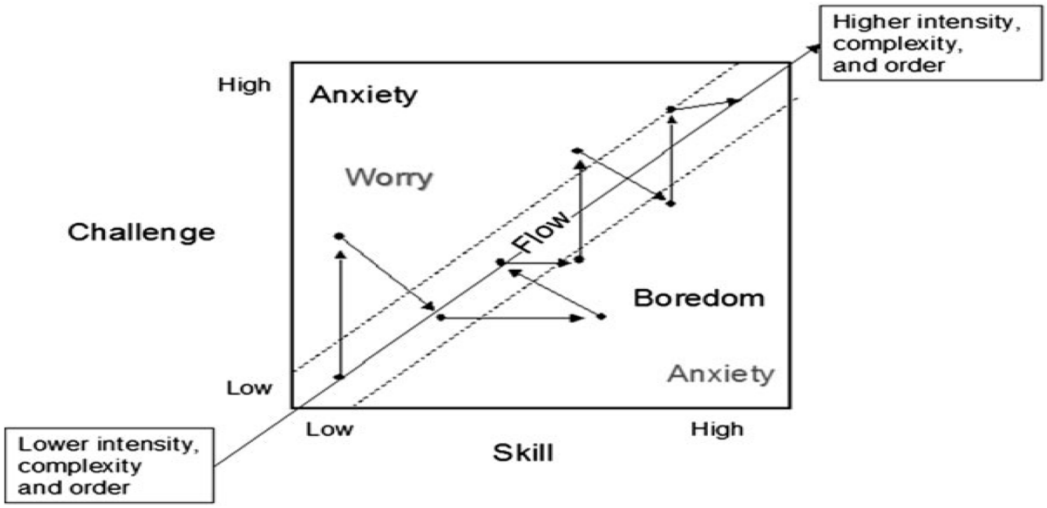


Figure 13. First Model of Flow State (Csikszentmihalyi,1975, 2000, in Singh, Junnarkar & Kaur, 2016, 74)

2.4.4.2 Quadrant Model of Flow State

In 1989 the first model of flow was revised by Csikszentmihalyi and LeFevre due to theoretical inconsistencies. According to new model, two conditions are required to experience flow as following (Singh, Junnarkar & Kaur, 2016, 74):

a. There is balance between challenges and skills
b. Both challenges and skills are greater than their weekly average

This new defined experience in four main states of flow, anxiety, boredom, and apathy is shown in figure 14; thus, it is called the “Quadrant Model”. Montena points out (2012, in Singh, Junnarkar & Kaur, 2016, 74) that the main difference between these two models of the flow state, is the addition of the “apathy”, state which is placed to be the least positive one of the four states.

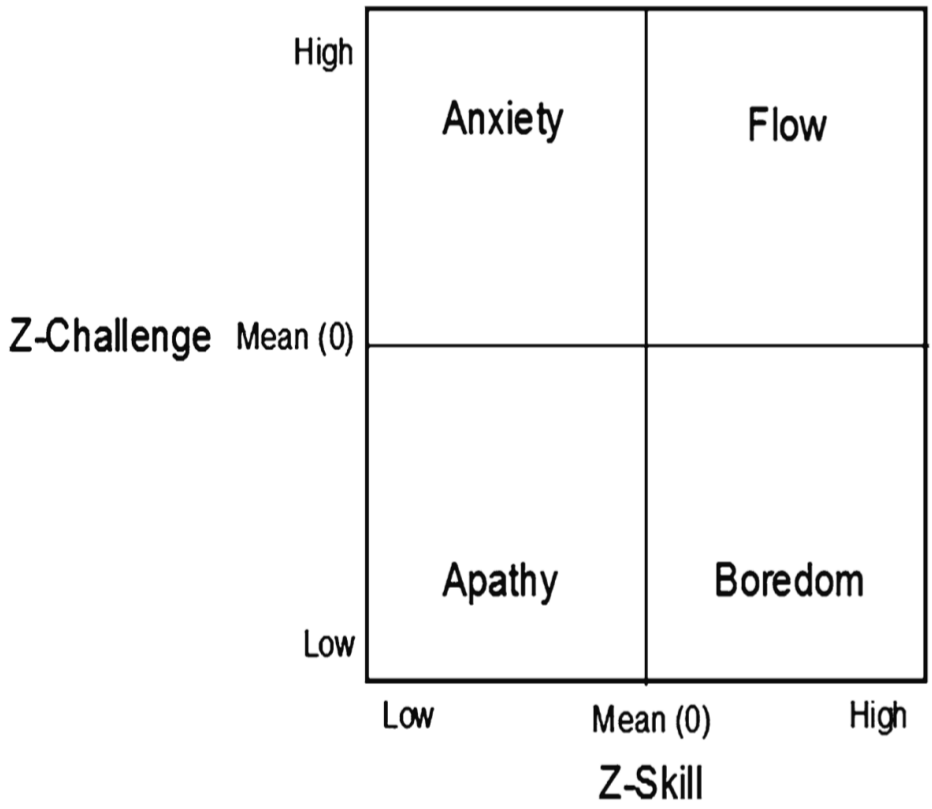


Figure 14. The Quadrant Model (Csikszentmihalyi & LeFevre, 1989, in Moneta, 2012, 35)

2.4.4.3 Absolute Difference Regression Model of Flow State

Moneta and Csikszentmihalyi in 1999 researched about an idea based on Csikszentmihalyi's previous conclusions regarding the connection between the skills-challenge balance and flow, stating that flow experiences can occur whether the balance of skills to the challenge reflects high skills and high challenge or if the balance reflects medium skills and medium challenge. This idea was explored to see if there exists a range of intensity of the flow experience as it would correlate to the intensity of the skills-challenge balance or in the other words if a balance of high skills-high challenge equate to a more intense experience of flow (Moneta and Csikszentmihalyi, 1999, in Zollars , 2017, 32). This research led to the Absolute Difference Regression Model (Zollars, 2017, 31-32) as illustrated in figure 15.

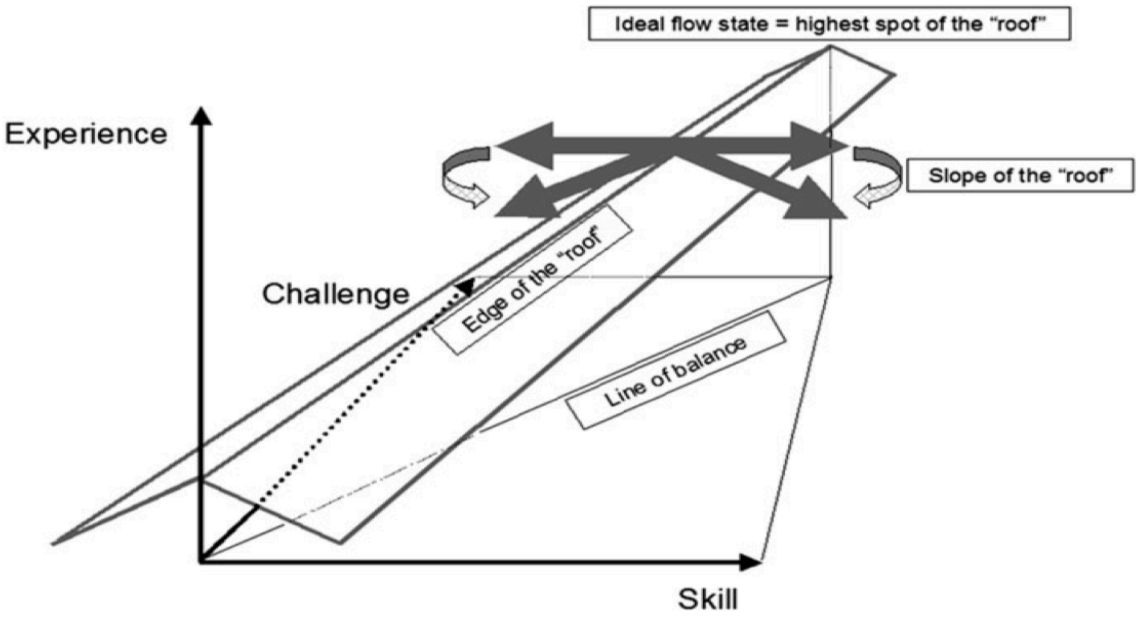


Figure 15. The three-dimensional representation of the absolute difference regression model of the flow state (Adapted from Moneta and Csikszentmihalyi, 1996, in Moneta, 2012, 38).

In fact, this model uses the skills-challenge balance as a foundational starting point for determining the existence of flow as did the previous models. The increase of skills is represented along the x-axis and the increase of challenge is represented along the y-axis. The difference is that it changes the perception of the nature of the flow experience from a static representation to a dynamic process. This change is manifested through the introduction of the dimension of subjective experience as represented along the z-axis. Subjective experience has many facets and can be defined in many ways. According to Massimini and Csikszentmihalyi (1987, 547, in Zollars, 2017, 32) employed examples of subjective experiences include concentration, control, alert, happy, cheerful, strong, friendly, active, sociable, involved, free, excited, open, clear, etc. (Zollars, 2017, 32). They actually, focused primarily on subjective experience through the lens of concentration, interest in the activity, enjoyment of the activity, or happiness to develop the above absolute difference regression model (Moneta, 2012, 39).

2.4.4.4 Componential Model of Flow State

The componential model is based on the nine components of flow. This model is more psychometrically sound model than previous ones. In 1999 Jackson and Csikszentmihalyi regarded these nine components as correlated dimensions of the flow contrast that can exchange in determining the intensity or level of flow. That means, If the level of all components is the highest, the individual will be in a most intense, complex, and ordered flow

state. On the other hand, if some components reach highest level whereas others reach only medium or low levels, it leads to producing a flow state that will be overall less intense, complex, and ordered than the ideal flow state. (Moneta, 2014, 192)

This model of flow was employed by Jackson and Eklund (2002,2004, in Moneta, 2014, 192) to study flow's variables as either state or trait and to measure flow as a state, a broad trait, and a domain-specific trait. Broad trait means the tendency to experience flow frequently and intensely across a wide range of situations, whereas domain-specific trait means the tendency to experience flow frequently and intensely in specific contexts of activity such as sport, study, work, leisure. Eventually, they developed refined and validated two standardized questionnaires:

a. Flow State Scale-2 to measure intensity of flow as a state
b. Dispositional Flow State-2 to measure intensity of flow as either a general trait or as a domain-specific trait

Thus, the componential approach provides a comprehensive definition of flow, and has generated measures for both state and trait flow with more psychometrically validity and reliability. (Moneta, 2014, 192)

To enhance the model even more Moneta (2012, 44) suggested a hybrid componential model, as shown in figure 16, that separates antecedents and facets of flow and states that the path from concentration to flow is moderated by goals, feedback, and balance.

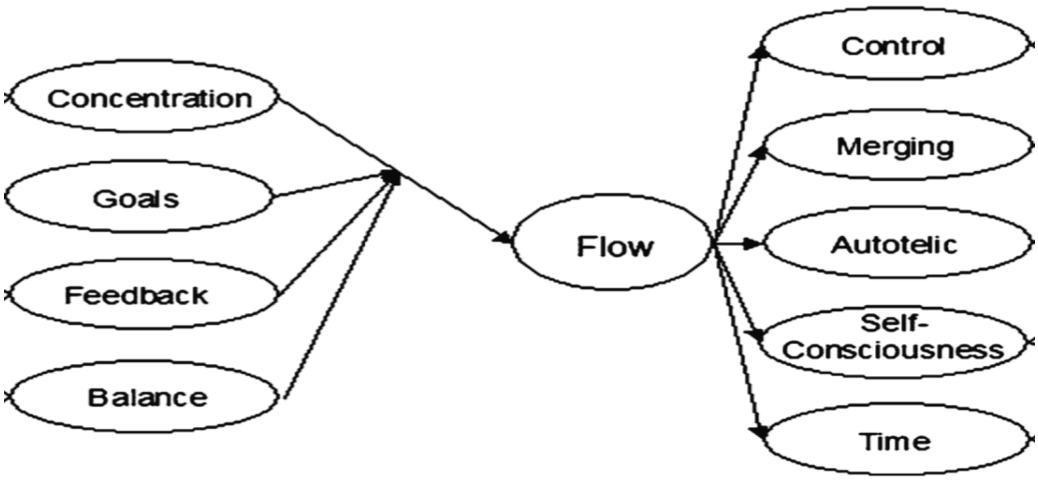


Figure 16. Hybrid Componential Model (Moneta, 2012, 44)

To clarify this model Moneta (2012, 44) explains that "…flow is presumed to cause the five latent facets: control, merging, autotelic, self-consciousness, and time. The latent facet

concentration is presumed to cause the latent construct flow, and the latent facets goals, feedback, and balance are presumed to moderate the effect that concentration has on flow. If the moderation pattern is antagonistic, the path from concentration to flow will be positive for high levels of the moderators and negative for low levels of the moderators. As such, the model states that concentration fosters flow if goals are clear, feedback is unambiguous, and challenge and skill are high and in relative balance with each other, and that concentration prevents flow if goals are unclear, feedback is ambiguous, and there is an imbalance of challenge and skill."

2.4.5 Flow in Sport

Although there are few activities such as performing music, drama, or playing chess, that are apt to make flow happen, sport also among all the things that people do in their lives presents a special opportunity for flow to occur (Jackson & Csikszentmihalyi, 1999, 6). The characteristics and nine dimensions of flow described by Csikszentmihalyi (1990, 1993) were supported in the sport environment through both quantitative and qualitative research a few years after (e.g., Jackson, 1996; Jackson & Marsh, 1996). In fact, initial studies examining flow states have focused on elite athletes (e.g., Jackson, 1995, 1996;Jackson & Robert, 1992) and the findings of them generally show that elite athletes do experience flow at least some of the time during practice or competition, and consider flow to be an important part of their sport experience. Furthermore, part of Jackson's qualitative work (1992,1995) has focused on elite athletes' perceptions of flow antecedents or factors required to optimize chances of experiencing flow in elite athletes. These critical facilitators for elite athletes seem to be such factors as confidence and positive mental attitude, motivation to perform, achieving optimal arousal level before competition and precompetitive and competitive plans; (Jackson & Kimiecik, 1998, 358-59) The factors which can be more available for highly emotionally intelligent athletes too.

However, there have also been some studies reporting concepts about how flow was experienced by athletes that do not easily reconcile with any of dimensions proposed by Csikszentmihalyi, such as "feel out of body", "watching self", "heightened sense of bodily awareness", "strong heartbeat", "awareness of being in flow" and so on. It is not clear that whether these extending dimensions apply across all sports or vary based on the nature or demand of certain sporting activities. Therefore, there seems to be scope for further investigation into, and possible refinement of, the experience of flow in sport. (Swann, 2016, 8-9)

Also, about how flow occurs in sport, there have also been other investigations of the factors influencing its occurrence through qualitative researches. The findings of these researches support the idea that flow seems to result from the interaction of internal states (e.g., focus, arousal, motivation, confidence, thoughts and emotions), external factors (e.g., environmental and situational conditions, i.e., weather, or course that suited the athlete) and behavioral factors (e.g., preparation) which is the case across all activities arguably. Despite these explorations, flow is still considered to elusive, rare and unpredictable and further research about how influencing factors combine and interact to produce or inhibit flow is needed to move toward a more accurate explanation. (Swann, 2016, 9-10)

Regarding the controllability of flow in sport and understanding if or how flow can be enhanced in terms of factors such as frequency and intensity of its experience, both intervention and qualitative studies have been conducted by researchers (Swann, 2016,10).

Some cases of intervention studies reported positive results in increasing flow. For example, Aherne & al. (2011, in Swann, 2016, 9) found that athletes undergoing mindfulness training reported significant increases in both global flow and also specifically on dimensions of “clear goals” and “sense of control” compared to control group. Thus, the potential of enhancing flow seems to be available from these initial evidences, despite that the results of other interventions were not convincing enough. (Swann, 2016, 10-11)

Results of athlete’s perceptions in controllability of flow from qualitative studies have been averagely recorded 66% of elite athletes perceiving flow to be controllable while 26.5% of them perceiving it to be difficult or impossible to control which seems to contradict the common suggestions of elusive and unpredictable state of flow. Furthermore, Chavez (2008, in Swann, 2016, 12) reported that 81% of his sample athletes perceived that it was possible to restore or reinstate flow after disruption with factors such as positive thinking, relaxing, clearing the mind and building confidence. Thus, despite of most of the researches which have focused on the initiation of flow so far, there is also great potential of understanding if or how athletes from various sport and standards are able to manage and manipulate flow during their performances. (Swann, 2016,12)

2.4.5.1 Correlates of Flow in Sport

About the correlational studies of flow in sport, several researches have been conducted so far. Results of these studies of correlations can be helpful in understanding the constructs related to flow in sport, the effects or consequences of flow in sport, specially sport performance, as well as some of its possible antecedents such as athlete engagement.

Among these results, some relationships have been found between dispositional flow and athlete's psychological skills such as the followings (Swann, 2016, 12-13):

- Athlete engagement (Hodge & al., 2009)
- Mental toughness (Crust & Swann, 2013)
- Mindfulness (e.g., Cathcart & al., 2014)
- Confidence (e.g., Koehn, 2013)
- High perceived ability (Jackson & Roberts, 1992)
- Psychological skill proficiency (Jackson & al., 2001)
- Mastery orientation (Kowal & Fortier, 1999)

In addition, it has been reported that flow can significantly predict athletes' performance (Stavrou & al., 2007). There are also relationships between skill level and flow (Catley & Duda, 1997) suggesting that elite athletes may experience flow more frequently than recreational-level athletes. (Swann, 2016, 13)

In the following tables, tables 2 to 5, summaries of researches conducted on the relationship of psychological correlates and occurrence of flow experiences in sports' performance from the results of the systematic review of Stamatelopoulou, Pezirkianidis, Karakasidou, Lakioti & Stalikas (2018, 2016-23) have been provided:

Table 2. Review of studies focused on psychological correlates and personality traits linked to flow in sport

Study	Design & Aim	Method	Sample	Key Findings
1) Crust & Swann (2013)	Cross-sectional study **Aim**: To examine the relationship between mental toughness (MT) and dispositional flow	Mental Toughness Questionnaire 48 (MTQ48) and Dispositional Flow Scale-2 (DFS-2)	135 athletes from University and local sports teams (i.e. soccer, rugby, netball, hockey). (104 men, 31 women) *Mage* = 20.81 years, *SD* = 2.76; *M experience* = 9.34 years, *SD* = 5.43	Strong correlation between MT dimension, confidence and the components of flow: a sense of control ($r = .68$; $p < .001$) and skill balance ($r = 66$; $p < .001$). Also, positive correlations emerged between total MT and global flow ($r = 0.65$, $p < .001$) and significant correlations appeared between subscales of MTQ48 and DFS-2 ($r = .26$ *to* $.68$; $p < .01$). High levels of confidence and challenge can predict the frequency of flow.
2) Koehn (2013)	Cross-sectional study **Aim**: Potential direct and indirect effects of confidence and anxiety dimensions on flow state in tennis competition.	Competitive State Anxiety Inventory-2 d (CSAI-2d), and Flow State Scale-2 (FSS-2)	59 junior tennis players (35 boys, 24 girls) *Mage* = 14.03, *SD* = 1.40; *M competition years* = 3.95, *SD* = 1.42; *M training hours per week* = 5.36, *SD* = 3.60	CSAI-2d showed significant positive correlations with eight *flow* subscales ($r = .72$, $p < .01$), expect time transformation. *Flow* dimensions showed negative links with *anxiety* constructs, more so with cognitive ($r = -.21$, $p < .01$) than with somatic ($r = -.20$, $p < .01$).
3) Koehn, Pearce, & Morris (2013)	Cross-sectional study **Aim**: To examine the mediation of confidence between sources of sport confidence (including achievement, self-regulation, and social climate) and athletes' affect in competition	Sources of Sport Confidence Questionnaire, Trait Sport Confidence Inventory (TSCI) and DFS-2	386 athletes from various sports (football, rugby, basketball, swimming and hockey) (257 men, 129 women) *Mage* = 20.69, *SD* = 3.17 *M experience* = 10.14 years, *SD* = 4.92; *M competition* = 8.14 years; *SD* = 4.22	Small significant correlations were found between sources of confidence and sport confidence ($r = .15$, $p < .01$) and dispositional flow ($r = .24$, $p < .01$). The only significant predictor of confidence appeared was achievement, $b = .15$, $p < .05$. On a subscale level, confidence showed moderate to strong association with flow dimensions of challenge–skills balance ($r = .60$, $p < .001$), sense of control ($r = .46$, $p < .001$), and concentration on the task at hand ($r = .42$, $p < .001$).
4) Koehn, Morris, & Watt (2013a)	Cross-sectional study **Aim**: To investigate the relationship between psychological correlates and flow in tennis competition	DFS-2, FSS-2, Marlowe-Crowne Social Desirability Scale-Short Form (MCSDS-SF), Action Control Scale-Sport (ACSS), Sport Imagery Questionnaire (SIQ), Tellegen Absorption Scale (TAS), and TSCI	261 junior tennis players (180 boys, 81 girls) *Mage* = 14.34, *SD* = 1.57; *M years in tennis competitions* = 4.28, *SD* = 1.86; *M training hours per week* = 9.01, *SD* = 5.87	Moderate to strong correlations found between dispositional flow and trait confidence ($r = .59$; $p < .001$), imagery use ($r = .58$; $p < .001$), and action control ($r = .41$; $p < .001$).

Continued

5) Koehn, Morris, & Watt (2013b)	Repeated-measures design **Aims**: 1) To examine main and interaction effects between imagery use and confidence on flow state in different performance contexts, 2) To assess main and interaction effects between flow state, imagery, and confidence on self-paced service and externally-paced groundstroke performance in tennis	FSS-2, SIQ, TSCI Performance was measured through shot accuracy, which was based on a point system ranging between 24 and 96 points	60 junior tennis players frequently competed in tennis tournaments *Mage* = 13.83, *SD* = 1.45; *Myears playing tennis* = 5.83; *M hours of training per week* = 7.57.	A significant correlation between *imagery* x *confidence* was found for flow state in the *groundstroke* (p *value* = .04, $p < .05$) but not in the *service* task ($p = .27$, $p < .05$). Flow state appeared to have a little higher significance in the externally- paced groundstroke performance ($r = .33$; $p < .05$) than in the self-paced task service performance ($r = .28$; $p < .05$).
6) Fullager, Knight, & Sovern (2013)	Longitudinal study **Aim**: To examine the relationship among challenge/skill balance, flow, and performance anxiety	Per week after practicing, students answered the FSS-2 and a series of questions that assessed: 1) the perceived challenge (2 items), 2) perceived skill (2 items), and 3) anxiety (single-item) while playing each passage of the music piece	27 music university students (14 men, 13 women) *Mage* = 21.71 years; *M No of recitals given* = 3.59, *SD* = 3.32	*Flow* and *performance anxiety* appeared to be negatively correlated ($r = -.57$, $p < .05$). Also, significant negative correlation emerged between *flow* and *challenge/skill balance* ($r = -.62$, $p < .05$).
7) Swann, Keegan, Piggot, Crust, & Smith (2012)	Qualitative study, **Aim**: To investigate the occurrence of flow in elite golfers	Semi-structured interviews	13 male professional golfers *Mage* = 33.5 years, *SD* = 9.28; *M experience* = 11.8 years, *SD* = 10.28	Facilitators of flow found to be: *motivation to perform*, effective preparation, *appropriate focus*, *positive state*, *letting it happen*, psychological interventions, optimal environmental and situational conditions, *optimal arousal*, maintenance of physical state, pre-shot routine, and playing well.
8) Swann, Piggot, Crust, Keegan, & Hemmings (2015)	Qualitative study **Aim**: To explore the specific ways in which facilitators influenced flow occurrence in European Tour golfers	Semi-structured Interviews Data were interpreted using an iterative process of thematic and connecting ana- lyses	10 male professional golfers who had all played full-time on the European Tour for at least one full season.	10 facilitators of flow were identified, of which *commitment* and the *caddie* have not been reported previously, and *confidence* and *concentration* also emerged as key constructs. 24 connecting links were identified in the data, through which the caddie, effective preparation, and high-quality performance appeared to be most influential for flow occurrence.
9) Swann, Keegan, Crust, & Piggot (2016)	Mixed-method multiple case study **Aim**: To better understand the occurrence and experience of flow in elite golf	1) direct observations, 2) performance data, and 3) interviews	10 male professional golfers. 4 players had competed full-time on the European Tour 2, 2 had won European Tour events. 2 had competed full-time on the Challenge Tour, with nine Challenge Tour wins between them.	2 different states were described as: 1) "*letting it happen*" which corresponded with the definition and description of flow; and 2) "*making it happen*" which was more effortful and intense, involved a heightened awareness of the situation.

Continued

10) Jackman, Hout, Lane, & Fitzpatrick (2014)	Qualitative study **Aim**: To explore the conditions that: (a) facilitate, (b) inhibit and (c) disrupt the occurrence of flow in flat horse racing	Semi-structured inter- views. 4 distinct sections: (a) background and career history (b) flow (c) flow inhibition and (d) flow disruption	10 Irish professional male Flat jockeys *Mage* = 27.4 years, *SD* = 7.14; *M career length* = 9.16 years, *SD* = 5.9; *M number of race wins* = 31.94, *SD* = 15.99 (2012 season)	12 conditions found to capture the essence of the flow experience: environmental and situational conditions, experience interaction with trainer/owner, physical readiness, effective preparation, performance assessment *confidence*, *optimal arousal*, *focus*, *motivation*, horse demeanor and performance and relationship between horse and jockey.
11) Aubé, Brunelle, & Rousseau (2014)	Cross-sectional study **Aim**: To test the relationships between flow experience, team goal commitment and team performance.	9-item Flow Scale, Information exchange (2 items), Team goal commitment (3 items), Team performance potential control variable	85 teams (395 members) of undergraduate and graduate students from a Canadian business school participating in a project management simulation as part of their course work. Team size varied from 4 to 6 members. 49% women, 51% men; *Mage* = 28.7 years, *SD* = 6.5	Flow experience is positively related to team performance ($r = .40$, $p < .01$). This relationship is mediated by *team goal commitment* (3 models analysis, p.125) and moderated by the level of *information exchange between team members* ($\Delta R^2 = .044$, $p < .01$, **Table 3**, p. 126).

Table 3. Review of studies focused on the internal states that can facilitate the flow experience

Study	Design & Aim	Method	Sample	Key Findings
12) Schüler & Brandstätter (2013)	Correlational and experimental study designs **Aim**: To examine the effect of need satisfaction on flow. And to examine the effect of *competence need satisfaction* is moderated by the **achievement motive** and if the effect of *need-for-relatedness satisfaction* is moderated by the **affiliation motive** in different sports domains.	**4** studies were conducted in different sport domains (badminton, fitness, volleyball). Multi-Motive-Grid (MMG), Competence environment (3 items), Flow Short Scale	**1:** 61 male and 33 female advanced badminton players *Mage* = 20.6 years, *SD* = 1.1 **2**: 78 undergraduate students without any experience in volleyball (60 women) *Mage* = 25 years, *SD* = 6.12 **3**: 695 students and alumni were recruited from university fitness courses (409 females) *Mage* = 32 years, *SD* = 9.97 **4**: 262 members of sports clubs *Mage* = 33.5, *SD* = 10.4	**1**: Achievement motive associated with the competence environment ($r = .23$, $p < .05$) and flow experience ($r = .21$, $p < .05$). Competence environment related to the flow experience ($r = .25$, $p < .001$). **2**: Achievement motive (*competence condition*) positively correlated to flow ($r = .26$), achievement motive (*control group*) negatively related to flow ($r = -.32$). **3**: *Competence* (need satisfaction) appeared to be *significantly correlated to AFF motive* ($r = .15$, $p < .01$) more than ACH motive ($r = .06$), and relatedness (need satisfaction) isn't significantly correlated to AFF motive ($r = .07$) and ACH motive ($r = .05$). **4**: *Competence* (need satisfaction) appeared to be *significantly correlated to AFF motive* ($r = -.19$, $p < .05$).
13) Schüler, Wegner, & Knechtle (2014)	Cross-sectional Study **Aim**: To test whether the implicit achievement and affiliation motives interact with the need for competence and the need for social relatedness satisfaction, respectively, to predict flow experience and well-being in extreme sports.	***Pilot study***: Picture Story Exercise (PSE), Sheldon & Hilpert's Balanced Measure of Psychological Needs, Flow Short Scale ***Main study***: The above plus Exercise Addiction Inventory	***Pilot study***: 29 ultra-endurance athletes (long-distance runners, triathletes, long-distance bikers; 24 men) *Mage* = 47.5 years, *SD* = 7.85 ***Main study***: 93 German-speaking long-distance runners (73 men) *Mage* = 47.7, *SD* = 9.46	*Achievement and affiliation motive* were unrelated ($r = .02$). *Achievement motive* was significantly related to *relatedness satisfaction* ($r = .22$, $p < .05$). Basic *need for competence and relatedness satisfaction* were associated with *each other* ($r = .68$, $p < .001$) and with *flow* ($r = .23$, $r = .26$, $p < .05$) on a highly significance level.
14) Oertig, Schüler, Brandstätter, & Augustine (2014)	Laboratory and naturalistic study **Aim**: To examine the joint influence of *avoidance temperament* and *avoidance-based achievement goals* on the experience of flow on a creativity task	**The indicators of avoidance temperance were BIS sensitivity (Study 1) and neurotism (Study 2)** **Study 1**: Randomly assigned to one of four goal conditions (2 V 2 achievement goal framework) and then given a verbal creativity task (*Flow Short Scale and BIS sensitivity scale*) **Study 2:** Different creativity task and avoidance temperament was operationalized in terms of individual differences in neuroticism (*NEO Five-Factor Inventory*)	**Study 1:** 101 university students from Switzerland (74.3% women) *Mage* = 22.61 years, *SD* = 4.03 **Study 2:** 102 high school students from Switzerland (48.0% females) *Mage* = 16.23 years, *SD* = 1.13	**Study 1:** No significant correlations between BIS sensitivity and baseline flow ($r = -.14$, $p = .16$) or post-manipulation flow ($r = .01$, $p = .94$). **Study 2**: Significant correlation between neuroticism and baseline flow ($r = -.17$, $p = .09$) and no correlation between neuroticism and post-manipulation flow ($r = -.03$, $p = .78$).

Continued

15) Koehn & Morris (2014)	Factorial design **Aim**: To examine interaction effects between skill level and performance contexts on the experience of flow in adolescent tennis players.	Dispositional Flow Scale-2 (DFS-2) and Open-ended questions	84 junior tennis players (55 boys, 29 girls) *Mage* = 14.45 years, *SD* = 1.53	*Club players* experienced flow with similar frequency in most performance contexts (training-competition) expect differences in the contexts of action-awareness merging (50%), unambiguous feedback (50%) and time transformation (50%) whereas *ranging list players* experienced flow more often during training than competition with shared variance between performance contexts ranged from 21% (challenge/skill balance) to 62% (time transformation).
16) Bertollo et al. (2015)	Counterbalanced-repeated measure trial **Aim**: To investigate the effect of different internal and external associative strategies on endurance performance.	3 experimental conditions to test the notion that *different attention-performance* types (Multi-action plan model; MAP) (***Optimal Type* 1** *(flow-feeling attentional mode),* ***Functional Type* 2** *(associative focus directed at core components),* and ***Dysfunctional Type* 3** (attentional focus directed at irrelevant components) would influence *endurance time* on a cycling task. Also, *psychological markers of fatigue* and 3 *affects* (i.e., RPE, hedonic tone and arousal) were measured	17 students (5 women, 12 men) *Mage* = 24.3 years, *SD* = 4.9	*Type* 1 *and Type* 2 attentional strategies, compared to Type 3 strategy, exerted functional effects on performance (time to exhaustion, arousal, hedonic tone, whereas a Type 3 strategy was linked to lower performance, and lower levels of arousal and pleasantness.

Table 4. Review of the studies focused on the way that flow is experienced in sports

Study	Design & Aim	Method	Sample	Key Findings
17) Swann, Crust, Keegan, Piggot, & Hemmings (2015)	Qualitative Research **Aim**: To explore perceptions regarding the experience of flow in elite golf	Semi-structured interviews	10 male professional golfers. They held a European Tour card for at least one full season (*range* = 1 - 24; 6 seasons; *M* = 10.7; *SD* = 7.5). Ages ranging from 23 to 58 (*SD* = 13.08)	Golfers reported being aware of flow experiences and able to manage them. They stated that *altered cognitive and kinesthetic perceptions,* visualizing well, visual narrowing, magnified visual perceptions, altered perceptions of time, loss of memory, sense of lightness, feel enhanced physically, feeling calm/relaxed, feeling the adrenaline were generated and that flow was observable (e.g. through changes in behavior).

sports environments A basic study, revealing the main findings on the factors that facilitate flow, is that by Swann et al. (2015), who found 11 factors leading to flow: among them where *motivation to perform*, *appropriate focus*, *letting it happen*, *optimal arousal*. To add in this section, a new study (Swann et al., 2015,

Table 5. Review of the intervention studies

Study	Design & Aim	Method	Sample	Key Findings
18) Briegel-Jones, Knowles, Eubank, Giannoulatos, & Elliot (2013)	Mixed methods design ***Aim***: To examine the effects of a 10-week yoga intervention on mindfulness and dispositional flow of elite youth swimmers	Qualitative Survey (10-week Sivananda Yoga Program), Child and Adolescent Mindfulness Measure (CAMM) and DFS-2	21 elite youth swimmers (10 males, 11 females; *M* age = 13.24 years, *SD* = 1.51 years) selected from two affiliated national training sites of the Amateur Swimming Association in the UK	No significant changes in mindfulness and dispositional flow were identified (*CAMM*, was no significant interaction effect between time and group ($F[1, 19] = 0.44$, $p = .837$), *DFS*-2, no significant interaction effect between time and group ($F[1, 19] = 3.41$, $p = .08$) However, the intervention had a positive impact on a range of *physiological, cognitive*, and *performance parameters* that included elements of *mindfulness and flow.*
19) Hutchinson, Karageorghis, & Jones (2014)	Cross-sectional study **Aim**: To examine the effects of music and music-video on a range of psychological and psychophysical variables during treadmill running at intensities above and below ventilatory threshold (VT).	Participants exercised at 10% of maximal capacity below VT and 10% above under music-only, music-video, and control conditions. Feeling Scale (FS), Felt Arousal Scale (FAS), Tammen's single-item attentional focus scale, Borg's Perceived Exertion Scale (RPE) scale, and Experimental Testing Heart Rate (HR)	24 habitually active participants (14 men and 10 women) *Mage* = 21.3 years, *SD* = 3.9; $M_{BMI} = 23.55$, *SD* = 2.14	The music-video condition elicited the highest levels of dissociation, lowest RPE, and most positive affective responses regardless of exercise intensity. *Attentional manipulations* influence psychological and psychophysical variables at exercise intensities above and below VT, and this effect is enhanced by the combined presentation of auditory and visual stimuli.
20) Bortoli, Bertollo, Hanin, & Robazza (2012)	Longitudinal design *Aim*: To help improve, stabilize, and optimize their performances during practice and competition (use of a multi-action plan intervention model)	1) Shooters described their optimal sequence of actions for the execution of a single shot from the start 2) They identified three or four of the most important core components to optimal performance 3) They assessed themselves by rating the quality of each core component 4) The core components were further assessed under conditions of increased distress and simulated competition	15 Italian shooters (*Mage* = 27.9 years, *SD* = 8.1) of the London 2012 Olympics	MAP improved individual's awareness of the core components and management of distressful conditions during shooting similar to those found in competition. Direct emotion, self-regulation treatments have been successfully applied in sports where performers were trained to either decrease or increase their levels of competitive self-confidence, anxiety, and pleasant/unpleasant emotional states to achieve their optimal states and to perform moptimally. Emotion-focused strategies can be used in combination with action-focused strategies to maintain or regain optimal performance.

Briefly, Stamatelopoulou, & al. (2018, 2027) concluded that confidence, anxiety, positive, calm and relaxed sate, commitment, motives, goals, and attention were considered as the main factors influencing the appearance and occurrence of the flow experience. In addition, motivation for performance, optimal focus and arousal, the "letting it go" state and altered and cognitive and kinesthetic perceptions modified the experience of flow in sport. In total, flow seemed to have a strong connection with psychological correlates and internal states such as motivation, focus and arousal.

3 Method

3.1 Participants

The sample was a group of n=94 young team-sport athletes consisting 39 female basketball players of 14-17 years old, 8 male basketball players of 15-17 years old, 32 male ice hockey players of 14-17 years old, 5 male floorball players of 16-18 years old and 10 male ice hockey players of 17-23 years old. Players were recruited mostly from clubs of Finland such as YMCA Heinola, KooKoo, LASB, ….

3.2 Procedure

A questionnaire in Google Form was prepared and sent to the coaches so that they would distribute to and ask their athletes to answer it. The collected responses then transferred to Excel to record for further analysis.

3.3 Measures

The questionnaire utilized for this research includes a survey for measuring EI and a survey for measuring Dispositional Flow.

To assess EI a 19-item version of EIS self-report test adapted for sport have been used. This scale comprises 6 factors including Appraisal of others' emotions, Appraisal of own emotions, Regulation of emotions, Social skills, Utilization of emotions, and Optimism.

To measure Dispositional Flow the brief version of DFS-2 consisting of 9 items has been applied. In fact, for each 9 subscales of Dispositional Fow Scale consisting Merging of action and awareness, Challenge-Skill balance, Sense of control, Clear goals, Autotelic experience, Concentration on task, Loss of self-consciousness, Transformation of time, and Unambiguous feedback, one question is included in the questionnaire to make a total of 9 questions and a brief scale of dispositional flow suitable for young athletes.

3.4 Results

The final scores were made from the responses of the participants to the questionnaire and descriptive statistics of them were calculated including means, standard deviations, minimum, and maximum. Next, outliers and missing values was removed from the data. After cleaning the data, the scores of 81 participants consisting of 39 girls ranging in age from 13 to 17 and 42 boys ranging in age from 14 to 19 were imported to SPSS to find

any possible correlation and regression between the variables EI, Flow and their sub-scales. All of the scores of EI, Flow and each of the subscales are out of 100.

3.4.1 Descriptive Statistics

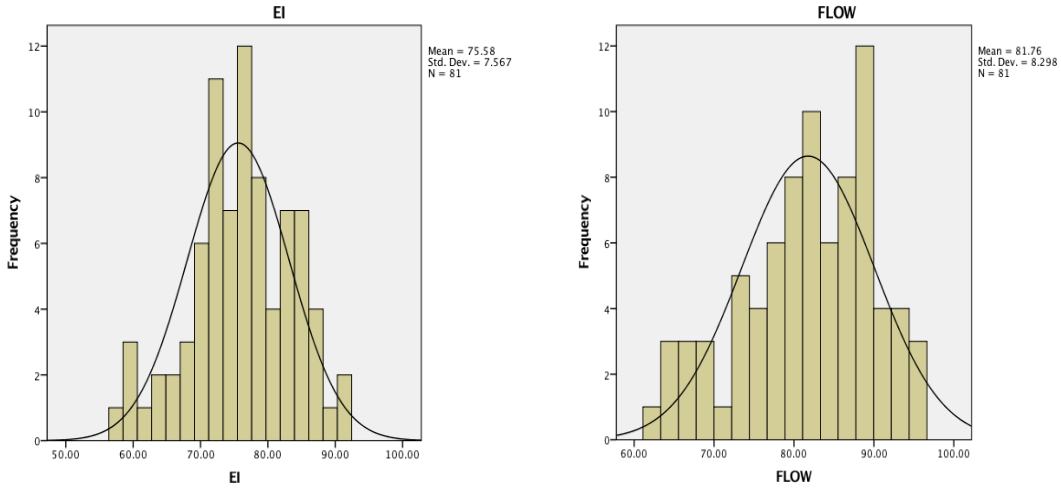
Descriptive analysis of the scores of 81 participants in EI and Flow was done on SPSS and it is summarized on table 6.

Table 6. Descriptive Statistics of Variables EI, Flow & Age

Function	EI	FLOW	Age
N	81	81	81
Mean	75.5846	81.7558	15.617
Std. Deviation	7.56702	8.29812	1.0556
Range	32.98	33.34	6.0
Minimum	57.45	62.22	13.0
Maximum	90.43	95.56	19.0

In addition, histograms with normal curve was produced for variable EI and Flow and they are shown below on figure 17.

Figure 17. Histogram with Normal Curve for EI & Flow



On table 7, descriptive statistics of EI and Flow for female and male groups are presented separately. Interestingly, the statistics for EI are closely similar in females and males. However, there are significant differences in Flow's descriptive statistics between female and male groups. In fact, these statistics in male group are noticeably higher than in female group and in this sample, males are averagely experiencing higher rate of dispositional flow than females.

Table 7. Descriptive statistics of EI and Flow for Females & Males

	Gender	EI	FLOW
Female	Mean	75.1228	77.1510
	N	39	39
	Std. Deviation	7.73895	8.26768
	Minimum	57.45	62.22
	Maximum	89.36	88.89
	Range	31.91	26.67
Male	Mean	76.0133	86.0317
	N	42	42
	Std. Deviation	7.47169	5.66633
	Minimum	58.51	75.56
	Maximum	90.43	95.56
	Range	31.92	20.00

3.4.2 Correlations

Pearson and Spearman correlation was obtained from SPSS between the variables EI, Flow and their subscales. Results of both were very similar. Based on these results, there is a small but statistically significant correlation between Emotional Intelligence and Dispositional Flow ($r = .23$, $p<0.5$). Table 8 shows the results of Pearson Correlation between variables EI and Flow.

Table 8. Pearson Correlation Between EI & Flow

		FLOW	EI
FLOW	Pearson Correlation	1	.227*
	Sig. (2-tailed)		.042
	N	81	81
EI	Pearson Correlation	.227*	1
	Sig. (2-tailed)	.042	
	N	81	81

*. Correlation is significant at the 0.05 level (2-tailed).

In addition, some significant correlations were found between EI & Flow's subscales and Flow & EI's dimensions which are highlighted by significant Correlation at level 0.05 with light green and significant correlation at level 0.01 with green on table 9 and 10. The correlations between all the subscales of Flow and EI are also provided on table 18 in Appendix 1.

According to table 9, there are moderate positive significant correlations between EI and Concentration on Task of Flow (r=0.30, p<0.01) and also between EI and Unambiguous Feedback of Flow (r=0.25, p<0.05). In addition, as we notice on Table 10 , there are moderately positive significant correlations between Flow and Regulation skill of EI (r=.29, p<0.01), Flow and Utilization of Emotions in EI (r=0.3, p<0.01) and also between Flow and Appraisal of Own (r=0.28, p<0.05) .Therefore, by considering the level of significance at p<0.05 there are enough evidences that all these correlations mentioned above exist.

By further studying of the results at subscale level, we can observe that there are significant correlations between Appraisal of Own and other dimensions of EI except for Appraisal of Others, while Appraisal of Others only correlates with Social Skills. Also, there are significant correlations between Optimism and other subscales of EI except for again Appraisal of Others. Furthermore, Utilization of Emotions significantly correlates with Regulation and Social Skills.

Table 9. Correlation Among EI and Flow's Subscales

		EI	Merging of Action and Awareness	Challenge and Skill Balance	Sense of Control	Clear Goal	Autotelic Experience	Concentration on task	Loss of consciousness	Transformation of Time	Unambiguous Feedback
EI	Pearson Correlation	1	.085	.142	.070	.197	.096	.302**	.084	-.052	.247*
	Sig. (2-tailed)		.453	.206	.532	.078	.394	.006	.455	.647	.026

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

Table 10. Correlation Among Flow and EI's Subscales

		Flow	Appraisal of Others	Appraisal of Own	Regulation	Social Skills	Utilization of Emotions	Optimism
FLOW	Pearson Correlation	1						
	Sig. (2-tailed)							
Appraisal of Others	Pearson Correlation	-.109	1					
	Sig. (2-tailed)	.333						
Appraisal of Own	Pearson Correlation	.284*	.097	1				
	Sig. (2-tailed)	.010	.388					
Regulation	Pearson Correlation	.288**	-.038	.377**	1			
	Sig. (2-tailed)	.009	.736	.001				
Social Skills	Pearson Correlation	.008	.418**	.352**	-.057	1		
	Sig. (2-tailed)	.947	.000	.001	.615			
Utilization of Emotions	Pearson Correlation	.297**	.167	.390**	.253*	.273*	1	
	Sig. (2-tailed)	.007	.135	.000	.023	.014		
Optimism	Pearson Correlation	.010	.181	.446**	.362**	.301**	.331**	1
	Sig. (2-tailed)	.927	.106	.000	.001	.006	.003	

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

3.4.3 Regressions

Simple linear regressions were calculated among the significantly correlated variables including the followings at the p-value<.05:

A simple linear regression was calculated to predict Flow based on EI and the result is presented on Table 11. A significant regression equation was found (F (1,79) = 4.283, p=.042) with an R^2 of .051. Participants' predicted Flow is equal to 62.959 + .249(EI). Participant's Flow increased .249 for each unit of EI.

Table 11. Simple Linear Regression to Predict Flow Based on EI

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.227[a]	.051	.039	8.13293

a. Predictors: (Constant), EI

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	283.295	1	283.295	4.283	.042[b]
	Residual	5225.415	79	66.144		
	Total	5508.710	80			

a. Dependent Variable: FLOW

b. Predictors: (Constant), EI

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	62.959	9.127		6.898	.000
	EI	.249	.120	.227	2.070	.042

a. Dependent Variable: FLOW

A simple linear regression was calculated to predict Concentration on Task based on EI and the result is presented on Table 12. A significant regression equation was found (F (1,79) = 7.951, p=.006) with an R^2 of .091. Participants' predicted Concentration on Task is equal to 52.829 + .471(EI). Participant's Concentration on Task increased .471 for each unit of EI.

Table 12. Simple Linear Regression to Predict Concentration on Task Based on EI

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.302[a]	.091	.080	11.29416

a. Predictors: (Constant), EI

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1014.272	1	1014.272	7.951	.006[b]
	Residual	10077.086	79	127.558		
	Total	11091.358	80			

a. Dependent Variable: Concentration on task

b. Predictors: (Constant), EI

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	52.829	12.675		4.168	.000
	EI	.471	.167	.302	2.820	.006

a. Dependent Variable: Concentration on task

A simple linear regression was calculated to predict Unambiguous Feedback based on EI and the result is presented on Table 13. A significant regression equation was found (F (1,79) = 5.154, p=.026) with an R^2 of .061. Participants' predicted Unambiguous Feedback is equal to 47.003 + .450(EI). Participant's Unambiguous Feedback increased .450 for each unit of EI.

Table 13. Simple Linear Regression to Predict Unambiguous Feedback Based on EI

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.247[a]	.061	.049	13.40457

a. Predictors: (Constant), EI

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	926.064	1	926.064	5.154	.026[b]
	Residual	14194.923	79	179.683		
	Total	15120.988	80			

a. Dependent Variable: Unambiguous Feedback

b. Predictors: (Constant), EI

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	47.003	15.044		3.124	.002
	EI	.450	.198	.247	2.270	.026

a. Dependent Variable: Unambiguous Feedback

A simple linear regression was calculated to predict Flow based on Regulation and the result is presented on Table 14. A significant regression equation was found (F (1,79) = 7.143, p=.009) with an R^2 of .083. Participants' predicted Flow is equal to 66.212 + .189(Regulation). Participant's Flow increased .189 for each unit of Regulation.

Table 14. Simple Linear Regression to Predict Flow Based on Regulation

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.288[a]	.083	.071	7.99676

a. Predictors: (Constant), Regulation

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	456.807	1	456.807	7.143	.009[b]
	Residual	5051.903	79	63.948		
	Total	5508.710	80			

a. Dependent Variable: FLOW

b. Predictors: (Constant), Regulation

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	66.212	5.883		11.254	.000
	Regulation	.189	.071	.288	2.673	.009

a. Dependent Variable: FLOW

A simple linear regression was calculated to predict Flow based on Utilization of Emotions and the result is presented on Table 15. A significant regression equation was found (F (1,79) = 7.632, p=.007) with an R^2 of .088. Participants' predicted Flow is equal to 62.221+ .260(Utilization of Emotions). Participant's Flow increased .260 for each unit of Utilization of Emotions.

Table 15. Simple Linear Regression to Predict Flow Based on Utilization of Emotions

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.297[a]	.088	.077	7.97417

a. Predictors: (Constant), Utilization of Emotions

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	485.310	1	485.310	7.632	.007[b]
	Residual	5023.401	79	63.587		
	Total	5508.710	80			

a. Dependent Variable: FLOW

b. Predictors: (Constant), Utilization of Emotions

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	62.221	7.126		8.731	.000
	Utilization of Emotions	.260	.094	.297	2.763	.007

a. Dependent Variable: FLOW

A simple linear regression was calculated to predict Utilization of Emotions based on Flow and the result is presented on Table 16. A significant regression equation was found (F (1,79) = 7.632, p=.007) with an R^2 of .088. Participants' predicted Flow is equal to 47.360+ .338(Flow). Participant's Flow increased .338 for each unit of Flow.

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Table 16. Simple Linear Regression to Predict Utilization of Emotions Based on Flow

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.297[a]	.088	.077	9.08971

a. Predictors: (Constant), FLOW

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	630.592	1	630.592	7.632	.007[b]
	Residual	6527.207	79	82.623		
	Total	7157.799	80			

a. Dependent Variable: Utilization of Emotions

b. Predictors: (Constant), FLOW

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	47.360	10.063		4.706	.000
	FLOW	.338	.122	.297	2.763	.007

a. Dependent Variable: Utilization of Emotions

A simple linear regression was calculated to predict Regulation based on Flow and the result is presented on Table 17. A significant regression equation was found (F (1,79) = 7.143, p=.009) with an R^2 of .083. Participants' predicted Regulation is equal to 46.291 + .438(Flow). Participant's regulation increased .438 for each unit of Flow.

Table 17. Simple Linear Regression to Predict Regulation Based on Flow

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.288[a]	.083	.071	12.1627

a. Predictors: (Constant), FLOW

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1056.724	1	1056.724	7.143	.009[b]
	Residual	11686.486	79	147.930		
	Total	12743.210	80			

a. Dependent Variable: Regulation

b. Predictors: (Constant), FLOW

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	46.291	13.465		3.438	.001
	FLOW	.438	.164	.288	2.673	.009

a. Dependent Variable: Regulation

4 Discussion

The purpose of this study was to investigate possible correlations and regressions between emotional intelligence and flow in junior team-sport athletes. The following questions were specifically asked:

1. Does emotional intelligence significantly correlate with flow and if yes can it predict flow?

2. Is emotional intelligence significantly correlated with any element of flow state and if yes can it predict this element of flow?

3. Is there any dimension of emotional intelligence that significantly correlate with flow and if yes can it predict flow or can flow predict this dimension of EI?

The results show a small but statistically significant positive correlational relationship between an athlete's Emotional Quotient and her Dispositional Flow score. The study more specifically found moderate statistically significant positive relationship between an athlete's Emotional Quotient and her Concentration on Task and also Unambiguous feedback. Furthermore, moderately significant relationships were found between an athlete's Regulation Skill and also Utilization of Emotions with her Dispositional Flow score. In addition, EQ, Regulation and Utilization of Emotions can be the predictors of Dispositional Flow score in athletes. Also, EQ can be a predictor for Concentration on Task and for Unambiguous Feedback as components of flow sate. On the other hand, Dispositional Flow score can predict the scores of Regulation and Utilization of Emotions in an athlete. While much more research including experimental design one is required to further investigate and understand these relationships, evidence that improved emotional intelligence may increase dispositional flow state in athletes is significant.

4.1 Validity and Reliability

The validity and reliability of the scales applied in this research has been confirmed through previous studies. The 19-item version of EIS was used to measure emotional intelligence of athletes. The validity of this scale for using in sport context has been confirmed by the study of Lane, Thelwell, Devonport & Gill published in Journal of sports science & medicine in 2009. This study suggests that researchers could use a 19-item version of EIS to assess perceptions of or self-reported EI in athletes. (Lane, Thelwell, Devonport & Gill, 2009, 294)

According to the study of Jackson, Martin, & Eklund (2008, 561), the brief version of DFS-2 used in this research to measure dispositional flow demonstrates acceptable model fit, reliability, and distributions; associations with key correlates in parallel and hypothesized ways; and invariance in factor loadings, while providing options for assessing flow in different contexts and with the operation of different goals or constraints.

4.2 Conclusion and Recommendations

Since emotional intelligence plays an important role for an individual in experiencing success through different areas of life as well as sport, and also entering the state of flow and remaining on this state longer and more frequently eventuate in increasing achievement of peak performance, the relationships found in this study between these two psychological factors and their subscales give deeper insight into their nature, development and implement in every performance-based activities. Despite the positive correlation between overall EI and Flow is not very strong, but it is statistically significant and EI can predict dispositional flow state. Therefore, by improving emotional intelligence of an athlete, her rate of experiencing flow state can increase. Specifically, based on the findings of this study, it is recommended for coaches to emphasize on improving the skills of regulation and utilization of emotions in their athletes in order to raise their levels of experiencing flow state to a higher degree.

Mindfulness techniques are one of the best strategies to improve both emotional intelligence skills and flow state. There is abundance of findings throughout the literature supporting the beneficial effects of mindfulness on many psychological skills as well as these two factors. The results of the study of Hill & Updegraff (2011,88) showed the existence of relationship between mindfulness and emotion regulation and suggested that it may influence emotion regulation by influencing people's awareness of their emotional experiences which can be considered as " appraisal of own emotions" in this study as an element of emotional intelligence. Besides, according to Josefsson & al. (2017, 1354) by increasing dispositional mindfulness in competitive athletes by practice, rumination may decrease while capacity to regulate negative emotion can increase; thus, the athletes' sport-related coping-skills, and therefore their athletic performance can be enhanced. On the other hand, the outcome of a systematic review conducted by Rivera, Quintana & Rincon in 2011 suggests that the more mindful individuals are, the more likely to experience flow states. Besides, flow state improved after a 4-week mindfulness training among Taiwanese baseball players in the study of Hong Chen, Tsai, Lin, Ken Chen & Yen Chen (2019, 21). In fact, mindfulness training enhances attentional focus by developing nonjudgmental thinking, acceptance of thoughts and focusing on the present moment (Weinberg & Gould,

2015, 395). These are all necessary for achieving concentration on task at hand as an element of flow state. Finally, all the connections mentioned above between mindfulness and both emotional intelligence and flow state are in consensus with the findings of this study which says increased EQ specifically through improved regulation, utilization and appraisal of own emotions can increase experiencing of flow state specially by enhancing concentration of task at hand and unambiguous feedback.

The necessity of deeper exploration of the relationship between emotional intelligence and flow state, two key factors for high performance, is completely obvious, regarding that up to the time of this study any other one was not conducted in the field of sport. Besides, this study was conducted over junior athletes, while additional research is recommended to examine this correlation among senior athletes too. It is also interesting to examine this study among athletes of various cultures and countries to get better insight into the nature of this correlation. Despite Jackson's study in 2011 showed no significant differences in the frequency or quality of flow states between individual-sport and team-sport athletes (Weinberg & Gould, 2015,147) conducting this study among individual-sport athletes and comparing its results with the current results may provide deeper understanding of this correlation too.

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Appendices

Appendix 1. Correlations

Table 18. Correlations between all the subscales of EI & Flow

		Appraisal of Own	Appraisal of Others	Regulation	Social Skills	Utilization of Emotions	Optimism	Merging of Action and Awareness	Challenge and Skill Balance	Sense of Control	Clear Goal	Autotelic Experience	Concentration on task	Loss of consciousness	Transformation of time	Unambiguous Feedback
Appraisal of Own	Pearson Cor.	1														
	Sig.															
Appraisal of Others	Pearson Cor.	.097	1													
	Sig.	.388														
Regulation	Pearson Cor.	.377**	-.038	1												
	Sig.	.001	.736													
Social Skills	Pearson Cor.	.352**	.418**	-.057	1											
	Sig.	.001	.000	.615												
Utilization of Emotions	Pearson Cor.	.390**	.167	.253*	.273*	1										
	Sig.	.000	.135	.023	.014											
Optimism	Pearson Cor.	.446**	.181	.362**	.301**	.331**	1									
	Sig.	.000	.106	.001	.006	.003										
Merging of Action and Awareness	Pearson Cor.	-.006	.004	.053	.030	.080	-.019	1								
	Sig.	.958	.969	.638	.794	.478	.869									

*Correlation between EI Subscales

**Correlation between EI Subscales

*Correlation between Flow Subscales

**Correlation between Flow Subscales

*Correlation between EI Sub. & Flow Sub.

**Correlation between EI Sub. & Flow Sub.

Challenge and Skill Balance	Pearson Cor.	.091	-.095	.333**	-.013	.190	.022	.359**	1					
	Sig.	.420	.400	.002	.907	.090	.845	.001						
Sense of Control	Pearson Cor.	.175	-.099	.190	-.087	.151	-.011	.059	.394**	1				
	Sig.	.117	.377	.089	.438	.177	.925	.603	.000					
Clear Goal	Pearson Cor	.330**	-.037	.182	.014	.339**	-.054	.108	.462**	.243*	1			
	Sig.	.003	.746	.105	.903	.002	.633	.335	.000	.029				
Autotelic Experience	Pearson Cor	.084	-.105	.041	.116	.080	-.049	.213	.425**	.288**	.424**	1		
	Sig.	.455	.349	.718	.301	.475	.662	.056	.000	.009	.000			
Concentration on task	Pearson Cor.	.178	.013	.183	.158	.268*	.192	.507**	.384**	.073	.396**	.403**	1	
	Sig.	.111	.908	.102	.159	.016	.087	.000	.000	.518	.000	.000		
Loss of consciousness	Pearson Cor	.141	-.029	.073	.023	.205	-.031	.068	-.012	.089	.168	.201	.233*	1
	Sig.	.211	.798	.519	.839	.067	.785	.549	.917	.429	.134	.072	.037	
Transformation of time	Pearson Cor.	.124	-.172	.149	-.209	-.118	-.003	.156	.126	.149	.285**	.272*	.151	.033
	Sig.	.269	.125	.186	.061	.295	.978	.165	.264	.183	.010	.014	.177	.769
Unambiguous Feedback	Pearson Cor.	.249*	-.047	.262*	.049	.224*	.060	.188	.327**	.220*	.374**	.244*	.381**	.209
	Sig.	.025	.679	.018	.665	.044	.592	.092	.003	.049	.001	.028	.000	.061

Challenge and Skill Balance	1
Sense of Control	.142
	.205

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).