Master's Thesis of Global Sport Management

The influence of Taekwondo training in the mood state of Ecuadorian adolescents

태권도 훈련이 에콰도르 청소년들의 기분상태에 미치는 영향

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Abstract

The influence of Taekwondo training in the mood state of Ecuadorian adolescents

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Taekwondo is the most popular martial art in Ecuador whose benefits have not yet been investigated in the realm of psychological research. This study examined in Ecuadorian context the influence of Taekwondo training on adolescents' mood state. Total mood disturbance (TMD) was measured based on the Profile of Mood States for Adolescents (POMS-A). A series of multiple regression analysis were developed to analyze the data collected from adolescents (N = 760) from conveniently selected schools in Quito, Ecuador. The results showed that male adolescents had a lower TMD score compared to female adolescents (Coefficient (Coef) = -6.609, SE = 0.976, $p < 0.001$); and the same was found for younger adolescents compared to older adolescents in this study

(Coef = 0.437, SE = 0.209, $p < 0.05$). Regarding participation in Taekwondo, adolescents with a higher Taekwondo training time reported a lower score on TMD (Coef = -0.056, SE = 0.014, $p < 0.001$). Also, there was a significant interaction effect between gender and Taekwondo training time (Coef = 0.058, SE = 0.027, $p < 0.05$). The analysis showed that in the overall role of Taekwondo training in mood improvement, female adolescents appear to be benefitted from it in a more impactful way than male adolescents. The main findings in this study indicate an enhancement in adolescents' mood product of a longer training experience in Taekwondo. Therefore, integration of Taekwondo practice in different settings such as physical education, youth development programs, fitness facilities, and even clinical environments; is recommended.

Keywords **:** Taekwondo, adolescence, total mood disturbance (TMD), Profile of Mood States.

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Chapter 1. Introduction

Sport is believed to be a potent vehicle for enhancing the development of young people. As stated in Plato's Republic, "sport serves the educational objectives of personal virtue, intellectual achievement and political harmony" (as cited in Reid, 2007). The quest to understand how sport might contribute to positive adolescent development has led to an increasing number of investigations over the last decade (Bean et al., 2014). For instance, Taekwondo is a sport and martial art whose practice has been found to help young people who experience disconnection, stress or anxiety, and physical inactivity (Akehurst et al., 2020).

Taekwondo, as other martial arts, is most frequently practiced in Asian countries. Ecuador, is a western country in Latin America where traditional sports, such as football and basketball, typically dominate (Ecuador Noticias, 2020). Since Taekwondo is a Korean martial art, the benefits that its practice could bring to Ecuadorian adolescents might be several, including cultural education, appreciation, and exchange. Moreover, some studies conducted outside the Ecuadorian context, indicated that long-term training in Taekwondo leads to the development of the practitioners' physical, emotional and social skills; also, it helps to establish in them an ethical and mental discipline (Kim et al., 2012). The aim of this study is to

examine in Ecuadorian context the influence of Taekwondo training on adolescents' mood state.

1.1. Study Background

Adolescence is a unique stage of human development, a phase of life between childhood and adulthood where individuals establish patterns of behavior crucial for protecting their health and wellbeing (World Health Organization, 2020b). People in the age group from ten to nineteen are considered adolescents and they represent over 16% of the world's population (World Health Organization, 2020a). Consequently, information and research around this stage in life is crucial to establish priorities, to follow trends, and to reduce inequalities for the present and even for the future generations.

According to the World Health Organization (WHO), adolescents experience rapid physical, cognitive, and psychosocial growth which affects how they feel, think, make decisions, and interact with the world around them (2020b). As stated before, adolescence is a stage in life where patterns of behavior, such as physical activity, diet, substance abuse, sexual activity, etc., are stablished; therefore, having a good guidance in this period is essential to prevent illness, injury or even death. To grow and develop in good health, beyond information, proper education, and safe and supportive

environments; adolescents “need opportunities to meaningfully participate in the design and delivery of interventions to improve and maintain their health” (World Health Organization, 2020b). Expanding such opportunities for adolescents is essential to meeting their specifics needs and rights.

One way to expand those opportunities is through the enrollment in a physical activity or sport. Martial arts, which popularity has shown a substantial growth, are performed as sports, as methods of self-defense, and as programs for physical, mental, and even spiritual conditioning (Finkenberg, 1990). Martial arts are worldwide practiced and popular, therefore, the influence of this type of training in personality has caught the attention of researchers as it is important to parents, policy makers, educators and so on (Wargo et al., 2007). In fact, “research conducted after the mid ‘90s and focusing on youth showed that martial arts practice has positive effects on the personality profiles of adolescents” (Vertonghen & Theeboom, 2010). Among many martials arts and combat sports, Taekwondo is globally practiced and popular. It has been substantially growing with and estimation of more than 80 million people who are part of its community (Kukkiwon, 2020).

Taekwondo is a Korean martial art, originated thousands of years ago, that pursues to instruct and to improve its practitioners in body, mind,

and spirit. Over the years, Taekwondo evolved into a sport, and it was even incorporated into the Olympics; first, as a demonstration sport in 1988 Seoul Olympics and 1992 Barcelona Olympics; and then, as an official sport since 2000 Sydney Games. Additionally, in 2015 Taekwondo was confirmed as an official sport for the 2020 Tokyo Paralympic Games. Nowadays, it is the world's most practiced martial art, and one of only two Asian sports represented in the Olympics (World Taekwondo Federation Statutes, 2020).

World Taekwondo (WT), founded in 1973, is the International Federation (IF) governing the sport of Taekwondo and seeking for its promotion and development. According to this organization, Taekwondo is the most inclusive and accessible combat sport which values, recognized by its practitioners and partners, are its strength (World Taekwondo Federation Statutes, 2020). Taekwondo has a solid base mixing the traditional and the modern: the principles of an ancient Asian heritage with the ideals of a global elite sport. This mix leads to the same values appreciated and found in our society: "the search for pleasure, surpassing oneself, perseverance, moral and physical strength, and respect for others" (World Taekwondo, n.d.).

WT has more than 200 Member National Associations (MNAs) making it one of the most diverse federations in the Association of Summer

Olympic International Federations (ASOIF) (World Taekwondo Federation Statutes, 2020). Since 1973, the Ecuadorian Taekwondo Federation (FETKD, by its acronym in Spanish), is one of the 200 MNAs of WT and it is the governing body that standardizes everything related to Taekwondo in Ecuador. According to data collected by this institution in 2020, there are more than five hundred Taekwondo schools in the country, with approximately eight thousand Taekwondo players that actively participate in official events promoted by FETKD (Ecuador TKD, 2020).

Given the popularity of Taekwondo in Ecuador, some studies have been carried out on different topics related to this sport in the country's context. Areas that have been researched the most include training methodologies, focusing on certain techniques or age groups (Aguinda, 2013; Bonilla et al., 2015; Malla, 2015; Rendón & Cabascango, 2015; Troya, 2014); and talent identification, mainly focused on physical abilities and anthropometric indicators (Estrella, 2017). Similarly, there are several studies centered in athletes regarding their performance (Medina & Villalba, 2016; Suárez, 2010), psychomotor development (Carvajal, 2009; Venegas & Acosta, 2016), nutrition (Ruales, 2015), injuries during training and competitions (Delgado, 2016), and motivational climate, anxiety, and superstitions (Aguilera, 2011). Also, there are a few studies that investigated

the origins and expansion of Taekwondo in Ecuador or in certain provinces (Guapi, 2020). Nevertheless, there is no study in Ecuador related to the influence of Taekwondo training in the practitioner's life beyond the topics mentioned before, which are mostly related to physical and physiological aspects.

1.2. Research Significance

Ecuador is a country located in northwestern South America bordering Colombia, Peru, and the Pacific Ocean; and divided into four regions: coastal, mountain, Amazon, and island (Pan American Health Organization, 2017). It is considered as a country with a developing economy having a gross domestic product (GDP) of $108.40 billion and a GDP per capita of $6,344.9 (United Nations Statistics Division, 2020). Ecuador has a total population of 17.64 million, highly multiethnic and multicultural, of which the 8.73% is adolescent, aged between ten to nineteen years (United Nations, 2020). As indicated before, adolescence is a period when people grow to be independent individuals, acquire social skills, create new relationships, and learn behaviors that may last for the rest of their lives. Therefore, it is important to evaluate the factors that could put their health and wellbeing at risk.

The WHO, through the *Maternal, Newborn, Child, and Adolescent Health and Ageing Data Portal*, gives access to the most up to date global health data organized by region and country (World Health Organization, 2020c). Risk factors that are measured for adolescents include prevalence of current cigarette smoking, prevalence of current drinking, prevalence of insufficient physical activity, obesity and overweight. Ecuador's profile indicates a value of 8.0%, 32.2%, 86.5%, 8.0% and 27%, respectively, for each one of the mentioned indicators (World Health Organization, 2016). Reducing the observed percentages in the Ecuadorian profile for each one of the indicators will contribute to achieving many of the 2030 Sustainable Development Goals (SDGs).

One way to reduce those percentages is by encouraging regular physical activity, which is proven to help prevent and treat diseases, overweight and obesity; and it can also improve mental health, quality of life and wellbeing (World Health Organization, 2018). As mentioned, martial arts are forms of physical activity that can also contribute to mental and spiritual development. Among all the variety of martial arts, Taekwondo, which is the focus of this study, is considered important not only for its practitioners' physical health but also for their psychological wellbeing (Weiss & Miller, 2019). Therefore, its practice can also contribute

to achieve the 2030 SDGs, and moreover, the goal of the *WHO Global Action Plan on Physical Activity 2018–2030*, to achieve a 15% relative reduction in the global prevalence of physical inactivity in adults and in adolescents by 2030 (World Health Organization, 2018).

Most of the studies, conducted outside the Ecuadorian context, have reported significant health benefits of a regular Taekwondo training, and even confirmed a positive correlation with cognition, academic achievements, behavior, and psychosocial function. However, most of them have been mainly focused on physiological changes (Roh et al., 2018). As well, particularly in Ecuador, there is no study related to the impact of Taekwondo training in the practitioner's life beyond topics mainly related to physical and physiological aspects. Therefore, there is a need for research exploring the influence of Taekwondo participation beyond those aspects. Additionally, since adolescence is a determining stage in the life of a human being, doing such research among people in this age group would be valuable.

Among the studies that evaluated the benefits of Taekwondo practice in psychological terms, most recommended exploring its long-term effects to reduce the limitations of the research. In relation to psychological factors, emotion has been largely assessed and it has generated persistent

investigations on the construct of mood (Terry et al., 1999). In this point it is important to understand the difference between emotion and mood. A comparison of numerous academic theories to understand that difference indicated that the most representative distinction was the duration of the experience. “Emotions were regarded as being of relatively short duration in comparison to moods, which are more long-term” (Beedie et al., 2005).

Additionally, other prominent features to difference mood and emotion were cause of experience, timing, control, and intensity. In relation to cause of experience, emotions are generally triggered by certain events, while moods seem to be the accumulated effect of several events. Regarding timing, emotions have a more immediate start relative to the stimuli, while moods can be built up gradually. In terms of control, emotions correspond to more instinctive reactions that are generally less controllable than moods. Lastly, emotions are more intense than moods, although moods are more persistent (Beedie et al., 2005). Regardless of the differences, some researches argue that there is a “transactional relationship” between mood and emotion (Lane & Terry, 2000). This means that “an individual’s current mood can influence their emotional response to a stimulus, which in turn can contribute to the mood that may result from the emotional response” (Garrido, 2014).

As it can be noticed, mood is considered to have more long-term attributes than emotions. Given their transactional relationship, evaluating mood can also contribute to understand the psychology of emotion. Furthermore, behavior can also be influenced by mood states, certainly, a lot of attention has been paid around this subject (Terry et al., 1999). Therefore, given the strong relation of mood with emotions and behavior, and its features that categorize it as a long-term indicator; assessing the mood state of individuals could provide appropriate information on their psychological condition. For instance, there are several investigations about the mood-enhancing properties of various activities and exercise modalities (Toskovic, 2001). Investigating the mood state of adolescent Taekwondo practitioners would provide an adequate insight of the long-term effects of the training in psychological terms.

1.3. Research Questions

The purpose of this study was to investigate and analyze the long-term effect of Taekwondo training on the mood state of adolescent practitioners in Ecuador. Specifically, it addressed the following questions:

RQ1. How does socio-demographic characteristics of adolescents in Ecuador relate to their mood state?

RQ2. How does Taekwondo training time relate to the mood state of adolescent practitioners in Ecuador after controlling for socio-demographic characteristics?

RQ3. How does the relationship between Taekwondo training time and the mood state differ according to socio-demographic characteristics?

1.4. Scope

This study was conducted in Ecuadorian context; therefore, the results can be applied only in that environment and considering the demographic characteristics of the individuals that were subjects of the research. The results may differ from previous studies, since there is no study that has been carried out in Ecuador on this topic before. Also, the research focused specifically on Taekwondo practitioners, not practitioners of any other sport or any other martial art. Additionally, the practitioners assessed were adolescents, in the age group from ten to nineteen years. Finally, only mood state of adolescents Taekwondo practitioners was evaluated, which provided a notion of their psychological condition. However, it is important to clarify that this study did not focus on any other psychological characteristic beyond mood state.

Chapter 2. Literature Review

2.1. Theoretical Framework

As previously mentioned, adolescence is a unique stage of human development and perhaps the one in which the most significant changes in life occur. Those changes are multidimensional, interrelated, and can be generally classified as physical/biological, cognitive, emotional, social, and behavioral (Tadesse, 2017). Since all of them occur relatively together, adolescents need to adapt properly to protect their wellbeing and enjoy a better adult life; maladjustment may result in the opposite (UNICEF, 2019). Given the importance of adolescents' wellbeing, the rationale and theoretical framework of this study is based on the theories of wellbeing, specifically it focuses on the telic or endpoint theories of subjective wellbeing which will be described below.

2.1.1. Theories of Wellbeing

Despite wellbeing is a growing area of research, the question of how it should be defined remains unanswered (Dodge et al., 2012). There is no single agreed definition of it, indeed, most contemporary research claim that it is "multidimensional in character and associated with how well we feel we are doing as individuals, communities and societies" (Mansfield et al., 2020). The concern of many social scientists and philosophers about a

proper description of wellbeing has led to the developing of several definitions of it which can be grouped into three categories. First, wellbeing has been defined by external criteria such as virtue or holiness; second, it has been labeled in terms of life satisfaction; and third, as a preponderance of positive affect over negative affect, stressing pleasant emotional experience (Diener, 2009). Related to these conceptions, one of the most widely researched conceptualizations of wellbeing is subjective wellbeing (SWB) (Adler & Seligman, 2016).

SWB refers to the subjective belief of a person that his or her life is desirable, pleasant, and good. In other words, SWB is related to "how and why people experience their lives in positive ways, including both cognitive judgments and affective reactions" (Diener, 2009). In this area, three features should be emphasized about SWB: first, it is subjective, meaning that it resides within the experience of the individual; second, it includes positive measures, stressing that it is not just the absence of negative factors; and third, it typically includes a global assessment of all aspects of a person's life (Diener, 2009). There are several theoretical approaches to subjective wellbeing which can be divided in telic or endpoint theories, associationistic theories, activity theories, judgment theories, and top-down versus bottom-up theories (Diener, 2009). For this research, the telic or

endpoint theories of subjective wellbeing will be emphasized as they are more relevant for the purpose of the study.

Telic or endpoint theories of SWB express that wellbeing is gained when some state, such a goal or need, is reached (Diener, 2009). In the area of needs satisfaction, it is suggested that there are a set of elements that humans need, regarding of their values, that are essential for attaining wellbeing. Fulfillment of those needs causes and enhances wellbeing while failure to do so decreases wellbeing and may even result in ill-being (Durayappah, 2011). Such theorization can be found in Glasser's choice theory, Wilson's work about correlates of avowed happiness, self-determination theory, and Maslow's theory of human motivation or hierarchy of needs (Deci & Ryan, 2008; Glasser, 1998; Maslow, 1943; Turkdogan & Duru, 2012; Warner, 1967). The latter will be described and employed in this study.

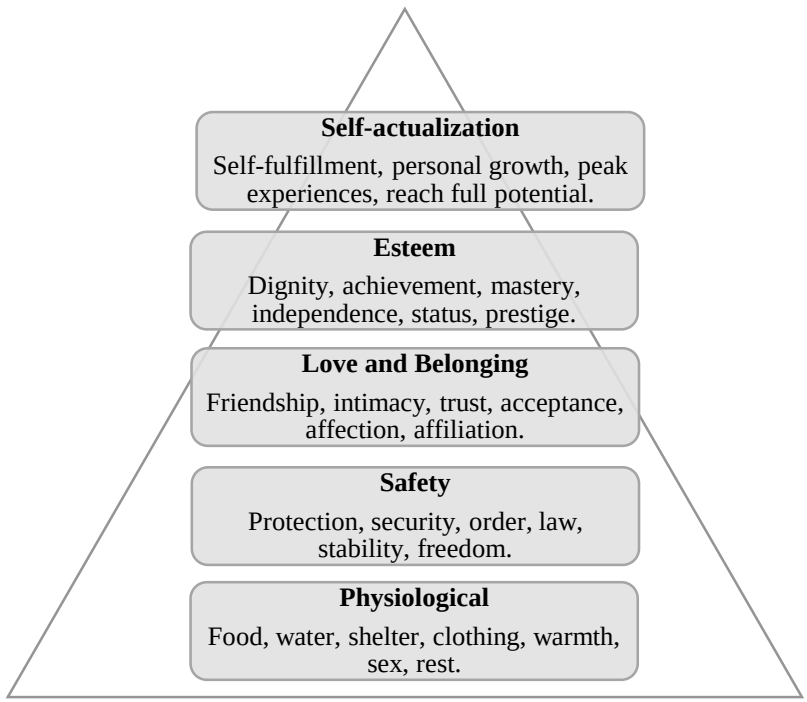
2.1.1.1. Maslow's theory of human motivation or hierarchy of needs

Maslow (1943), affirms that there are at least five sets of goals, that can be called *basic needs,* which are hierarchical and that humans are motivated by the desire to accomplish or preserve the various conditions that form them and by certain more intellectual desires. Those needs are classified, from bottom to top, in physiological (food, water, shelter,

clothing, warmth, sex, rest), safety (protection, security, order, law, stability, freedom), love and belonging (friendship, intimacy, trust, acceptance, affection, affiliation), esteem (dignity, achievement, mastery, independence, status, prestige), and self-actualization (self-fulfillment, personal growth, peak experiences, reach full potential) (see Figure 1). In addition, Maslow also emphasizes that there are certain preconditions which are prerequisites for the basic needs satisfaction and that danger to them is almost a direct danger to the basic needs themselves (1943). Those preconditions are freedom (to speak, to do what one wishes without harming others, to express, to investigate, and to defend oneself) and cognitive capacities (perceptual, intellectual, and learning). Finally, Maslow argues that any thwarting to "these basic human goals, or danger to the defenses which protect them, or the conditions upon which they rest, is considered to be a psychological threat" (Maslow, 1943).

Figure 1

Maslow's Hierarchy of Needs (Maslow, 1943).



The hierarchical component of Maslow's theory suggests that the satisfaction of the mentioned needs follows an order of 'prepotency' (Maslow, 1943). This means that the most prepotent (higher) goal will monopolize consciousness of the individual and recruit its capacities to achieve it. In the same way, when a need is well satisfied, the next prepotent need will emerge to dominate the conscious life and that is how behavior is established (Maslow, 1943). Maslow's theory leads to four basic conclusions, which give the base for the conceptual framework of this

research. First, it underscores that human behavior is driven by a desire to accomplish fundamental needs. Second, it highlights that those needs are not only physiological or biological, but also psychological and social. Third, it accentuates that failure to fulfill those needs may result in psychopathology or ill-being. Finally, it shows an optimistic approach about the nature of a human being as the higher goal in the hierarchy illustrates a strive for growth and improvement (Tadesse, 2017).

2.2. Conceptual Framework

Based on the theoretical framework examined in the previous section (i.e., Maslow's theory), the conceptual framework of this research will be developed. This section will be centered on the literature review about the nature of Taekwondo training and its influence on adolescents' wellbeing. In other words, the discussion will focus on how the diverse elements of Taekwondo training help adolescents meet their various fundamental needs which consequently improves their wellbeing. The following sections 2.3. and 2.4. will focus on how to measure wellbeing and the existing studies related to the influence of Taekwondo training.

2.2.1. Elements of Taekwondo Training

Etymologically, Taekwondo means the way/path of kicking and punching (Park et al., 2009). Its training pursues to instruct and to improve

its practitioners in body, mind, and spirit. As stated in section 1.1., Taekwondo is a popular, worldwide practiced, Korean martial art and Olympic sport. Like other martial arts, Taekwondo training can be classified in two types: traditional and modern, where different elements of training are present. The major components of those elements are Taekwondo techniques, Poomsae or forms/patterns, Kyorugi or sparring, self-defense, breaking, physical fitness, warming-up, cooling-down, stretching, philosophy and ethics, meditation, breathing, demonstrations, and competitions (Park et al., 2009; Svinth, 2010; Tadesse, 2017). The mentioned components will be briefly described below.

Taekwondo techniques can be classified in four major groups that include: kicking, punching, blocking, and stances (Park et al., 2009). Kicking and punching are for attacking while blocking is for defensing. Both techniques are trained to improve power, speed, reaction, and efficacy. Similarly, stances are practiced based on effectiveness in terms of mobility, power, and speed. Taekwondo is distinguished from other martial arts because it mainly focuses on foot techniques or kicks, however, it also depends on the training modality (i.e., Kyorugi, Poomsae, demonstration, self-defense).

Poomsae practice is also called pattern or forms practice, which involves pre-arranged Taekwondo techniques in response to an imaginary opponent. When performing Poomsae, technical accuracy and balance are very important, also, appropriate power and speed, rhythm and tempo, and expression of energy are needed (Park et al., 2009). Nowadays, Poomsae has another modality called freestyle, where the practitioner creates its own performance with music and acrobatic movements that must involve Taekwondo techniques. Similarly, not only accuracy and balance are important, but also, creativity, harmony, music and choreography, and expression of energy (World Taekwondo, 2014).

Kyorugi, sparring, or fight training is the major teaching method in modern Taekwondo as well as in other martial arts (Svinth, 2010). Different approaches are employed for its practice, for example, non-contact and contact sparring. The latter uses protective gear to avoid causing harm or injuries to the practitioners. In addition, although it follows the rules of the sport established by World Taekwondo, it also combines an arrangement of techniques for allowing the practice of a real-life-like fight (Park et al., 2009).

Related to real-life situations, Taekwondo also involves the practice of self-defense techniques. Self-defense training is designed to prepare

students to react in specific real-life or street attacks (Park et al., 2009). Additionally, the objective is to develop in the students a sense of inner discipline and harmony that prevents them from panicking in dangerous situations. Likewise, to develop confidence, based on their capabilities and limitations, to be able to analyze a certain scenario and make the best decision. According to Park et al. (2009), the heart of the teachings of Taekwondo is to avoid violent/unnecessary confrontations, even if the practitioner is highly skilled and strong.

Breaking is a part of Taekwondo that focuses on using different techniques to break wood or brick (Park et al., 2009). This type of training can be orientated towards strength and power, by breaking several hard or thick materials like concretes; or towards agility, by using amazing spinning, jump, or even acrobatic techniques to break mainly wooden boards (Svinth, 2010). Breaking practice is more emphasized for demonstrations, exhibitions, competitions, and grade promotion tests or events. Students are expected to improve their breaking capabilities according to their level. It is noted that the students get the ability to focus not only their physical power, but also their mental one, having a unity of body and mind (Park et al., 2009).

The elements of Taekwondo training referring to physical fitness, warming-up, cooling-down, and stretching, are related to physical exercise. Indeed, Taekwondo combines the training of the four basic physical capabilities: strength, resistance, speed, and flexibility (J. S. Kim, 2003). Also, the physical exertion has a moderately heavy intensity and a cognitive training component (e.g., Poomsae training). Therefore, physiological mechanisms are activated including biochemical regulation, cardiovascular functioning, and body temperature (J. S. Kim, 2003). For example, given that Taekwondo combines a variety of static and dynamic exercises, it produces "changes in cardiac output accounted by the changes in hear rate … having cardiovascular training effects" (J. S. Kim, 2003). Additionally, it has been shown that the mentioned activation of physiological mechanism due to physical exercise, has a direct beneficial effect on psychological factors (Byrne & Byrne, 1993).

Regarding the philosophy and ethics in which Taekwondo is based, it is important to mention that it has been widely influenced by major religions and philosophies of Asia, such as Taoism, Buddhism, Zen Buddhism, and Confucianism (Svinth, 2010). The core of Taekwondo philosophy is the concept of duality in nature which implies the interaction of opposing forces (e.g., good/bad, hot/cold, male/female, soft/hard) (Park et

al., 2009). Harmony is achieved when those forces are distributed equally, resulting in balance. Taekwondo is considered a lifestyle which principles should be applicated in everyday life. Those principles, widely promoted and taught, are courtesy, integrity, perseverance, self-control, and indomitable spirit. Therefore, it is believed that the indomitable spirit, which makes the essence of Taekwondo practitioners, makes them capable of leading a peaceful life harmonizing their actions with nature (Park et al., 2009).

Meditation and breathing are other elements of Taekwondo training, sometimes taught directly, with exercises related purely to them (e.g., mindfulness, breathing techniques); and sometimes indirectly, through Poomsae practice. The latter, already explained, allows the practitioners to free their mind through physical activity which is considered an essential part of their spiritual development (Nosanchuk, 1981). When practicing Poomsae, the pre-arranged movements enable the trainees to apply the diverse techniques and fight without being conscious of their actions and without having aggressive thoughts, or thoughts at all. This means that meditation can occur when practicing Poomsae. Additionally, as previously mentioned, Taekwondo has bases on major oriental religions and philosophies such as Zen Buddhism, where martial art practice is considered

a form of mediation or a way of practicing the Zen (no-mindedness) (Svinth, 2010).

Lastly, demonstrations and competitions in Taekwondo differ according to the modality. Demonstrations are based on performing a variety of Taekwondo techniques of Poomsae, Kyorugi, breaking, and self-defense to an audience. Demonstrations are mostly staged in events or promotion ceremonies. On the other hand, there are two major types of Taekwondo competitions: Kyorugi and Poomsae. Both are staged at international, continental, regional, national, and local levels, although only Kyorugi competitions are Olympic (World Taekwondo, n.d.). There are also breaking contests where two major modalities are divided by agility and strength. Taekwondo competitions have several categories based on age, gender, belt level, and on weight in the case of Kyorugi. The rules and requirements are established by World Taekwondo, the international federation in charge of governing the sport of Taekwondo worldwide (World Taekwondo Federation Statutes, 2020).

2.2.2. Taekwondo Training and the Wellbeing of Adolescents

Each of the elements of Taekwondo training discussed above can contribute to adolescents' fundamental needs which in turn can improve their wellbeing. The theoretical framework described in section 2.1. will be

now used to explain this process which gives the rationale for the study. In summary, the five needs in Maslow's theory: physiological, safety, love and belonging, esteem, and self-actualization (see Figure 1), will be addressed in relation to the elements of Taekwondo training that help to their fulfillment and consequently to improve wellbeing. The explanation will follow the hierarchical order established by Maslow.

As stated in Maslow's theory, physiological needs are driven by homeostasis and appetites which are efficient indicators of actual needs or lacks in the body (Maslow, 1943). Homeostasis refers to the automatic effort of the body to maintain a normal and constant state of the blood stream, while appetite is developed when the body lacks some chemical. A proper regulation includes balancing the content of water, salt, sugar, protein, fat, calcium, oxygen, acid-base rate, and temperature of the blood; as well as minerals, hormones, vitamins, etc. (Cannon, 1932, as cited in Maslow, 1943). In addition, Maslow also pointed out that "any of the physiological needs and the consummatory behavior involved with them serve as channels for all sorts of other needs as well" (1943). This means that a hungry person may be looking for more comfort or confidence than for vitamins and proteins.

The elements of Taekwondo training that contribute to physiological needs satisfaction are those related to physical exercise (i.e., physical fitness, warming-up, cooling-down, and stretching), cognitive exercise (i.e., Poomsae, techniques) meditation, and breathing. As previously stated, physiological mechanisms are activated such as biochemical regulation, cardiovascular functioning, and body temperature. Those physiological processes serve homeostasis and appetites and therefore impact physiological needs' satisfaction. For example, it has been observed that the levels of catecholamine and cortisol elevated by emotional and mental stressors were significantly reduced during meditation performance (Jin, 1992). Physiological needs are the most pre-potent of all needs according to Maslow's theory and, as explained, Taekwondo can positively contribute to them.

After physiological needs are relatively satisfied, a new set of needs emerge called safety needs (Maslow, 1943). These needs include protection, security, order, law, stability, and freedom. Members of a 'functional' society can sense these needs satisfied as they feel safe enough from wild animals, weather extremes, criminals, assaults, tyranny, etc. However, when there is a threat, individuals develop safety-seeking mechanisms that motivate their behavior. Aspects of Taekwondo training that can contribute

to safety needs include Kyorugi, self-defense, meditation, and breathing. Indeed, Kyorugi involves fighting abilities that can make practitioners feel confident, self-defense prepares students for real-life unsafe situations, while mediation and breathing allows to develop calmness and internal serenity that can help to make proper decisions in dangerous situations.

The next echelon in the hierarchy corresponds to love and belongingness needs. Maslow (1943), highlights the need of affectionate relations with people in general involving both giving and receiving love. Affiliation, understood as being art of a group, is also important. Taekwondo demonstrations and competitions are two elements standing out for love and belonginess satisfaction. Certainly, the generated environment resulting from training Taekwondo allows its practitioners to be part of a group, club, association, federation, and even a worldwide community with more than 80 million practitioners (Kukkiwon, 2020). Therefore, there is an important contribution of the martial art to this need.

Next step in the pyramid is esteem needs which Maslow divides in two categories: self-esteem and esteem from others (1943). Self-esteem involves strength, achievement, adequacy, confidence, independence, and freedom. Esteem from others is grounded in reputation, prestige, recognition, attention, importance, and appreciation (Maslow, 1943). All

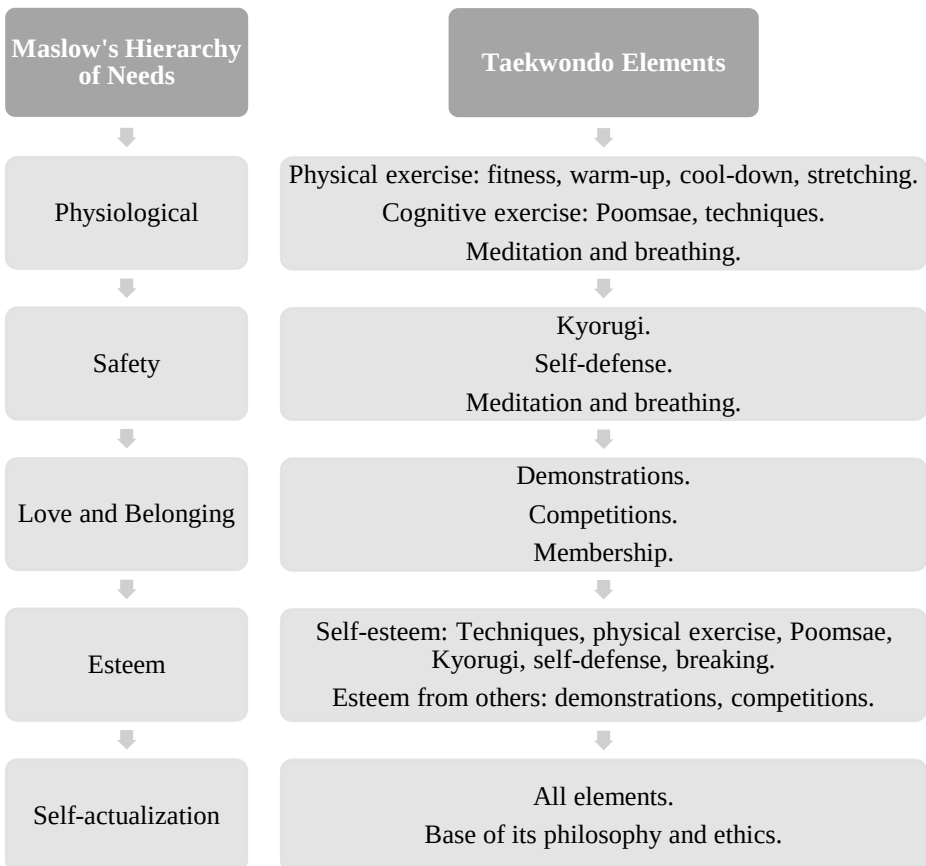
elements of Taekwondo training contribute to this need fulfillment in certain way. Physical exercise, Poomsae, Kyorugi, self-defense, breaking, and their different techniques make its practitioners stronger and more confident. Moreover, part of the philosophy in Taekwondo is to develop an 'indomitable spirit' which gives the player a sense of independence and freedom. On the other hand, demonstration ceremonies like belt promotions satisfied the need of esteem from others by giving status, and consequently, reputation, prestige, and recognition. Similarly, competitions give the opportunity for fame, thus, also for attention, importance, and appreciation (Tadesse, 2017).

Finally, the last need in the hierarchy is self-actualization. This term refers to the desire of self-fulfillment to reach a full potential, or in Maslow's words "to become everything one is capable of becoming" (1943). Same as esteem needs, all elements of Taekwondo take part in the fulfillment of self-actualization needs. As a martial art, Taekwondo goal is indeed self-actualization making its practitioners aware of their assets and limitations, so they can optimize them and use their potential to the fullest (Tadesse, 2017). As a sport, Taekwondo is always evolving providing an environment full of opportunities to keep exploring and improving techniques and skills in every aspect of it.

As mentioned before, Maslow's theory also categorize preconditions for the basic needs' satisfaction which should be protected (1943). Freedom and cognitive capacities constitute those preconditions, which can also be guarded by Taekwondo practice in certain concepts. Appropriately, Taekwondo provides an environment of freedom, that one stressed by Maslow: to speak, to do what one wishes without harming others, to express, to investigate, and to defend oneself (Maslow, 1943). Likewise, the perceptual, intellectual, and learning cognitive capacities are also addressed by Taekwondo practice. As a conclusion, Taekwondo greatly contributes to the diverse needs in Maslow's theory, contributing as well to wellbeing according to theory. This conceptualization can be observed summarized in Figure 2.

Figure 2

Taekwondo Elements Relation to Maslow's Hierarchy of Needs to Improve Wellbeing (Tadesse, 2017).



2.3. Measuring Wellbeing

As mentioned above, the literature on subjective wellbeing is based on people's experience of their lives in positive ways which include both cognitive judgments and affective reactions (Diener, 2009). However, as SWB can be defined as the subjective belief of an individual that his or her

life is going well, “there is no single judgement that can capture the diverse ways that life can be evaluated” (Diener, 2009). Consequently, cognitive, and affective factors are needed to provide an insight of one’s life. Indeed, it is recommended for researchers who study wellbeing to consider carefully which components are must useful for their purposes, because not all of them will behave in similar ways. Overall, high SWB combines three specific factors: frequent and intense positive affective states, relative absence of negative affective states, and global life satisfaction (Adler & Seligman, 2016). As it can be observed, these three factors combine both cognitive and affective traits, which can be separable depending on the purpose of the study.

In this study, the purpose is to investigate and analyze the long-term effect of Taekwondo training on the wellbeing of adolescent practitioners in Ecuador. Pertinently, the study of SWB involves the scientific analysis of how people assess their lives, both at present and for longer periods. These evaluations include people’s emotions, moods, and judgments about life satisfaction, fulfillment, and contentment with different domains of life, such as marriage or work (Diener et al., 2003). Given that people’s emotions fluctuate overtime, mood construct has been of interest when evaluating long-term effects. Indeed, emotions have relative short duration in

comparison to moods that are more long-term. As explained in section 1.2., features that differentiate mood and emotion are cause of experience, timing, control, and intensity. Moods seem to be the accumulated effect of several events, built up gradually, more controllable, and more persistent (Beedie et al., 2005). Moreover, they possess a transactional relationship with emotion and influence behavior (Lane & Terry, 2000; Terry et al., 1999). Certainly, evaluating the mood state of individuals could provide appropriate and valuable information about their wellbeing.

There is an extensive collection of validated measurement tools for different domains of wellbeing as a result of more than three decades of research (Adler & Seligman, 2016). As previously mentioned, the three factors of subjective wellbeing are both cognitive and affective, and numerous scales have been designed to measure them (Diener, 2009). Moods, pertinent to this study, are considered affective traits which can be related to two of the three specific factors of high subjective wellbeing: frequent and intense positive affective states and relative absence of negative ones. One of the most widely used measurement tools for evaluating moods is the Profile of Mood States (POMS) (Terry et al., 1999). This profile describes six subcomponents of the overall construct of mood: anger, confusion, depression, fatigue, tension, and vigor (McNair et al.,

1971). The first five subcomponents are considered negative states while the last one is positive, which, as explained, corresponds to the factors of subjective wellbeing. More information about this measurement tool is provided in section 3.4. about data type for this research.

Finally, it is important to mention some factors that may influence subjective wellbeing. The ones that have been studied include subjective satisfaction, income, behavior and outcomes (social contact, life events, activities), personality, biological influences, and other demographic variables such as age, gender, race, employment, education, religion, marriage, and family (Diener, 2009). The mentioned variables can limit the study, therefore, some of them are considered in this research and described in section 3.4. The theoretical and conceptual background presented in this section provides the rationale for investigating the mood state of adolescent Taekwondo practitioners in Ecuador. It will offer an adequate insight of the long-term effects of the training in their subjective wellbeing. The next section reports the existing studies about Taekwondo in the context of psychological research focusing on different aspects of wellbeing.

2.4. Existing Studies

Most of the studies related to Taekwondo training have been developed evaluating physical characteristics (Roh et al., 2018). For

instance, Fong & Ng (2011), critically reviewed 23 Taekwondo-related papers and examined the effect of regular Taekwondo training on the improvements in physical fitness. The comparison between the number of investigations related to physical and physiological aspects and those related to psychological aspects of Taekwondo training indicates that "Taekwondo has not yet been comprehensively examined in the context of psychological research" (Roh et al., 2018). However, the existing studies suggest positive outcomes of its practice among the trainees (Weiss & Miller, 2019).

General topics that have been studied about Taekwondo in a psychological manner include its influence on wellbeing (Tadesse, 2016; Weiss & Miller, 2019), behavior (Lakes et al., 2013), and personality (Kurian, 1994; Kurian et al., 1993; Wargo et al., 2007). Regarding wellbeing, some studies have focused on school-life adaptation (Cho et al., 2018), life skills and character (Kim et al., 2012), health and life satisfaction (J. Kim et al., 2011), and self-regulation (Lakes & Hoyt, 2004). Other studies have concentrated on more specific effects such as in aggression (Parthi, 2013; Skelton et al., 1991), self-concept (Finkenberg, 1990; Lim & Kim, 2012) and mood (Roh et al., 2018; San Juan et al., 2014; Toskovic, 2001).

Although it can be argued that there are many martial arts studies orientated towards psychological features, most of them have focused on different practices such as Karate, leaving Taekwondo as an understudied sport (Weiss & Miller, 2019). Nevertheless, there are some studies about martial arts programs that include Taekwondo on their curriculum. For instance, Moore et al. (2019), evaluated mental and psychosocial health outcomes product of the effects of a bespoke program primarily based on Taekwondo. Similarly, Wargo et al. (2007), investigated about the personality characteristics of martial artists involved on Taekwondo and Karate programs. To this point, it is important to keep in mind that "outcomes associated with other styles of martial arts may not generalize to Taekwondo practitioners" (Weiss & Miller, 2019).

Comparably, much of the previous work that is exclusively centered on Taekwondo psychological correlates concentrates mainly on children (Kurian, 1994; Lakes et al., 2013; Lim & Kim, 2012; Roh et al., 2018; Skelton et al., 1991); adults (Kim et al., 2012; J. Kim et al., 2011; Kurian et al., 1993; Parthi, 2013; Weiss & Miller, 2019); and some studies are specifically about effects on college students (Finkenberg, 1990; San Juan et al., 2014; Toskovic, 2001). However, there are only few studies focusing on the adolescent age group (Cho et al., 2018; Moore et al., 2019; Tadesse,

2016). As before, it is important to contemplate that the results of studies of specific age groups cannot be generalized to other populations.

Despite the expansion of investigations on Taekwondo, research on its impact on psychological aspects of an individual is still limited (Weiss & Miller, 2019). The following sections will provide a description of the existing studies, mostly collected through computer searches of primary sources, predominantly from journal articles. The inclusion criteria considered studies that measured social and psychological results of practicing Taekwondo and were conducted from the 1990s onwards, although major findings of older studies are also discussed. Articles excluded were those in which Taekwondo was incorporated just as minor part of a larger intervention program. Articles with a qualitative research methodology were also excluded, although their major findings are mentioned as well.

The final selection resulted in sixteen studies analyzed in two sections. The first section addresses general social and psychological outcomes of Taekwondo practice, such as its effects on wellbeing, behavior, and personality. The second focuses on more specific effects of Taekwondo training, particularly on aggression, self-concept, and mood. To present each of the topics, a chronological order for the existing investigations is

considered. There is no other criterion for the order of the description of the studies beyond chronology.

2.4.1. General Social and Psychological Outcomes of Taekwondo Practice

2.4.1.1. Wellbeing

To categorize the studies about Taekwondo and wellbeing, given that there is not a single agreed definition of it (see subsection 2.1.1.), the studies with commonly linked concepts of it will be analyzed. Indeed, wellbeing is frequently linked with quality of life, happiness, life satisfaction, mental health, personal growth, self-efficacy, self-determination, and so on (Huppert, 2017, as cited in Mansfield et al., 2020). Given the association of wellbeing with a wide range of concepts, this section groups the existing literature addressing Taekwondo training effects on some of those concepts. Specifically, this section reviews the research about Taekwondo influence on some conceptions of wellbeing such as self-esteem, physical health, mental health, adaptation, life skills, character, life satisfaction and self-regulation.

Weiss & Miller (2019) examined the associations between Taekwondo experience and wellbeing focusing on several variables. Their study aimed to obtain insight into practitioners' motivations for Taekwondo participation to provide a deeper understanding of the mechanisms through

which its practice is related to health and wellbeing. Subjects were 57 Taekwondo students (32 male, 24 female) who had just participated in a training session from a large organization in the Northeastern U.S. Demographic data were collected regarding age, ethnicity, and gender. Participants were asked to provide information about the amount of training experience in Taekwondo and their reasons for participation.

The studied measured self-esteem using The Rosenberg Self-Esteem Scale (RSES); perceptions of body image using the Body Image Satisfaction Scale (BISS); and perceptions of physical and mental health using a rate given by participants on a scale of 1 (extremely poor) to 6 (excellent). Also, two questions were asked regarding their opinions of Taekwondo influence in their physical and mental health. The results showed that higher levels of self-esteem were positively related with Taekwondo experience; also, they showed that Taekwondo training can have a positive impact on body image perceptions. It was also found that the longer the involvement in Taekwondo training, the greater the impact the practitioners had on their physical health. The study provided "evidence for Taekwondo's positive effects on wellbeing through increased self-esteem and positive body image perceptions" (Weiss & Miller, 2019).

Cho et al. (2018) studied the impact of the exercise value of Taekwondo training with respect to school-life adaptation. The population of the study included trainees who aged over 10 years and trained Taekwondo as an after-school physical-education activity in centers located in Illinois, in the middle west of U.S. First, to assess the exercise values of the taekwondo trainees, a total of 17 questions that consisted of general, moral, and status types were developed. Second, to evaluate the adaptation to school life, a total of 12 questions divided into four categories were used: adaptation to teachers, adaptation to academic activities, adaptation to school rules, and adaptation to school activities. Based on a multiple regression analysis, it was found that the moral and general subfactors of exercise values affected all the subfactors of school-life adaptation (school activities, teachers, rules, and academic activities); while the status subfactor affected both rules and academic activities adaptation (Cho et al., 2018).

Previous studies reported similar results regarding the positive impact of exercise values on school-life adaptation. The results of this study indicate that "taekwondo training can contribute to learning and academic-activity improvements, inspire the sociability that is necessary for school life, and promote the cooperation, unity, and school affection that are necessary for organizational life" (Cho et al., 2018). Additionally, based on

this study, taekwondo helps the growth and development of children and youth, cultivating ideal human beings combined with a holistic/humanist education, forming great personalities, and, at the same time, improving physical wellbeing.

Tadesse (2016), developed a study to describe the nature of Taekwondo training, to explore the benefits of Taekwondo training for the wellbeing of adolescents, and to identify problems/challenges associated with it in Addis Ababa, the capital city of Ethiopia (Tadesse, 2016). The research was designed both with a qualitative and quantitative approach, with data collected concurrently. Mixed methods were used to minimize their limitations, maximize their strengths, and to triangulate the results of the study. The quantitative part of the study selected randomly four Taekwondo clubs of the 53 found by the researcher and all the 108 Taekwondo adolescent practitioners found in these clubs were included in the study using one stage cluster sampling.

The results of the study showed that the nature of Taekwondo training provided for the adolescents in the four clubs is largely similar and it includes: the process of registration and expenses, community services, facilities of the gyms, frequency and hours of training, components of the training of Taekwondo, and competition. Regarding the perception of the

benefits of Taekwondo for adolescents, six themes were identified: social benefits; physical benefits; mental benefits; self-defense; addiction avoidance; and other benefits expressed as improvement in education, participation in competition, new skills, and opportunity to teach. Finally, in terms of adolescents' problems related with Taekwondo practice, the researcher found: family-related problems, injury, community-related problems and miscellaneous including busy schedule, lack of Taekwondo materials and other facilities, far distance from home to clubs, and lack of balanced diet. It is important to note that majority of the adolescent respondents claimed that the faced no problem at all. Around Taekwondo competitions the main important problems found were adolescents competing in adult categories, poor infrastructure in Taekwondo competition, injuries, and unhealthy weight management (Tadesse, 2016).

Analyzing the results, it is essential to identify the nature of Taekwondo training because a traditional martial art methodology is usually better for wellbeing than modern/sport kind of training. Modern sport training is more focused on competition and winning, while traditional Taekwondo training emphasizes on self-defense, technique, mediation, and philosophy. In the four participant clubs, the nature of Taekwondo was concentrated on fight competitions, so it was more a modern sport type of

training. However, despite being a modern Taekwondo practice, the findings of this study showed that the Taekwondo training provided for adolescents in Addis Ababa “has positively contributed for the wellbeing of its practitioners” (Tadesse, 2016).

Kim et al. (2012), conducted a study to identify the relationship between life skills and character and to define character of Taekwondo practitioners which affected the development of those life skills. The subjects of the study were 310 Taekwondo teachers nationwide (South Korea) utilizing a purposive sampling technique. The subjects ranked higher than fourth Dan black belt and had more than three years of teaching experience. They were 262 males, 48 females, with an average age of 37.2 years, average teaching career of 12.7 years, and average rank of 5.4 Dan black belt. The data on 160 people were used for the content analysis, while the data of 150 people were used for quantitative analysis.

To measure the life skills of Taekwondo practitioners, the Taekwondo Life Skill Scale developed by Chung (2010, as cited in Kim et al., 2012) was used. It measures five subfactors: social, psychological, emotional, physical, and martial arts-spirit skills. On the other hand, to measure the taekwondo character of practitioners, concepts were identified through survey questions. Five classes of character were recognized: self-

regulating, self-understanding, self-esteem, social relationship, and empathetic understanding others. Measurements of life skills and character indicated social skills and self-regulating character with the highest scores, respectively. Also, the self-regulating, self-understanding, and empathetic understating others character had high interrelationships with the five subfactors of life skills. Based on the results, life skills increase or decrease according to the increment or decrement of Taekwondo character at the same time. Therefore, it confirmed that "life skills of taekwondo practitioners were generated as a result of their mutual dynamic relationship with taekwondo character" (Kim et al., 2012).

Similarly, Kim et al. (2011), explored the relationship between Taekwondo participation as a possible serious leisure pursuit and associated life satisfaction and perceived health. A total of 168 adults enrolled at eight Taekwondo academies in different cities in the United States participated in the study voluntary and anonymously. Life satisfaction was measured through Diener, Emmons, Larson, and Griffin's (1985) Satisfaction with Life Scale (SWLS). Health perception was measured by asking a single question "In general, how would you rate your health?" in a range from 1 (poor) to 5 (excellent). On the other hand, serious leisure was measured using the Serious Leisure Inventory Measure (SLIM) that focuses on five

central qualities of serious leisure: perseverance, leisure career, significant effort, unique ethos, and identification with pursuit.

Based on the SLIM scores of the participants, a hierarchical cluster analysis was conducted to segment them into three clusters that were named: Novices (less than three years of participation), Journeymen (five or more years of participation), and Serious Sages (almost eight years of participation). The results indicated that participants in Serious Sages reported significantly higher life satisfaction and more positive perceptions of health than Novices and Journeymen. Also, the findings indicated that Taekwondo creates an opportunity for participants to take part in an activity that has serious leisure qualities and "individuals pursing Taekwondo as a serious leisure demonstrated high life satisfaction and perceived health" (Kim et al., 2011).

Lastly, Lakes & Hoyt (2004) evaluated the Leadership Education Through Athletic Development (LEAD) curriculum (program based on Taekwondo training) to explore the efficiency of martial arts training for promoting self-regulation among children from kindergarten to fifth grade. Participants were 207 students (94 boys, 99 girls, in the final sample of 193 students) at a private lower school in a midsize Midwestern city. During the academic year, martial arts (LEAD) instruction was replaced for the

standard physical education course for two or three (rotating weekly) of the four 45-min physical education periods each week. Students were randomly divided by homeroom class into two groups: LEAD group (receiving LEAD curriculum) and comparison group (receiving standard physical education). Pretest was developed during the first four days of school, and after the intervention (four months) posttest was conducted (Lakes & Hoyt, 2004).

Demographic data was provided by parents through survey. It included questions related to family constellation, family income, and the racial or ethnic background of the child. Self-regulation in response to challenge was measured using the Response to Challenge Scale (RCS); student strengths and difficulties were measured by teachers using Strengths and Difficulties Questionnaire, Teacher Version (SDQT); freedom for distractibility was measured using the Wechsler Intelligence Scale for Children-Third Edition (WISC-III) (Arithmetic and Digit Span subtests); and self-esteem was measured only for fourth and fifth grade students (n=66) with The Coopersmith (1967) Self-esteem Inventory (SEI).

The RCS results showed that children in the martial arts group have greater self-regulation in response to a challenge than children in the comparison group for all three dimensions of self-regulation: cognitive, affective, and physical. SDQT indicated significant effect only in the

prosocial subscale. According to WISC-III results, significance was found only on the Arithmetic subtest. SEI results indicated no significant effects. Gender analysis revealed that both girls and boys in the LEAD group showed benefits relative to the comparison group; however, the effects for boys were numerically larger on many scales. This may be due to the significant differences in the pretest, and differential reactions to martial arts training, instructor (male), and nature of the classes. Results of this study

> Have exciting and important implications for educators and mental health professionals interested in promoting positive youth development … self-regulation is linked to later success in life, it is an aspect of positive child development that is worthy of future consideration. (Lakes & Hoyt, 2004)

2.4.1.2. Behavior

Lakes et al. (2013), addressed the feasibility and acceptability of implementing Taekwondo into Physical Education (PE) in a middle school and investigated its effects. The school agreed to implement Taekwondo as a component of their PE for one academic year. The selected classes for the study were randomly assigned, either to Taekwondo or PE; and to minimize side effects, the teacher, the hour, and the participating grade level were the same in both classes. Sixty students were evaluated at baseline and during the last week of the intervention (nine months later). A multimethod

approach was used to measure effects on different variables such as physical condition (by calculating Body Mass Index, BMI), executive function (by using a computerized performance task), and behavior (by using the Strengths and Weaknesses of ADHD and Normal behavior, SWAN, questionnaire).

The findings signaled that BMI scores generated a moderate, non-significant effect size; however, they indicated a trend toward larger BMI reduction among Taekwondo students. Regarding the executive function computer-administered task, the results revealed greater accuracy on the congruent trial for Taekwondo students. Similarly, there was a significant large effect size for parent-rated inhibitory behavioral control, reflecting greater improvement among Taekwondo students. The study concluded that "Taekwondo is an exercise program that improves cognitive functioning and is both feasible and acceptable to implement in a public-school setting" (Lakes et al., 2013). Additionally, it indicated that given the noteworthy advancements in parent-rated inhibitory behavioral control, the improvements promoted in Taekwondo training generalized to other contexts.

2.4.1.3. Personality

Wargo et al. (2007), developed a study using the MMPI-2 (Minnesota Multiphasic Personality Inventory 2nd Edition) to explore the personality characteristics of beginner and upper-level martial artists, with a focus on hostility and psychopathology. Participants were 20 black belt (17 males, 3 females, average age of 38.3 years) and 19 yellow belt (13 males, 6 females, average age of 33.7 years) members of the Vanderbilt Taekwondo Black Belt Association and the Taiho Ryu Karate organization. Each participant filled up the MMPI-2 consisting of 567 empirically derived true-false items.

The results of this study indicated no evidence for improved self-esteem or reduced aggressiveness with rank. Indeed, the results indicated normal limits of Low Self-Esteem and Hostility, which suggest that participants have no more self-esteem issues, or they are no more likely to view ambiguous situations, than the general population (Wargo et al., 2007). However, two exceptions were noticed: upper-level female practitioners reported meaningful negative scores on Paranoia and Anger, and at the same time, they tended to be less defensive and demonstrated lower levels of Social Discomfort. In general, these findings coincide with the literature review that indicates that martial arts may be beneficial to students.

However, also based on the results of this study, "women may want to consider the elevated traits … before embarking on long-term martial arts training" (Wargo et al., 2007).

Similarly, Kurian (1994), evaluated the relationship between personality factors and ATA Taekwondo training in a sample of young students. Participants were 72 boys attending to two ATA schools in the southwestern U.S. The subjects averaged 1.5 years of Taekwondo training, and their mean age was 9.8 years. To give a proper evaluation related to training time, belt ranks of the subjects were converted to numerical values ranging from 1 (beginner) to 10 (master). All subjects completed the 1973 Form A of the Children's Personality Questionnaire following a regular training session. The results showed that "ATA belt rank is associated with a pattern of enthusiastic optimism and self-reliance" (Kurian, 1994). Since this personality trait is socially positive, it can be concluded that Taekwondo training may be beneficial for young male students.

Another study conducted by Kurian et al. (1993), focused on how length of Taekwondo training might be related to differences in the personality elements measured by the 16 Personality Factor Questionnaire (Cattell, Eber, & Tatsuoka, 1970, as cited in Kurian et al., 1993). The study included 30 adult participants attending two American Taekwondo

Association schools in the southwestern U.S. The sample contained 7 women and 23 men with a mean age of 28.6 years and an average of 2.6 years of Taekwondo training. The participants completed Form C of the 16 Personality Factor Questionnaire during a regular training period. The total sample was divided into two groups of 15 subjects each. The first group had an average of formal Taekwondo training time of 1.4 years or less; and the second group of 1.5 years or more. The mean ages of both groups did not differ significantly.

The results of the data analysis indicated that the length of Taekwondo involvement is related with lower scores on Anxiety and with higher scores on Independence. Although there was not a statistically significant difference on the Leadership derived score, the mean difference between the two training groups indicated that longer trained individuals tended to have higher scores in this area. Therefore, the results of this study indicate and support the statement that a formal martial art training is associated with scores on measures of personality composition. Lower scores on Anxiety and higher scores on Independence are often associated with enhanced mental health, implying that enrollment in Taekwondo training may be beneficial as part of therapeutic programs (Kurian et al., 1993).

2.4.2. Specific Social and Psychological Outcomes of Taekwondo Practice

2.4.2.1. Aggression

Vertonghen & Theeboom (2010) reviewed literature about the social-psychological outcomes of martial arts involvement among youth. They found a shift in the interest of researchers towards the study of the relationship between martial artists and aggression. In general, martial arts participation can be described in controversial terms: on one side, it is believed to provide positive learning opportunities for youth, and on the other side, it has been assessed by others as problematic due to an assumed link with negative socialization processes. Despite the inconsistency of the findings in this field reported in Vertonghen & Theeboom (2010), studies assessing Taekwondo and aggression concluded that longer training was associated with lower levels of aggressiveness.

For instance, Parthi (2013) studied aggressive behavior and personality traits in a total sample of 60 male subjects (age 18-25 years) divided in 30 Taekwondo and 30 non-Taekwondo participants. Demographic information was obtained regarding age, place of residence (rural/urban), and the family type (joint/nuclear). Only those Taekwondo students that had been undergoing training for at least three years were considered for the purposive sampling. Furthermore, it was ensured that

non-Taekwondo subjects had not participated in any martial arts training program. Buss & Perry's Aggression Questionnaire (AQ) was used to measure four sub traits of aggression: anger, physical aggression, hostility, and verbal aggression. Eysenck's Personality Questionnaire was used to measure three personality dimensions of psychoticism, extraversion, and neuroticism. Finally, a brief questionnaire with three questions was administered. Those questions included: reasons for training Taekwondo, has training of Taekwondo made you aggressive? what have you learnt from the training? (Parthi, 2013).

Results revealed significant differences between Taekwondo and non-Taekwondo participants on the sub traits of physical aggression, hostility, and total aggression. For anger and verbal aggression, significant differences were not found. Additionally, significant differences between both groups emerged only in the Eysenckian dimension of psychoticism. These results are interesting in terms of the higher score obtained by Taekwondo participants in psychoticism but having a lower score on total aggression and its sub traits of physical aggression and hostility compared to the control group (Parthi, 2013).

According to the responses for the three questions, most of the Taekwondo participants reported interest in the martial art as the primary

reason for training it, followed by self-protection, and parents' decision. All the respondents answered negative to the question of whether Taekwondo training has made them aggressive. Regarding on what Taekwondo has taught them, 43% of participants reported developing emotional control and self-discipline; 20% reported enhanced decision-making capacity; 17% reported developing a sense of responsibility; 13% reported developing humility and respect; and 7% a boost in self-confidence (Parthi, 2013). According to this study, it can be concluded that "regular Taekwondo training impacts aggressive behavior as Taekwondo participants were found to be significantly lower on total aggression" (Parthi, 2013). Therefore, Taekwondo seems to be a promising martial art for affecting the inhibition of aggression in young male adults.

Similarly, Skelton et al. (1991) investigated and analyzed the relationship between aggressive behavior and higher belt ranks among children in the American Taekwondo Association (ATA). Participants were 68 children (54 boys, 14 girls, age 6-11 years) enrolled in ten ATA schools located in Indiana, Ohio, Kentucky, and Illinois. The independent variable was belt rank, where participants were allocated in five groups according to their belt degree. The dependent variable was each participant score on the Aggressive scale of the Revised Child Behavior Profile, which is a

standardized portion of the Child Behavior Checklist (Achenbach, 1981, as cited in Skelton et al., 1991). This tool is designed for children aged between 6 and 11 years and it contains 23 statements which are answered by an adult familiar with the child. The results indicated an observable and significant difference among children's belt rank aggressiveness as perceived by their parents (Skelton et al., 1991). Regarding the trend analysis, there was a significant orientation towards reduced aggression with advanced ATA group rank. As a conclusion, this study suggests that "aggressiveness tends to decline as a function of advancement in a martial arts program" (Skelton et al., 1991).

2.4.2.2. Self-concept

Lim & Kim (2012) studied the physical self-concept of Taekwondo practitioners by comparing it with non-practitioners with measures in three different periods. An elementary school was chosen through purposive sampling and 70 students from third to sixth grade participated in the study. There were 40 students who were not enrolled in any Taekwondo institutes or/and the school aptitude program for physical activity. Demographic factors were measured, such as sex, exercising (yes or no), participatory period, frequency, and intensity. The Development of Taekwondo's Psychological Change Model and Its Verification, created by Lim (2007),

was used to examine physical self-concept of participants (as cited in Lim & Kim, 2012). This model measures seven factors: endurance, disease, flexibility, obesity, muscular strength, competence, and confidence in sport.

Based on the results and the analysis of the data collected from the measurements in each period (within a 12-week interval), it can be concluded that in general there was a difference in physical self-concept between the two groups, where Taekwondo participants had higher scores in physical self-concept than non-participants. Similarly, there was a general difference in the changing pattern of physical self-concept between the two groups by period. Also, there were detailed differences in the patterns of endurance, competence, and sport confidence. Specifically, a statistically significant difference was found in flexibility and physical strength between the groups in the second and third measurements. In conclusion, this study suggests that "Taekwondo training has an effect on the change of youth physical self-concept" (Lim & Kim, 2012).

Similarly, Finkenberg (1990) evaluated whether self-concept of college women was affected by their participation in Taekwondo classes. The Tennessee Self-concept Scale was administered to 51 women enrolled in Taekwondo classes (Taekwondo group, mean age 22.61 years) and 49 women enrolled in four general education classes (control group, mean age

22.94 years) as a pre-test (first week of a semester), and as a post-test (a week before the semester finished). The Taekwondo group participated in eighteen weeks of Taekwondo classes between both tests. None of the control group or the Taekwondo group had had previous experience in martial arts.

The Tennessee Self-concept Scale measures self-concept based on 100 descriptive statements which the subject uses to describe his or her own self-picture. Ten of the 100 items represent the self-criticism scale and the remaining 90 items include perceptions of physical self, moral-ethical self, personal self, family self, social self, identity, self-satisfaction, and behavior (Finkenberg, 1990). The results indicated that both on total self-concept scores and on certain self-concept subscales significant differences were found; and mean self-concept scores for the Taekwondo group were higher. The subscales where significant differences were found included physical, personal, social, identity, and satisfaction. This study reinforces findings of Duthie, et al. (1978, as cited in Finkenberg, 1990) that showed that students of martial arts were more self-confident than those without training.

2.4.2.3. Mood

Roh et al. (2018), investigated the effect of Taekwondo training on physical fitness, mood, sociability, and cognitive function in children from

multicultural families in South Korea. The study included 30 children with Korean fathers, and Chinese, Vietnamese, or Japanese mothers. The children were randomly assigned to a control group and Taekwondo group. The testing was conducted before and after sixteen weeks of intervention (60 minutes of Taekwondo training session once a week) to analyze physique, fitness, mood state, sociability, and cognitive function of each subject.

Physique was measured by height, weight, body mass index (BMI), and percentage of body fat. Physical fitness was measured by cardiorespiratory endurance, strength, flexibility, power, and balance. Mood state was estimated using the Korean Version of the Profile of Mood State-Brief (K-POMS-B) that is divided in 6 sub-areas: tension, depression, anger, vigor, fatigue, and confusion. Sociability was measured using the sociability measuring model for juveniles that consists of 6 sub-areas: leadership, group life, being left out, sociability, expressiveness, and patience. Finally, cognitive function was measured using the Korean version of the children's version of the Stroop color and word test (Roh et al., 2018).

The results revealed no significant differences in any of the variables related to physique and physical training, except for the Stork test score (balance). Therefore, it can be concluded that Taekwondo training once a

week does not appear to induce improve physique and fitness. On the other hand, this study showed that Taekwondo led to a significant reduction in tension and depression scores and significant increase in vigor score. Likewise, the 'being left out' score was significantly reduced, and the sociability score was significantly increased. Finally, there were not significant changes in the Stroop color test and word test score that evaluate the cognitive function of children. The outcomes of the study indicate that participation in regular Taekwondo training can be effective in improving the mood state and developing sociability in children from multicultural families in South Korea (Roh et al., 2018).

Another type of study about mood was developed by Toskovic (2001) that investigated and compared the acute alterations in selected measures of mood profile in male and female novice Taekwondo practitioners. The study evaluated whether Taekwondo practice was an appropriate exercise modality for enhancing scores on six psychological state dimensions measured by the Profile of Mood States (POMS): vigor, anxiety, depression, anger, fatigue, and confusion. A total of 40 male and female college students (ages 18-21 years) volunteered to participate and enrolled in each of these two groups: Taekwondo activity class and lecture-

control class. Experimental and control subjects were instructed to complete the POMS test prior and immediately after the exercise or lecture class.

The results indicated a significant difference on the Total Mood Disturbance (TMD) score and each affective factor score for experimental versus control subjects regardless of sex. The analysis of data suggested that participation in a single bout of dynamic Taekwondo exercise can produce immediate positive changes in mood in college-age individuals. Novice Taekwondo practitioners reported a decrease in negative mood and an increase in positive mood compared with the lecture-class control subjects. For future research, a larger sample of Taekwondo subjects should be assessed, additionally, it is important to analyze long-term implications (Toskovic, 2001).

Chapter 3. Research Method

3.1. Research Design

The present study employed a conclusive research design with a descriptive approach and a cross-sectional strategy to investigate and analyze the long-term effect of Taekwondo training on the mood state of adolescent practitioners in Ecuador. A conclusive research design was selected since the objectives included testing specific hypotheses and examining relationships. Also, the descriptive approach matched the objectives of the study since it focused on description and determined the degree to which variables are associated. Similarly, a cross-sectional design was appropriate because it involved the collection of information from a sample of population elements only once. In addition, a conclusive type of research was used because the sample was large and representative, the information needed was clearly defined, the research process formal and structured, and a quantitative data analysis was applied. The following sections will provide more detailed information about the mentioned characteristics, specifically regarding sampling, data collection method, data type, and data analysis techniques.

3.2. Sampling

3.2.1. Target Population

Adolescents in the study must meet two qualification criteria: age from 10 to 19, and live in Quito, capital city of Ecuador. Therefore, the target population for this study is defined as follows:

Element: Male or female adolescents meeting the qualification criteria.

Sampling unit: Classes in schools.

Extent: Metropolitan Quito.

Time: Survey period (November 2021).

3.2.2. Sampling Frame

The sampling frame consisted of adolescents regularly attending classes in conveniently selected schools located in Metropolitan Quito. The respondents were screened in the data-collection phase to ensure that they satisfy the criteria for the target population in this study.

3.2.3. Sampling Technique

The sampling technique in this study used a traditional approach with sampling without replacement. In a traditional approach the entire sample is selected before data collection begins. A sampling without replacement means that once an element is selected for inclusion in the

sample, it is removed from the sampling frame and cannot be selected again (Malholtra & Dash, 2016). A nonprobability sampling technique was used to select schools in metropolitan Quito through convenience sampling. All adolescents from those schools that voluntarily agreed to fill-up the questionnaire and have their parents' consent, were included in the research.

3.2.4. Sample Size

Cohen (1992) recommends sample size determination based on the concept of power analysis, so that sufficient sample size is secured to minimize statistical errors. Cohen (1992) developed a handbook specifying sample size for different statistical tests given values for α (0.01, 0.05 and 0.10), power (0.80), and effect size (small, medium, and large). This method was used by Tadesse (2015), who investigated the role of Taekwondo training on the wellbeing of adolescents in Ethiopia. Therefore, based on Cohen's (1992) advice and the expectation of some attrition rate; for a multiple regression analysis at $\alpha = 0.05$, power of 0.80, six independent variables, and an expected medium effect size, the sample size for this study is recommended to be higher than 97 (see Cohens, 1992, pp. 158). However, given that adolescents had to voluntarily agree and have their parents' consent to participate in the present study; and since a convenience

sampling technique was employed, the sample size was determined after the selection of the schools in metropolitan Quito.

3.2.5. Sampling Process

In summary, schools in Metropolitan Quito were selected by convenience sampling. Next, the target population was determined based on adolescents voluntarily agreeing to fill-up the questionnaire having their parents' consent. Following, all the adolescents meeting the criteria were directly approached by the interviewers. Finally, the collection data phase started, which will be described in the next section.

3.3. Data Collection Method

Adolescents were recruited through a direct approach in their high school classes. This research used a structured data collection through survey method. The questionnaires that were employed will be described in section 3.4. The mode of administration was both through personal interviewing and electronic interviewing. Personal interviewing was computer-assisted (CAPI) and electronic interviewing was via internet.

In CAPI, the respondent was seated in front of a computer terminal and answered a questionnaire on the computer screen by using the keyboard or a mouse. CAPI was used as a personal interview technique since an interviewer was present to serve as a host and guide the respondent as

needed. On the other hand, internet survey required the respondent to go to a particular Web location to complete it. These methods offered several advantages because it was possible to prevent respondents from selecting more than one response where only one was intended, or from otherwise typing where no response was required.

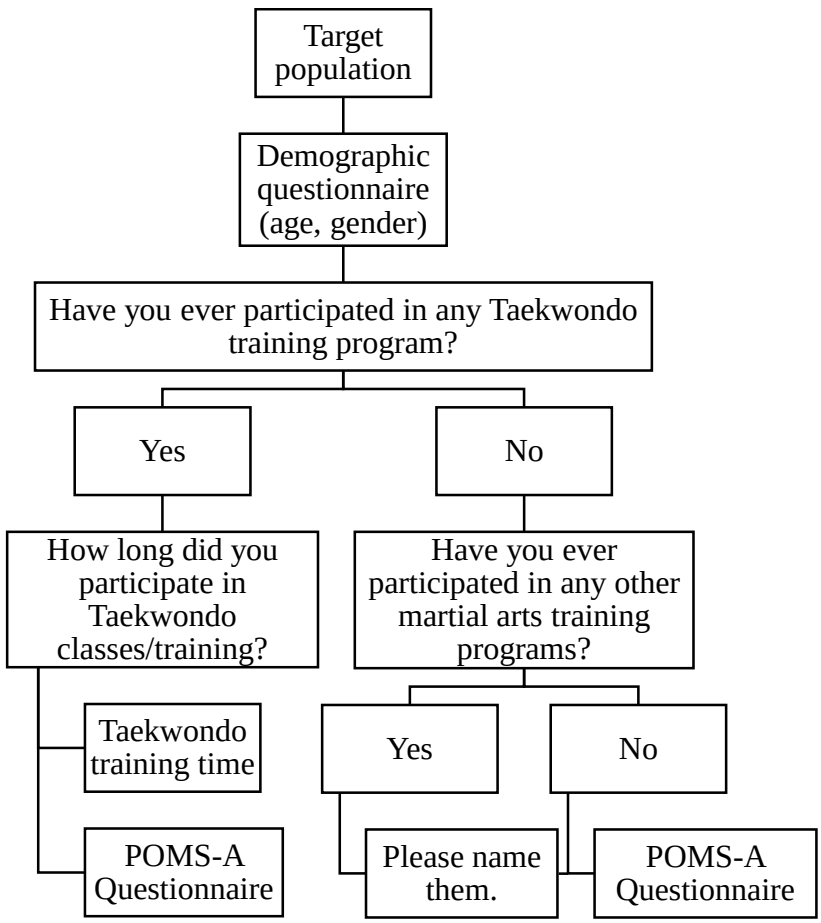
3.4. Data Type

Adolescents were screened in this phase to ensure that they satisfied the criteria for the target population in the study (see subsection 3.2.1.). First, participants were asked to complete a brief demographics questionnaire requesting their age and gender. Second, they were asked to report if they have experience in Taekwondo training by answering the question: Have you ever participated in any Taekwondo training program? If the answer was "Yes", the respondents were asked to report their training time in years and months by answering the question: How long did you participate in Taekwondo classes/training? Their responses represented the variable "Taekwondo training time" that was coded in months (e.g., 2 years = 24 months). If the answer was "No" (Taekwondo training time = 0 months); they were asked: Have you ever participated in any other martial arts training programs? if their answer was 'Yes", they were asked to name all the martial arts that they have practiced.

Subsequently, this study used a noncomparative scaling technique with an itemized rating scale based on the Profile of Mood States-Adolescents questionnaire (POMS-A) developed by Terry et al. (1999). POMS-A is a shortened version of the Profile of Mood States (POMS) developed by McNair et al. (1971; 1992, as cited in Terry et al., 1999). Despite POMS has been used as a research tool with adolescents in physical education, sport environments, and clinical settings; it was generated from the responses of undergraduate students all aged 18 years or over (Terry et al., 1999). Consequently, Terry et al. (1999), developed POMS-A as a tested valid instrument for the assessment of mood in adolescents. Therefore, for the purpose of this study, POMS-A version of POMS was used, which is suitable for the target population (see subsection 3.2.1.). Figure 3 shows an illustration of the entire process that was required to obtain the data type for this study.

Figure 3

Illustration of the Process to Obtain the Data Type Required for the Study.



POMS-A measures six factors of the overall mood construct: anger, confusion, depression, fatigue, tension, and vigor. Each of the factors has four items rated on a 5-point scale from 0 (‘not at all’) to 4 (‘extremely’). Therefore, 24 items were rated by adolescents in this study. Additionally, participants were questioned at the same time of the day since Hill & Hill

(1991) reported significant differences from morning to afternoon in scores on Tension and Depression of POMS. Table 1 shows each of the factors of the overall mood construct and their respective items considered in POMS-A questionnaire, which is attached in Appendix A.

Table 1

Factors and Items of the Overall Mood Construct in POMS-A Questionnaire

Mood factor	Item
Anger	Annoyed
	Bitter
	Angry
	Bad tempered
Confusion	Confused
	Mixed-up
	Muddled
	Uncertain
Depression	Depressed
	Downhearted
	Unhappy
	Miserable
Fatigue	Worn out
	Exhausted
	Sleepy
	Tired
Tension	Panicky
	Anxious
	Worried
	Nervous
Vigor	Lively
	Energetic
	Active
	Alert

(Terry et al., 1999).

Finally, the overall mood construct was obtained by adding the scores of the five negative mood factors: anger, confusion, depression, fatigue, and tension, and subtracting the value of the positive mood factor:

vigor. The resulting variable, total mood disturbance (TMD), was calculated and represents the dependent variable. In summary, to address the research questions this study analyzed the relation between the following dependent and independent variables:

Dependent variable: total mood disturbance (TMD = anger + confusion + depression + fatigue + tension – vigor).

Independent variables: socio-demographic characteristics (age and gender), and Taekwondo training time.

3.5. Data Analysis Technique

After data collection, data cleaning and management was performed. The questionnaire was checked for problems like response sets, inappropriate responses, and no response. Only participants with response sets problems were excluded from further analysis. On the other hand, questionnaires with inappropriate responses or no response were retained to be analyzed as missing values since they contained other appropriate and necessary responses for other questions. After this process, the data was entered into IBM SPSS Statistics 26 to be analyzed as follows.

At the beginning outliers were checked and descriptive statistics was used to summarize the sample characteristics. After that, multiple regression analysis (MRA) was performed which allowed to create a mathematical

relationship between the variables. To address the research questions in this study (see section 1.3) four MRA were executed. The first model was developed to investigate the relation between the dependent variable TMD (interval scaled), and the independent variables age (interval scaled), and gender (categorical). The second model was executed to examine the relation between TMD and the independent variable Taekwondo training time (interval scaled) after controlling for socio-demographic characteristics. The third model was built as the second model but with the inclusion of dummy variables to categorize the respondents' experience in Taekwondo and other martial arts training programs. Therefore, respondents' participation in martial arts was categorized as follows: no martial arts experience, other martial arts only (excluding Taekwondo), Taekwondo only, and both. Finally, a fourth model was generated to assess the relation between TMD and Taekwondo training time according to age and gender. Since interaction effect was studied, multicollinearity had to be investigated as well.

At first, interaction terms with uncentered variables were examined for addressing the degree of multicollinearity by analyzing the variance inflation factor (VIF). VIF measures the degree to which multicollinearity amongst the predictors degrades the precision of an estimate. If an

independent variable is highly correlated with the remaining predictors, its VIF will be very large, a general rule is that the VIF should not exceed 10 (Belsley et al., 1980). Indeed, VIF is an important part in examining interaction effects in multiple regression.

After measuring VIF, centered variables were created to avoid multicollinearity problems. For centering the variables, the mean was subtracted from each score, yielding a centered score. Variables were centered because "considerable multicollinearity is introduced into a regression equation with an interaction term when the variables are not centered" (Robinson & Schumacker, 2009). Moreover, Aiken & West (1991) showed that using other transformations, additive constant, or uncentered scores can have a profound effect on interaction results. In fact, centering variables "is an important step when testing interaction effects in multiple regression to obtain a meaningful interpretation of results" (Robinson & Schumacker, 2009). Lastly, after checking for interaction effects between sociodemographic variables and Taekwondo training time, a graph was developed to illustrate the relation with TMD.

The hypotheses tested in this study were:

H1. There is a significant relation between socio-demographic characteristics and TMD resulting score of the POMS-A questionnaire applied to adolescents in Quito, Ecuador.

H2. Taekwondo training time is significantly and negatively related to TMD resulting score of the POMS-A questionnaire applied to adolescents in Quito, Ecuador.

H3. There is a significant interaction between socio-demographic characteristics and Taekwondo training time in relation to TMD resulting score of the POMS-A questionnaire applied to adolescents in Quito, Ecuador.

Chapter 4. Results

4.1. Descriptive Statistics

After data cleaning and management, out of a sample of 774 participants, 14 were excluded from further analysis due to response sets. Therefore, a total of 760 adolescents provided the data for this study. Outliers were checked, and even though SPSS identified some data as outliers, they were kept as it was concluded that they were valid and relevant for the study. In Table 2, the participants' demographics are summarized.

Excluding missing values, the adolescent participants comprised 390 (51.93%) males and 361 (48.07%) females. The mean age of the participants was 14.65 (±2.32) years. Among the adolescents, 441 (58.03%) reported having participated in Taekwondo classes/training, while 319 (41.97%) reported not having participated. Similarly, 178 (23.42%) reported having participated in any other martial arts training program, while 582 (76.58%) reported not having participated. Therefore, regarding the participants' experience in different martial arts; 251 (33.03%) have never practiced martial arts, 68 (8.95%) have practiced other martial arts excluding Taekwondo, 331 (43.55%) have practiced Taekwondo only, and 110 (14.47%) have practiced both. The mean Taekwondo training time of the

participants was 23.89 (±36.80) months, and their total mood disturbance (TMD) score was 6.86 (±14.07).

Table 2

Characteristics of Adolescents

Characteristics (N = 760)	Category	N	%
Gender	Male	390	51.93
	Female	361	48.07
Age (Mean ± SD)		14.65 ± 2.32	
Taekwondo participation	Yes	441	58.03
	No	319	41.97
Martial arts participation (excluding Taekwondo)	Yes	178	23.42
	No	582	76.58
Different martial arts experience	None	251	33.03
	Other martial arts only (excluding Taekwondo)	68	8.95
	Taekwondo only	331	43.55
	Taekwondo and other martial arts	110	14.47
Taekwondo training time (months) (Mean ± SD)		23.89 ± 36.80	
Total Mood Disturbance (Mean ± SD)		6.86 ± 14.07	

Among the 178 adolescents who reported having experience in martial arts training programs excluding Taekwondo; 79 (44.38%) stated to have practiced Karate; 33 (18.54%) Kickboxing; 23 (12.92%) Boxing; 12 (6.74%) Judo; 11 (6.18%) Jiu Jitsu; 10 (5.62%) Muaythai; 7 (3.93%) Mixed Martial Arts; 6 (3.37%) Kung Fu; 5 (2.81%) Capoeira; for Brazilian Jiu Jitsu, Hapkido and Sambo there were 4 (2.25%) adolescents practitioners for each; 3 (1.69%) declared having practiced Aikido; 2 (1.12%) Wrestling;

and for K-1, Kendo, Krav Maga, Ninjutsu, Sojukay, Sumo, Tai Chi, Tricking, Vale Tudo, and Wushu there was only 1 (0.56%) adolescent practitioner for each. The data for the 24 martial arts named by adolescents in the study are summarized in Table 3. Also, it is important to clarify that some adolescents reported to have practiced more than one martial art, therefore, they included more than one martial art name in their response.

Table 3

Participation in Martial Arts Excluding Taekwondo

Martial Art Name	N	%
Karate	79	44.38
Kickboxing	33	18.54
Boxing	23	12.92
Judo	12	6.74
Jiu Jitsu	11	6.18
Muaythai	10	5.62
Mixed Martial Arts	7	3.93
Kung Fu	6	3.37
Capoeira	5	2.81
Brazilian Jiu Jitsu	4	2.25
Hapkido	4	2.25
Sambo	4	2.25
Aikido	3	1.69
Wrestling	2	1.12
K-1	1	0.56
Kendo	1	0.56
Krav Maga	1	0.56
Ninjutsu	1	0.56
Sojukay	1	0.56
Sumo	1	0.56
Tai Chi	1	0.56
Tricking	1	0.56

Vale Tudo	1	0.56
Wushu	1	0.56

4.2. Multiple Regression Analysis

The results for the four multiple regression analysis are shown in Table 4 and Table 5. Excluding missing values, data from 736 adolescents were used to perform the analysis. As it can be observed in Table 4, in model 1, gender (Coef = -6.609, SE = 0.976, $p < 0.001$) and age (Coef = 0.437, SE = 0.209, $p < 0.05$) significantly affected TMD. The results indicated that model 1 explained 6.131% ($R^2 = 0.061$) of the variance in TMD and that it was a significant predictor of TMD ($F_{2,748} = 24.429$, $p < 0.001$).

In model 2, gender (Coef = -6.130, SE = 0.982, $p < 0.001$), age (Coef = 0.768, SE = 0.221, $p < 0.001$), and Taekwondo training time (Coef = -0.056, SE = 0.014, $p < 0.001$) significantly affected TMD. After controlling for age and gender, adding Taekwondo training time to the model increased its predictive capacity by 2.069% ($\Delta R^2 = 0.021$) in a statistically significant way ($\Delta F_{1,732} = 16.486$, $p < 0.001$). In summary, the results indicated that model 2 explained 8.135% ($R^2 = 0.081$) of the variance in TMD and that it was a significant predictor of TMD ($F_{3,732} = 21.068$, $p < 0.001$).

Table 4

Multiple Regression Analysis of Total Mood Disturbance (TMD) among Ecuadorian Adolescents Model 1 and 2

Characteristics	Model 1		Model 2	
(N = 736)	Coef	SE	Coef	SE
Intercept	3.655	3.117	-0.038	3.225
Gender				
Male (ref)				
Female	-6.609***	0.976	-6.130***	0.982
Age	0.437*	0.209	0.768***	0.221
Taekwondo training time			-0.056***	0.014

Note: Coef = regression coefficient; SE = standard error, ref = reference category.
*$p < 0.05$, **$p < 0.01$, ***$p < 0.001$.

In model 3, gender (Coef = -5.846, SE = 1.006, $p < 0.001$), age (Coef = 0.703, SE = 0.224, $p < 0.01$), Taekwondo training time (Coef = -0.033, SE = 0.017, $p < 0.05$), and participation in Taekwondo only (Coef = -3.054, SE = 1.311, $p < 0.05$) significantly affected TMD; while participation in other martial arts only (excluding Taekwondo) (Coef = -1.107, SE = 1.866, $p > 0.05$), and participation in both Taekwondo and other martial arts (Coef = -3.430, SE = 1.784, $p < 0.10$) did not significantly affect TMD; as it can be observed in Table 5. The results indicated that model 3 explained 8.901% ($R^2 = 0.089$) of the variance in TMD and that it was a significant predictor of TMD ($F_{6,729} = 11.871$, $p < 0.001$).

As explained in section 3.5., to develop the final model, interaction effects between variables were studied and VIF was measured to check for multicollinearity. The results showed that without centering the variables,

VIF for Taekwondo training time was 56.995 and for the interaction effect between Taekwondo training time and age VIF was 56.906. Since VIF was greater than 10, multicollinearity was present (Robinson & Schumacker, 2009). Consequently, variables were centered to proceed with the construction of the model. After centering the variables, all values of VIF were less than 10. Since multicollinearity was solved, the model was developed, and the results are described below.

In the final model, gender (Coef = -5.918, SE = 1.005, $p < 0.001$), age (Coef = 0.731, SE = 0.224, $p < 0.01$), Taekwondo training time (Coef = -0.063, SE = 0.025, $p < 0.05$), participation in Taekwondo only (Coef = -2.829, SE = 1.341, $p < 0.05$), and interaction effect between gender and Taekwondo training time (Coef = 0.058, SE = 0.027, $p < 0.05$) significantly affected TMD; while participation in other martial arts only (excluding Taekwondo) (Coef = -0.520, SE = 1.882, $p > 0.05$), participation in both Taekwondo and other martial arts (Coef = -3.366, SE = 1.783, $p < 0.10$), and interaction effect between age and Taekwondo training time (Coef = -0.003, SE = 0.006, $p > 0.05$) did not significantly affect TMD. The results indicated that model 4 explained 9.499% ($R^2 = 0.095$) of the variance in TMD and that it was a significant predictor of TMD ($F_{8,727} = 9.539$, $p < 0.001$).

Table 5

Multiple Regression Analysis of Total Mood Disturbance (TMD) among Ecuadorian Adolescents Model 3 and 4

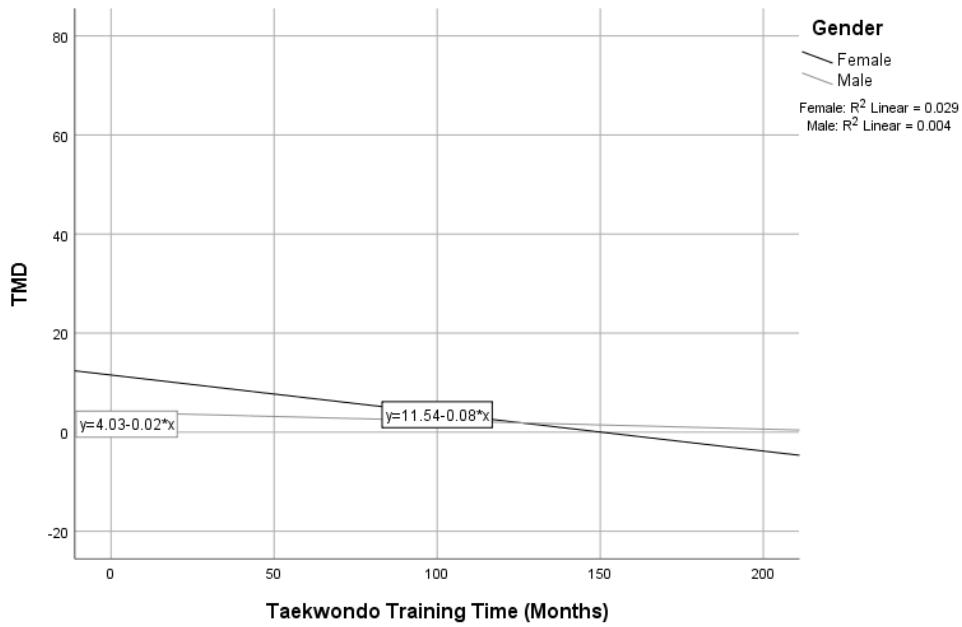
Characteristics (N = 736)	Model 3		Model 4	
	Coef	SE	Coef	SE
Intercept	2.115	3.375	11.468***	1.053
Gender				
Male (ref)				
Female	-5.846***	1.006	-5.918***	1.005
Age	0.703**	0.224	0.731**	0.224
Taekwondo training time	-0.033*	0.017	-0.063*	0.025
Different martial arts experience				
None (ref)				
Other martial arts only (excluding Taekwondo)	-1.107	1.866	-0.520	1.882
Taekwondo only	-3.054*	1.311	-2.829*	1.341
Taekwondo and other martial arts	-3.430	1.784	-3.366	1.783
Interaction effect				
Age*Taekwondo training time			-0.003	0.006
Gender*Taekwondo training time			0.058*	0.027

Note: Coef = regression coefficient; SE = standard error, ref = reference category.
*$p < 0.05$, **$p < 0.01$, ***$p < 0.001$.

As mentioned, the interaction effect between gender and Taekwondo training time was significant. Figure 4 illustrates the relation between Taekwondo training time and TMD according to gender. As it can be observed, R^2 value for female adolescents is 0.029, while for male adolescents is 0.004. The regression coefficient is -0.08 for female adolescents and -0.02 for male adolescents.

Figure 4

Linear Regression between Taekwondo Training Time and TMD in Relation to Gender.



Chapter 5. Discussion

The present research is the first one that used a quantitative approach with a multiple regression analysis to evaluate mood in Ecuadorian adolescents. By addressing three research questions (see section 1.3), its purpose was to investigate and analyze the long-term effect of Taekwondo training on Ecuadorian adolescents' mood state. The following discussion is based on the interpretation and explanation of the results, as well as on existing studies previously mentioned in the literature review section.

As hypothesized (H1, section 3.5), there was a significant relation between the studied socio-demographic characteristics (i.e., age and gender) and TMD score. According to the results, male adolescents have a lower TMD score compared to female adolescents. Gender differences in TMD scores could be explained, in part, by increased developmental challenges for girls during adolescence. Those challenges include "pubertal development, dissatisfaction with weight and attainment of a mature female body, and increased importance of feminine sex role identification" (Wichstrom, 1999). These results are consistent with previous studies assessing mood in relation to gender (Ge et al., 1994; Jacobson & Rowe, 1999; McDowell et al., 2016; Siegel et al., 1998; Weinstein et al., 2007; Wichstrom, 1999).

McDowell et al. (2016), investigated the sex-related differences in mood responses to acute aerobic exercise and found that worry symptoms and trait anxiety were significantly higher among female participants. Also, they concluded that females were more likely to report scores indicative of depression and anxiety. Similarly, Wichstrom (1999) investigated depressed mood during adolescence and found that girls scored higher than boys in depressed mood. Another study developed by Jacobson & Rowe (1999), investigating sex differences among several factors, found that depressed mood was higher for female adolescents than for male adolescents. Likewise, Siegel et al. (1998) investigated adolescent depressed mood in a multiethnic sample and found that advancing puberty was associated with depressed mood only among females.

Regarding age, younger adolescents had a lower TMD score compared to older adolescents in this study. These results are consistent with several previous studies. For example, Weinstein et al. (2007) found that positive affect of mood (e.g., vigor) during adolescence significantly declined from Grade 8 to 11. Other studies, which made distinctions between age and gender, indicated that girls experienced a greater number of depressive symptoms after age 13 compared to boys (Garber et al., 2002; Ge et al., 1994; Twenge & Nolen-Hoeksema, 2002).

However, a review elaborated by Miller et al. (1992) revealed that major data-based studies' results vary when addressing age influence on mood at adolescence stage. For example, Devine et al. (1994) examined depressed mood in adolescence during four consecutive years and found that it remained relatively stable across at least three consecutive years of data collection. On the other hand, Chen et al. (1998) developed a longitudinal study on depressed mood in adolescence, finding higher levels during mid-adolescence. Likewise, a six-year longitudinal study investigated depressed mood through adolescence finding among girls a curvilinear trend with a peak level during mid-adolescence. Also, "there was a tendency for adolescents to retain their relative level in depressed mood, most pronounced for a period of 4 years, from age 15 to age 19 years" (Holsen et al., 2000).

As it can be noticed, the results of the present study are consistent with several previous studies. However, investigation including other factors is needed to specifically address age influence on adolescents' mood. In fact, several important factors (e.g., presence of stressful life events, pubescent changes, relationship with significant others) affect mood in different stages of adolescence, and therefore should be included for further investigation (Chen et al., 1998; Miller et al., 1992).

Regarding the relation between Taekwondo training time and mood state of adolescents in Ecuador, as hypothesized (H2, section 3.5), there was a significant negative relation between Taekwondo training time and TMD score. According to the results, adolescents with a higher Taekwondo training time reported a lower score on TMD. As described below, these results are consistent with existing studies about Taekwondo focusing on the time of practice.

Weiss & Miller (2019) studied adults practitioners from an organization in Northeastern U.S. and found that higher levels of self-esteem were positively related with the amount of training experience in Taekwondo; also, they found a positive impact on body image perceptions. Kim et al. (2011) found that adult Taekwondo practitioners in different cities in U.S. with more experience in training reported significantly higher life satisfaction and more positive health perceptions than novices. Kurian (1994) studied personality factors among boys attending two Taekwondo schools in the southwestern U.S. Their results showed a pattern of enthusiastic optimism and self-reliance associated with belt rank. These positive personality traits suggested that Taekwondo training may be valuable for young male students. Similarly, Kurian et al. (1993) showed that adult practitioners in two schools in the southwestern U.S with more

than 1.5 years of Taekwondo training time reported lower scores on Anxiety and higher scores on Independence than practitioners with a shorter training time.

Skelton et al. (1991) investigated aggressive behavior among children with higher belt ranks in the American Taekwondo Association (ATA) in Indiana, Ohio, Kentucky, and Illinois. The results indicated a significant reduced aggression with advanced ATA group rank. In the same matter, Vertonghen & Theeboom (2010) reviewed several studies on Taekwondo influence on aggression and concluded that longer training was associated with lower levels of aggressiveness. On the other hand, Wargo et al. (2007) investigated the personality characteristics of beginner and upper-level martial artists in the Vanderbilt Taekwondo Black Belt Association and the Taiho Ryu Karate organization in U.S. They focused on hostility and psychopathology; however, their results indicated no evidence for improved self-esteem or reduced aggressiveness with rank.

In conclusion, this study contributes to research specifically targeting Taekwondo training time effect on various aspects of its practitioners' psychological condition. As mentioned, several studies have focused on wellbeing, personality, behavior, and aggressiveness. However, studies focusing on mood states among Taekwondo practitioners have been

experimental in nature, without explicitly investigating training time. For instance, Roh et al. (2018) explored, with an experimental study, the effect of Taekwondo training on mood (among other several factors) in children from multicultural families in South Korea. The results indicated that Taekwondo participation led to a significant reduction in tension and depression scores and significant increase in vigor score. They concluded that Taekwondo training can be effective in improving the mood state of its practitioners. Similarly, Toskovic (2001) investigated, through an experimental study, acute alterations in mood in novice Taekwondo practitioners using POMS Questionnaire. The results showed a significant decrease in TMD for the Taekwondo group. The analysis suggested that participation in a single session of dynamic Taekwondo exercise can produce instant positive changes in mood in college-age individuals.

Correspondingly, the results in this study are consistent with previous studies targeting Taekwondo participation without specifically addressing training time. Cho et al. (2018) studied in adolescents in Illinois, U.S., the impact of the exercise value of Taekwondo training in school-life adaptation, and they found a positive contribution in academic activities, sociability, cooperation, unity and school affection. Tadesse (2016) studied the SWB of adolescents in Addis Ababa, Ethiopia, in relation to their

Taekwondo participation and found several positive contributions of the sport as well. Kim et al. (2012) found in adult Taekwondo practitioners/professors in South Korea, a mutual dynamic relationship between their life skills (social, psychological, emotional, physical, and martial arts-spirit) and their character (self-regulating, self-understanding, self-esteem, social relationship, and empathetic understanding others). Similarly, Lakes & Hoyt (2004), through an experimental study, concluded that children in the Taekwondo group have greater self-regulation (cognitive, affective, and physical) in response to a challenge than children in the comparison group. Using an experimental study as well, Lakes et al. (2013) showed that Taekwondo is an exercise program that improves cognitive functioning and inhibitory behavioral control among children.

In the subject of aggression, Parthi (2013) found, through an experimental study among adults, significant lower scores on total aggression and its sub traits of physical aggression and hostility for Taekwondo practitioners compared to non-practitioners. On a different topic, Lim & Kim (2012) developed an experimental study among children in an elementary school to analyze physical self-concept. Their results showed higher scores for Taekwondo participants compared to the control group. On the other hand, Finkenberg (1990) evaluated self-concept on

college women with an experimental study as well. Significant differences were found on total self-concept score and certain subscales scores (physical, personal, social, identity, and satisfaction); which were higher for Taekwondo group.

Some of the mentioned studies required their participants to not have any experience in other martial art besides Taekwondo. In this study, that was not an exclusion criterion; however, when analyzing the categorized martial arts experience, a significant relation with TMD was found just for respondents with participation in Taekwondo only. The remaining three categories (i.e., none, other martial arts only (excluding Taekwondo), Taekwondo and other martial arts) did not have a significant influence in TMD. In this matter, it can be argued that this result lacks statistical power since there were just 68 adolescents that reported just martial arts participation. Nevertheless, there was a tendency for lower scores in TMD when the participant reported experience in any martial art compared to participants without experience.

As it can be concluded, studies analyzing Taekwondo impact on psychological aspects have showed significant benefits for its practitioners. When training time was a studied variable, most of the research determined that people with longer training time showed significant higher scores when

measuring positive traits, and significant lower scores on negative traits. However, much of the research about Taekwondo psychological correlates has focused mainly on children and adults, leaving adolescents as an understudied population. This study contributes to several research gaps as it reports Taekwondo influence on adolescents' mood with an emphasis on training time.

According to this study, training time also showed a significant interaction effect with gender when predicting TMD as hypothesized (H3, section 3.5). The results showed that in the overall role of Taekwondo training time in improving mood, female adolescents reported more improvement that male adolescents. One reason for female adolescents exhibiting greater mood benefits from Taekwondo participation may be that "women tend to report more pre-exercise levels of depression and anxiety than men" and "individuals who report a worse mood before exercise generally derive the most subsequent benefit" (Rocheleau et al., 2004). However, pre-training measures of mood were not evaluated in this study, therefore, future research in this area is recommended.

Generally, the exercise-mood relationship has been stronger among women than men. For instance, McDowell et al. (2016) explored sex-related differences in mood responses to acute aerobic exercise among young

adults. They found that “the magnitude of improvement in mood outcomes was larger among females than males for all outcomes other than feelings of tension” (McDowell et al., 2016). Similarly, Merns (1995) studied self-esteem and mood enhancement in different exercise modes, and found that girls experienced a significantly greater reduction on anxiety following exercise. However, girls reported significantly more anxious levels at pre-exercise, which, as mentioned, could have been a determinant for greater improvements after exercise.

Another explanation is that women found mood enhancement as a motivation for exercise more often than do men (Rocheleau et al., 2004). Therefore, expectation of mood enhancement may be an indicator for that precise outcome. For example, Tiggemann & Williamson (2000) found that women exercised for reasons of mood improvement more than men; however, they concluded that it did not provide an adequate explanation for the obtained differences in body satisfaction and self-esteem across gender. Comparably, Twamley (2000) concluded that women endorsed mood improvements motives for exercise more strongly that did men. The present study did not measure motives for Taekwondo participation, which may be different in Ecuadorian context, therefore an interesting approach could be developed around this subject.

There is not so much investigation about gender differences in mood in relation to Taekwondo training. In the already mentioned study by Lakes & Hoyt (2004) about self-regulation, the results demonstrated that both girls and boys in the Taekwondo group showed benefits; however, the effects for boys were numerically larger on many scales, and significantly so on several. Yet, there were significant differences in the pretest which could have influenced the results. Consequently, pre-test is needed for further research. To conclude, in this study female adolescents appear to be benefited from Taekwondo training in a more impactful way than male adolescents in terms of mood. As described, results in this study are consistent with previous analyses; however, pre-evaluation is needed to adequately conclude about more precise reasons for this outcome.

According to the theoretical and conceptual framework, the elements of traditional and modern Taekwondo training (i.e., techniques, physical exercise, Poomsae or forms/patterns, Kyorugi or sparring, self-defense, breaking, philosophy and ethics, meditation, breathing, demonstrations, and competitions) can contribute to adolescents' fundamental needs satisfaction which in turn improves their wellbeing. As explained in section 2.3., subjective wellbeing combines three factors including intense positive affective states, relative absence of negative affective states, and global life

satisfaction. Since TMD in this study was obtained from measures of positive (i.e., vigor) and negative (i.e., anger, confusion, depression, tension, and fatigue) affective states, TMD provided to certain extent an adequate knowledge of participants' wellbeing.

The results indicated that Taekwondo training time was a significant predictor of TMD of adolescents in Ecuador. Furthermore, the longer Ecuadorian adolescents in this study have been involved in Taekwondo training, the lower their score in TMD. Consequently, this study showed an enhancement in mood, thus, an improvement in adolescents' wellbeing product of a longer training experience in Taekwondo. Accordingly, this study offers an adequate insight of the long-term effects of Taekwondo practice in the participants subjective wellbeing.

5.1. Practical Implications

Several practical implications can be mentioned mainly related to the implementation of Taekwondo practice in different settings such as physical education, youth development programs, fitness facilities, and even clinical environments. The positive association between Taekwondo participation and wellbeing found in this study, provide rationale for integrating Taekwondo as part of the physical education curriculum in schools. The fact Taekwondo benefits were evidenced in adolescent population makes this

practical implication potentially important. Indeed, Taekwondo could be integrated in schools and taught to students since the beginning of their adolescence, given that better results are shown as their time involved in this sport increases. In fact, Taekwondo has been already included as part of formal physical education in South Korea and United States (J. S. Kim, 2003). Being Taekwondo a Korean martial it is particularly interesting that it has even been introduced in the educational system in the United States, mainly for physical and mental health promotion among young people (Thompson & Vinueza, 1991).

For the same reasons, Taekwondo could also be integrated in youth development programs as a main activity or even as part of a larger intervention program. Progress could be evaluated using models of positive youth development, and experimental investigations could serve not only to provide feedback for the general betterment of the program design and implementation, but also to fill gaps in academic research. Taekwondo could also be used in fitness facilities as a training program for people seeking improvement in their wellbeing or psychological health. Additionally, programs with the intention to increase exercise behavior could use Taekwondo as part of their curriculum as well. Since practitioners can experience mood enhancement and increased wellbeing, it is likely that

they will be willing to maintain a regular exercise routine. Lastly, Taekwondo could be used as an alternative to other physical activities in psychotherapeutic intervention programs in clinical environments to deal with symptoms related to fatigue, anxiety, and depression.

5.2. Limitations and Recommendations

Regarding research design, this is study used POMS-A to measure TMD among adolescents in schools in Quito, Ecuador. Despite showing internal consistency and being a valid and reliable tool for measuring mood states among adolescents, it has been criticized arguing that it is heavily focused on negative states (Rocheleau et al., 2004). Even though this is not a limitation per se, replicating the current study while using a mood scale with more positive states may be warranted. For instance, Physical Activity Affect Scale (PAAS) evaluates exercise-induced feeling states such as positive affect, negative affect, tranquility, and physical exhaustion. PAAS showed adequate internal consistency and discriminant validity among its factors, and it is balanced between positive and negative affective states (Lox et al., 2000). Hence, using PAAS would be valuable to test Taekwondo-induced mood changes. Regarding results, several factors can be expected to have an influence when evaluating effects of participation in physical activities or sports making its analysis considerably complex.

Consequently, this study has several limitations such as selection bias, evaluation of socio-demographic characteristics beyond age and gender, martial arts participation, and pre-test measurements.

Some factors, that were not included in this study, may influence subjective wellbeing such as satisfaction, income, behavior, personality, and biological influences (Diener, 2009). In terms of personality, there is a high concern in cross-sectional studies regarding selection bias. In this study adolescents who reported longer Taekwondo participation could have kept training as it was consistent with their personal tendencies and interests. Correspondingly, adolescents with shorter training time could have found their own values and beliefs not aligned with those in Taekwondo and decided to quit practice. Therefore, as indicated by several authors, it is recommended to conduct longitudinal studies to address this limitation (Vertonghen & Theeboom, 2010).

Other factors that may influence subjective wellbeing are demographic characteristics such as age, gender, race, employment, education, religion, marriage, and so on (Diener, 2009). However, just age and gender were evaluated in this research since the studied population were adolescents who belong to conveniently selected schools located in Quito, Ecuador. Therefore, there was not a particular necessity to investigate other

demographic variables as it was considered that they would not vary significantly among the studied population. Indeed, Taekwondo training time was a significant predictor of TMD after controlling for the effects of age and gender; however, inclusion of other demographic data should be considered for future research.

This study found that participation in martial arts excluding Taekwondo was not a significant predictor of TMD. However, given the lack of statistical power, it does not prove that martial arts different from Taekwondo have no effects in adolescents' mood. Indeed, it is critical to evaluate martial arts training programs individually since they are not the same and have specific characteristics and elements (Lakes & Hoyt, 2004). For further research, detailed characteristics of martial arts should be considered as they have their own qualities which can lead to different outcomes (Vertonghen & Theeboom, 2010).

Lastly, another limitation of this study is that its nature did not allow to report mood scores at a baseline. There was no information about the participants' mood states before they started practicing Taekwondo. This is particularly interesting when interpretating the differences found between male and female adolescents TMD improvement related to their Taekwondo training time. As previously mentioned, reasons for that outcome could be

that women tend to report a worse mood before exercising, thus benefitting more than men from its practice. Once again, longitudinal studies are recommended to address this limitation measuring pre-existing differences. Likewise, women report mood enhancement as a motivation for exercise more often than men. Consequently, to have a better understanding of this outcome, motives for Taekwondo participation should be investigated as well.

5.3. Conclusions

This study demonstrated that longer Taekwondo training time is associated with a significant reduction in total mood disturbance which indicates improvement in wellbeing. Hence, Taekwondo participation has a long-term effect on the mood state of adolescent practitioners in Quito, Ecuador. Also, the results indicated that male adolescents have lower levels of TMD compared to female adolescents and the same was true in this study for younger adolescents compared to older adolescents. Lastly, female adolescents appear to be benefited from Taekwondo training in a more impactful way than male adolescents as regards of mood.

The results are encouraging as Taekwondo participation was found to be significant and effective in improving mood. Moreover, Taekwondo training may be particularly effective in female adolescents, as they showed

the greatest overall mood enhancement. Future research measuring pre-training mood states and motivations for Taekwondo participation is recommended to investigate the reasons for gender differences in mood scores. Also, it could be valuable to analyze effects of Taekwondo participation in children and adults in the context of Ecuador. As described, results in this study are consistent with previous research; however, longitudinal studies are recommended to evaluate mood at baseline and address selection bias.

Potentially important theoretical and practical implications can be derived regarding Taekwondo as a tool for mood enhancement and wellbeing in adolescent population. Taekwondo could be integrated in Ecuadorian physical education system, fitness facilities, youth development programs, and even as alternative physical activity in psychotherapeutic intervention programs in clinical environments. Finally, Being Taekwondo a Korean martial art, it also provides an opportunity for cultural education, appreciation, and exchange in the context of Ecuador. The nature of the training should be considered where the traditional style is highly recommended, as it includes all the elements of the martial art, which can contribute to adolescents' need satisfaction and, in turn, improve their mood and wellbeing.

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Appendix A. The Profile of Mood States-Adolescents

Below is a list of words that describe feelings that people have. Please read each one carefully. Then choose the answer which best describes HOW YOU FEEL RIGHT NOW. Make sure you answer every question.

	Not at all	A little	Moderately	Quite a bit	Extremely
1. Panicky	0	1	2	3	4
2. Lively	0	1	2	3	4
3. Confused	0	1	2	3	4
4. Worn out	0	1	2	3	4
5. Depressed	0	1	2	3	4
6. Downhearted	0	1	2	3	4
7. Annoyed	0	1	2	3	4
8. Exhausted	0	1	2	3	4
9. Mixed-up	0	1	2	3	4
10. Sleepy	0	1	2	3	4
11. Bitter	0	1	2	3	4
12. Unhappy	0	1	2	3	4
13. Anxious	0	1	2	3	4
14. Worried	0	1	2	3	4
15. Energetic	0	1	2	3	4
16. Miserable	0	1	2	3	4
17. Muddled	0	1	2	3	4
18. Nervous	0	1	2	3	4
19. Angry	0	1	2	3	4
20. Active	0	1	2	3	4
21. Tired	0	1	2	3	4
22. Bad tempered	0	1	2	3	4
23. Alert	0	1	2	3	4
24. Uncertain	0	1	2	3	4

(Terry et al., 1999).

국문초록

태권도 훈련이 에콰도르 청소년들의 기분상태에 미치는 영향

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태권도는 에콰도르에서 가장 인기 있는 무술이지만 심리학 분야에서 그 장점이 조사된 연구는 많지 않다. 본 연구는 에콰도르 맥락에서 태권도 훈련이 청소년들의 기분 상태에 미치는 영향을 조사했다. 본 연구의 종속변수인 Total mood disturbance (TMD)는 청소년 기분 상태 프로파일(POMS-A) 척도를 기반으로 측정되었다. 에콰도르의 수도 Quito 내 학교의 청소년들로부터 수집한 데이터(N = 760)를 분석하기 위해 다중 회귀 분석을 실시하였다. 그 결과 남성 청소년의 TMD 점수는 여성 청소년에 비해 낮았으며 (계수 = -6.609, 표준에러 = 0.976, $p < 0.001$), 연령이 높은 청소년과 비교했을 때 (계수

= 0.437, 표준에러 = 0.05, p <0.05) 어린 청소년에게도 동일하게 나타났다. 태권도 참여시간의 경우, 훈련시간이 높은 청소년은 TMD (계수 = -0.056, 표준에러 = 0.014, p < 0.001) 점수가 상대적으로 낮은 것으로 나타났다. 뿐만 아니라, 성별과 태권도 훈련 시간 사이에는 유의미한 상호작용 효과가 있는 것으로 나타났다(계수 = 0.058, 표준에러 = 0.027, p < 0.05). 청소년들의 기분상태의 향상에 있어 태권도 훈련의 전반적인 역할은 여성 청소년들이 남성 청소년들보다 더 큰 영향을 받는 것으로 나타났다. 이 연구의 주요 결과를 통해 태권도를 더 오랜 기간 훈련한 경험이 있는 청소년들의 기분 상태가 향상되었음을 알 수 있었다. 따라서 체육, 청소년 개발 프로그램, 피트니스 시설, 임상 환경 등을 비롯한 다양한 환경에서 태권도 종목을 통합하여 태권도 참여를 권장할 필요가 있다.

주요어: 태권도, 청소년, 총정서장애, 기분상태검사

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