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Risk of Eating Disorders and Physical Self-Concept in Adolescence

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1. Introduction

Recent years have witnessed an intensification in the study of factors associated with eating disorders (EDs), mainly due to increased social concern regarding these problems. For 30 years now, these types of problems have become increasingly frequent; so much so, in fact, that it can now be said (Schur et al., 2000) that more than half of all adolescents feel dissatisfied with their bodies. This has given rise to a multitude of studies on the epidemiological scope of these disorders, the personality traits which influence their development and sustained presence and the factors which may intervene in their prevention.

The numerous factors which predispose a person to eating disorders include: the psycho-physiological changes of adolescence, being aged between 14 and 20, having certain personality traits, being female and belonging to Western culture (Striegel-Moore, 1997; Toro, 2004; Garner, 1998). However, the construct most frequently considered as predictor of a greater predisposition to anorexia nervosa (AN) or bulimia nervosa (BN), as a factor in their subsequent sustained presence and even as a prerequisite for the development of any kind of eating disorder is low self-esteem and, in particular, dissatisfaction with one's own body shape (Gual et al., 2002; Fairburn et al., 1998; Toro, 2004).

A chapter such as this one, dedicated to studying the relationship between EDs and physical self-concept during adolescence, cannot afford to overlook body image, a construct which is strongly associated with EDs and closely linked to physical self-concept. We will therefore take a moment to explain the term *body image* and to explore its similarities and differences in relation to *physical self-concept*.

2. Body image

One's body image is formed from diverse information provided by different sensorial receptors (visual, tactile and coenesthetic), collected gradually over time. It can be evoked in a single whole and is commonly associated with significant emotional responses resulting from its aesthetic assessment (Toro, 2004).

Interest in appearance and body image has, over recent years, reached an all-time high, but is not exclusive to either our society or our modern era. In pre-Columbian cultures artificial

cranial deformation was seen as a symbol of beauty and, more recently, during the 19th and early 20th centuries, it was common for women to wear corsets in order to enlarge their busts and reduce their waists, despite the fact that habitual use of this garment resulted in the deformation of the thoracic cavity. Examples of concern over body image in non-Western cultures include neck stretching (i.e. the wearing of hard metal neck rings to give the appearance of an elongated neck), earlobe elongation and lip plates (used to stretch the lower lip), practices all typical of certain African tribes, which aim to enhance the beauty of the wearer (de la Serna, 2004).

2.1 Definition

As is often the case with scientific terms, the notion *body image* poses a fair degree of conceptual complexity, and no consensus has yet been reached regarding its definition, how it should be assessed or how its alterations or distortions are manifested (Baile, 2003).

The first references to body image and the alterations associated with it, can be found in medical studies in the field of neurology from the beginning of the 20th century. During the 1920s, Henry Head proposed that individuals all construct a model or image of themselves, and that this image constitutes a standard with which they compare body movements. Hence the term *body schema* came into use (Fisher, 1990). Some time later, in 1935, Schilder proposed the following definition of body image:

> *"the picture of our own body which we form in our mind, i.e. the way in which our body is represented to ourselves" (Schilder, 1935, p.46).*

Later on, this definition was expanded to include emotional and attitudinal aspects (Kolb, 1959); and some years later, two aspects of body image were identified (Slade & Russell, 1973): adequate body estimation and feelings and attitudes towards one's own body. Given that behaviour is related to physical self-concept and degree of body satisfaction (for example, the avoidance of situations in which one is obliged to show one's naked body or attempts to change one's physical body shape), the behavioural component was finally added to the perceptive and cognitive-affective ones (Cash & Pruzinsky, 1990; Thompson, 1990). Consequently, body image is formed by three different components:

- The perceptual component: the accuracy with which one perceives the size of different body segments, or one's body as a whole. Perceptual alterations can result in either overestimation (perception of one's body as being bigger than it really is) or underestimation (perception of one's body as being smaller than it really is).
- The subjective component (cognitive-affective): degree of body satisfaction. This refers to attitudes, feelings, thoughts and valuations (satisfaction, concern or anxiety) generated by either one's body as a whole or by any of its parts, its weight or any other aspect of one's physical appearance.
- The behavioural component: behaviours provoked by one's perception of one's body and associated feelings (e.g. avoiding situations involving nudity, purchasing clothes which hide certain parts of one's body, exhibition, avoidance of exhibition, checking one's body, attempts to change one's physical shape, etc.).

As a result of this conceptual complexity, several different definitions exist which vary as regards the emphasis they place on each of the three components. A comprehensive view of the concept, however, is offered by the following definition:

> *"… it is a complex construct which includes the perception we have of our whole body, each of its parts and its movement and limits, the subjective experience of attitudes, thoughts, feelings and assessments we make, and the way in which we behave as a result of our thoughts and feelings" (Raich, 2000, p.25).*

After taking into account different contributions, Baile (2003) also attempts a definition, which includes all prior knowledge regarding body image, defining it as follows:

> *"a complex psychological construct which refers to how self-perception of one's body / appearance generates a mental representation, consisting of a perceptive body schema and its associated emotions, thoughts and behaviours" (Baile, 2003, p.58).*

However, a review of over one hundred papers on body image leads to the conclusion that:

> *"the concept of body image has yet to be conclusively defined and the task of measuring alterations in body image in an objective manner is still a formidable challenge" (Skrzypek et al., 2001, p.216).*

2.2 Factors which influence body dissatisfaction

It is broadly accepted that dissatisfaction with one's body image and its distortions are not the result of a single cause, but are rather due to a range of different factors (Toro, 2004). The list of risk factors considered is extensive, with some of the principal ones being social-cultural pressure from the media, family and interpersonal relationships (Rodríguez & Goñi, 2009), and certain personal characteristics such as gender, diverse physical-biological aspects, cognitive distortions and even physical-sporting activity (Rodríguez & Goñi, 2009; Esnaola & Rodríguez, 2009). The following sections analyse those factors which have been studied in most detail.

2.2.1 Social-cultural factors

One of the factors, which most influences alterations in body image, is the cultural concept of beauty which prevails in each society. Every culture establishes its own stereotype of beauty and ugliness, which changes over time. Thus, in certain intellectual circles, an excessive concern over musculature, body shape or sport has been viewed for years as something typical of the less intellectually or culturally enlightened segments of society. Nowadays, however, the cultural pressure of the female model of slimness, the muscular prototype of masculinity and, in both cases, the stigmatisation of obesity (all factors associated with possible eating disorders) is well documented (Acosta & Gómez, 2003).

But how is this cultural pressure transmitted? The mass media play a key role in the propagation and exaltation of aesthetic stereotypes. Publicity invades everything; manifestations of body aesthetics are a constant presence in the film world, the fashion world, television shows and adverts, etc. Only perfect bodies are valid for selling products; today, more than ever, an image has more selling power than a thousand words (Gervilla, 2002). However, some studies have found that the influence exerted by fashion magazines is much more pernicious for body image, because since it is information that the subject him or herself has made an effort to obtain, its processing is more intentional and therefore more profound (Harrison & Cantor, 1997; Tiggemann, 2003); the same cannot be said for television, where messages appear incidentally, rendering their processing and influence less intense.

Reference groups constitute another powerful transmitter of society's prevailing body ideals. It is in primary groups, such as family and peers, that reference values for body image are created, with the family being the first socialisation context and a powerful risk factor for dissatisfaction, through two mechanisms (Kearney-Cooke, 2002): a) modelling, through which parents transmit their attitudes and values to their children, including negative attitudes and values regarding body image (Rieves & Cash, 1996; Hill & Franklin, 1998); and b) parents' verbal messages about their children's image, appearance or weight (Striegel-Moore & Kearney-Cook, 1994).

Nevertheless, in some cases, negative comments about body image from friends can become even more important than those messages received from one's own family, since it has been found that frequent peer interactions involving discussions of weight, body shape or diets are more closely associated with traits typical of EDs or body dissatisfaction (Barr-Taylor et al., 1998).

All these influences contribute to ensuring that the socially-accepted body image is internalised as the chosen aesthetic model, and this model plays a vital role in body satisfaction/dissatisfaction: when the discrepancy between the desired body image and one's own physical appearance is minimal, one tends to feel satisfied with one's body. However, if the discrepancy between the desired body and one's own is too great, body dissatisfaction arises.

2.2.2 Personal factors

In addition to social-cultural factors, certain personal characteristics also facilitate the appearance and sustained presence of body image alterations. The following sections analyse the most important of these: gender, age-related physical and biological changes, cognitive distortions and even physical-sporting activity, among others.

Gender

Concern about body image is not exclusive to women; there are also many men who feel dissatisfied and concerned about their physical appearance, and indeed the number of these men has tripled over the last 25 years (Pope et al., 2000). In relation to gender differences, it has been observed that men assess their physique in terms of strength (chest, shoulders, biceps and muscular strength), while women express concerns related to weight and the shape of certain body parts (hips, thighs, buttocks, etc.).

These results indicate the presence of a gender-based double body standard, which causes a predominance of bigorexia among men and renders the prevalence of AN and BN significantly higher (90% in fact) among women (American Psychiatric Association [APA], 2003).

Physical and biological aspects

As regards physical and biological aspects, during puberty the body undergoes major changes, and difficulties accepting these changes often give rise to concern over physical appearance. Thus, a rejection of the physical and biological changes typical of the early years of puberty may become a risk factor for developing a distortion in physical self-concept at a later stage.

Girls who develop earlier than their friends and classmates often experience more problems in relation to body image, since the majority of them consider the changes they observe in their own bodies (such as, for example, developing breasts and broadening hips) to be grotesque, or fattening, rather than as proof of the fact that they are reaching adulthood. Moreover, the changes which take place in their bodies go against the aesthetic model of the female body: broadening hips and thighs as opposed to narrow hips and slender thighs. For their part, boys who take longer to grow than their peers often end up deeply scarred by their concern over being small and puny, missing those traits typically associated with masculinity (Raich, 2000).

Cognitive distortions

Although we are all immersed in the same culture, not everyone is influenced in the same way by social-cultural pressure; much the same is true also of other influences, such as the family or social context in which each individual exists and develops. Why is this? What makes some people more capable than others of resisting these influences?

People with body image disorders develop beliefs about their physical appearance and its implications, which influence their thinking, emotions and behaviour. These beliefs are formed during early adolescence, when self-identity and physical development change rapidly. As Ellis (Ellis & Maclaren, 2005) asserts, we feel how we think; how one feels and acts will depend on how one interprets facts and events. In other words, feelings depend on one's own interpretations, judgments and thoughts.

Raich (2000) recounts a series of psychological experiments, which demonstrate how people behave in accordance with what they believe they are like and others react to them in accordance with how they show themselves to be. Thus, a group of actors had a hideous scar painted on their faces just before going to an interview. However, at the end of the make-up session the scar was removed without their knowing it, so that when they arrived at the interview they believed their faces were still disfigured. Following the interview, the actors claimed to have noted the interviewers' unease over the traumatic scars they had (or thought they had) on their faces; the same interviewers also reported not having liked the person interviewed very much, because they seemed to have a complex about their physical appearance. The conclusion that can be drawn from this experimental situation is clear: when faced with a real situation or event, the most important thing is how one judges, interprets or understands one's own possibilities; depending on this, individuals will feel and act in a certain way.

Physical-sporting activity

Sportsmen and women constitute a special group as regards altered body image perception. Those who habitually engage in sporting activity may have a higher risk of developing EDs due to the sports environment itself, which not only may precipitate this type of disorder in a predisposed individual (or exacerbate an already existing symptom), but may even legitimise it (Wilmore, 1991). Indications and signs of these alterations in the elite sportsmen and women of certain disciplines are often ignored, and are, on occasions, even considered natural. The emphasis on obtaining a fat-free body and the acceptance of the need to engage in excessive physical exercise in the world of top-level competition may make an existing

eating disorder harder to diagnose, and consequently more difficult to treat (Thompson, 1990).

In short, it is currently widely accepted that the causes of body image alterations do not stem from a single factor, but are rather the result of multiple factors such as culture, family, interpersonal relationships and personal characteristics such as gender, physical and biological aspects, personality, cognitive distortions and physical activity, etc. Delimiting and analysing the possible causes of body alterations is a basic exercise which will help us gain a better understanding of these disorders and will provide us with information which can be used to ensure more effective interventions.

3. Eating disorders

Eating disorders are serious psychological disturbances which involve abnormal eating habits (APA, 2003) and which may be fatal in between 4% and 20% of cases (Cruz et al., 2002). Although there are many different subtypes, the two most common EDs are AN and BN. In Spain alone, the Health Ministry sets the prevalence rate at 1.5% of the population; in other words, 500,000 Spaniards would be diagnosed with AN, BN or one of their subtypes, a figure which rises sharply to 8 million adolescents and young adults in the United States. In both cases, the rate is particularly high among adolescent girls and young women, with a proportion of 9 to 1 in comparison with men.

3.1 Risk factors for eating disorders

Exploring the factors which influence the origin, development and sustained presence of EDs is of enormous theoretical and social interest. It is also a controversial and complex task due, firstly, to the numerous underlying causes, and secondly to the fact that it is not always easy to distinguish between the risk indicators of an eating disorder and the indicators of normal habits designed to look after one's appearance, since both are closely linked to each other and the dividing line between them is often very fine.

In AN, some authors (Lucas; and Plog & Pircke, as cited in Chinchilla, 1994; Toro, 2004) highlight both biological vulnerability (genetic, biochemical and anatomical-physiological) and psychological and social vulnerability (family, friends, culture) as key factors in determining personality changes, which prompt diet behaviour. Others (Chinchilla, 1995, 2002), however, offer a more exhaustive analysis of all possible factors (see chart 1), dividing them into: a) predisposing factors (those that are found in the initial stage and which facilitate the appearance of the disorder, but which are not an inevitable sign of its development); b) precipitating factors (precursor behaviours which increase the risk of development when they interact with trigger factors) and c) sustained presence factors (in this phase factors which foster the perpetuation of the disorder interact with diverse defence mechanisms).

BN is also divided into these factors (see chart 2), although it is generally accepted that the etiopathogenesis of this disorder has not been fully explored and is multi-factorial in nature (Chincilla, 2002). Of all of these factors, we will focus on those used subsequently for studying the relationship between physical self-concept and eating disorders, namely: body mass index, gender, age, personality traits and physical-sporting activity.

ANOREXIA NERVOSA		
Predisposing F.	**Precipitating F.**	**Sustained presence F.**
- Genetic vulnerability (hypothalamic decrease and neuronal transmission). - Age (12-25 years old). - Being female. - Affective disorder. - Obesity. - Medium-low social level. - Low self-esteem. - Family members with affective disorders, addictions or eating disorders. - Maternal obesity. - Social-cultural pressure. - Early stressful situations. - Family concern about appearance and/or diet. - Parental dependency. - Incomplete personal identity. - Overprotective or strict family. - Difficulty attaining independence. - Certain professions (dancers, models, gymnasts). - Certain psychological traits (perfectionism, negativism, isolation, subordination, self-sacrifice, mood swings).	- Body changes during adolescence. - Separations, deaths and family conflicts. - Parental breakups. - First sexual experiences. - Rapid weight increase. - Criticism about one's body. - Disease resulting in weight loss. - Disfiguring injury. - Increase in physical activity. - Life events. - Families which try to prevent children from growing up. - Sporting activity. - School and marriage. - Dieting. - Stress affecting the endocrine functions.	- Consequences of starvation. - Altered family interactions. - Social isolation. - Anorexic thoughts. - Excessive physical attitude. - Iatrogenesis. - Hypothalamic alternations. - Tendency to be hard workers, anxious to achieve professional success. - Being responsible and determined to fulfil obligations. - Alexithymia. - Attitudes to food mediated more by external than internal influences. - Reduction of carbohydrates and fat. - Hyperactivity. - Concern about food-centred thoughts. - Severe mood swings. - Difficulty identifying feelings.

Source: Chinchilla, 1995; Chinchilla, 2002; Toro & Vilardel, 1987.

Chart 1. Predisposing, precipitating and sustained presence factors of anorexia nervosa.

3.1.1 Body mass index

Body weight is related to the onset of ED symptoms; a high body mass index tends to be associated with the desire to lose weight and achieve a slimmer body (Schur et al., 2000; Richard et al., 1990) and also prospectively predicts body dissatisfaction and the beginning of bulimic pathology and binging (Vogeltanz-Holm et al., 2000).

According to data obtained from the non-clinical adolescent population (Goñi & Rodríguez, 2004), the existing relationships among diverse ED-linked symptoms, thoughts and behaviours and body mass index are notable. Those with a higher body mass index are not only disgusted by their physical appearance and want to lose weight, they also have a higher frequency of eating disorder personality traits and behaviours; in specific terms, those with a higher body mass index also tend to score higher in *drive for thinness*, as well as in *body dissatisfaction, negative self-assessment* and *interpersonal distrust.* Coinciding with the findings of other studies (Toro, 2004), *perfectionism,* on the other hand, is higher in thinner subjects and lower in subjects with either normal or above-normal weight.

BULIMIA NERVOSA		
Predisposing F.	**Precipitating F.**	**Sustained presence F.**
- Family history of psychiatric problems. - Addictive behaviours. - Mood disorders in first degree relatives. - High ED morbidity in the family. - Predisposition to obesity. - Disorganised or conflictive families. - Emotional dependency. - Neurobiological alternations (serotonin/noradrenalin / dopamine, etc.) - Alterations in insulin secretion. - Body dissatisfaction. - Obsession with obesity. - Low self-esteem. - Prior mood disorder. - Social phobia. - Addictive behaviours. - Borderline personality. - Perfectionism. - Social-cultural factors.	- Following a strict diet. - Prior anorexia nervosa. - Being overweight. - Body dissatisfaction. - Concern about weight.	- Persistence of predisposing factors. - Seriousness of predisposing factors. - Body dissatisfaction. - Concern about weight. - Continued behavioural alteration of eating regulation mechanisms by alternate abstinence, binging and vomiting.

Source: Chinchilla, 1995; Chinchilla, 2002; Toro & Vilardel, 1987.

Chart 2. Predisposing, precipitating and sustained presence factors of bulimia nervosa.

3.1.2 Adolescence and gender

It is during adolescence, when individuals have to adapt to major changes in their bodies, changes which often go against the socially-accepted stereotype of beauty (broadening hips, thighs and buttocks), that physical self-esteem runs the risk of deteriorating more among girls than among boys (Franzoi & Shields, 1984), giving rise to EDs. It is therefore hardly surprising that AN, BN and other subtypes of clinical pathologies occur most frequently in the female population, with 15 to 24-year-old girls and young women being the main risk group (Toro & Vilardell, 1987).

3.1.3 Personality traits

Personality traits are another important factor associated with body image rejection and the disorders derived from this. Different personality patterns exist for each type of alteration associated with body image (AN and BN as opposed to bigorexia). The aetiology of bigorexia seems to be related to a narcissistic personality, in which the individual in question is interested almost exclusively in him or herself. It sometimes arises as a means of compensating fears of homosexuality and seeking self-affirmation, with having a muscular body ending up becoming an end in itself. At risk individuals tend to be insecure, with low

self-esteem, who feel themselves to be unattractive to the opposite sex, a situation which leads to a regime of uncontrolled exercise.

Traits such as perfectionism, hyperactivity, shyness, negativism, isolation, a tendency towards self-sacrifice, mood swings and subordination have often been related to the onset of AN and BN. During the first part of the 20th century, detailed descriptions were drafted of the personality of certain anorectic patients (DuBois, 1949), and a short time later, more studies were published attesting to the "abnormal" characteristics of these patients' personalities (Dally, 1969). Over recent years, Cloninger's model of temperamental dimensions has been related to eating disorders, particularly AN (Casper, 1990). Cloninger (1988) proposed a personality model with four temperamental dimensions, which are the consequence of either genetic inheritance or early-learned behaviour. These dimensions are: a) harm avoidance, or the ability to cope with potentially harmful life events; b) reward dependence, understood as the tendency to establish or easily make responses conditional upon reinforcement signals (approval, help, etc,); novelty seeking or excitability of the response to new stimuli; and d) persistence, understood as the tendency to sustain certain behaviour as a means of resisting frustration.

Casper (1990) was the first researcher to exhaustively assess these four dimensions in patients suffering from AN, finding that, in comparison with control subjects, they scored very low in novelty seeking but very high in harm avoidance and reward dependence (although this latter result was not statistically significant). These conclusions have since been confirmed by subsequent studies (Bulik et al., 1995; Klump et al., 2000) and have been related to cognitive factors such as ineffectiveness, perfectionism and interpersonal distrust (Vervaet et al., 2003).

But it is David Garner (1998), currently one of the world's leading experts in these types of psychopathology, who has most thoroughly explored the personality traits of EDs, focusing particularly on drive for thinness, ineffectiveness, perfectionism, interpersonal distrust, interoceptive awareness, maturity fears, asceticism, impulse regulation and social insecurity. All these traits form part of what is currently perhaps the most important instrument used for diagnosing EDs: the Eating Disorders Inventory (EDI). The following is a brief description of each one.

Drive for thinness, or a desire to lose weight, is the psychopathological core and driving force behind those behaviours aimed at ensuring a slimmer figure: hypo-caloric diet for individuals with AN and vomiting for those suffering from BN. The principal personality traits of these patients are an incessant search for thinness (Bruch, 1973) and an exaggerated fear of weight gain (Russell, 1970), driven by an internalisation of the prevailing aesthetic model of the ideal body shape (Toro, 2004). Nevertheless, not all ED patients experience this drive or impulse; those diagnosed as atypical (20%) claim not to feel any drive for thinness and insist that their low food intake is due to a lack of appetite or gastric alternations.

It was Bruch (1973) who first described the feeling of ineffectiveness as one of the disturbances underlying EDs. Since then, this trait has been present in the majority of clinical explanations (Garner & Bemis, 1985; Wagner et al., 1987). However, and despite the fact that ineffectiveness has always been understood as something very similar to negative self-assessment or low self-esteem, Garner (1998) sees it as a construct which, while being similar to both, nevertheless goes one step further in that it also includes feelings of emptiness and loneliness.

As regards perfectionism (very common in eating disorders, particularly AN), clinical experience shows a close association with body dissatisfaction, since patients want everything they do or have (including their bodies) to be seen by others as perfect. These individuals are overwhelmed by a constant desire to ensure that their personal results are always the best and wage a fierce battle to achieve perfection in everything that they do (Bruch, 1973). They end up believing that only the very highest personal performance levels are acceptable. They are also convinced that the other people in their immediate environment, such as parents, teachers, friends or relatives, all expect nothing less than exceptional results from them (Garner, 1998). This personality trait has recently been put to the test, with the results being contradictory. Some authors (Bastiani et al., 1995; Szabò & Terre Blanche, 1997) have concluded that this personality trait has nothing whatsoever to do with EDs, since it fails to improve following the patient's treatment and recovery. Others, by contrast (Casper, 1990; Toro, 2004) claim that: a) perfectionism is sensitive to the condition of the disease; b) some aspects of perfectionism represent a transitory state associated with the clinical state; and c) studies which demonstrate the opposite can assert only that perfectionism does not improve with the elimination of inanition, and should not dismiss the possibility that it may have developed after the ED.

Distrust in social relationships is another variable closely associated with eating disorders. This interpersonal distrust is characterised by a notable lack of interest in establishing intimate relationships and by a clear difficulty in expressing thoughts and feelings (Garner, 1998; Gismero, 2001). Moreover, between 24% and 55% of anorexic patients also suffer from some kind of social anxiety disorder (Toro, 2004). Studies exist which show that those with a high level of body dissatisfaction experience more difficulties in their relationships with others (Chinchilla, 2002; Gismero, 2001). Indeed, some even claim that in certain cases, the need to keep people at arm's length is a trigger factor for some types of ED (Johnson & Connors, 1987).

In 1974, reference was made to the deep-rooted distrust of all sensations originating from inside the organism (interoceptive awareness) felt by patients suffering from AN. This distrust was termed *intra-psychic paranoia* (Selvini-Palazzoli, 1974), and is a character trait often referred to as *alexithymia* due to the difficulty experienced by patients in identifying and describing their feelings, or due to a way of thinking severely conditioned by concerns over bodily symptoms. In this sense, it was recently found that the anomalous eating responses of ED patients are in fact the result of difficulties in correctly interpreting emotional states (Toro, 2004) and are found in over 70% of cases (Zonnevijille-Bendek et al., 2002).

Research carried out into the personality trait known as maturity fears is a little ambiguous. While some authors (Garner, 1998) argue that this trait is closely associated with body dissatisfaction because the psychopathological core of these patients is a fear of the adult body, other authors defend a totally different hypothesis, claiming that the biographies of these subjects show adolescents who were too mature for their age, with high levels of responsibility, reflection or competitiveness (Chinchilla, 2002).

However, personality traits vary from one gender to the other, and in accordance with the type of eating disorder in question. It is generally accepted that people with AN are calmer, more indifferent, more organised and more methodical than those suffering from BN, and within this specific type of pathology, bulimic and anorectic patients are more excitable,

curious, impulsive and untidy than restrictive anorectic patients (Toro, 2004). As regards gender, it has been found that men diagnosed with EDs have a greater tendency to avoid problems and harm, and are more reward dependent and more perfectionist than their female counterparts. Moreover, while for adolescent girls the main character trait for ED risk is drive for thinness, for adolescent boys it is problem avoidance (García-Grau et al., 2004; Woodside, 2004).

3.1.4 Physical-sporting activity

It is of special interest to clarify whether sport is really a trigger factor in EDs or merely a means of weight control used by those with a prior history of eating disorders, thus resulting in a higher concentration of these pathologies among the sporting population.

It has been shown that some types or forms of physical activity may have negative health consequences (Beumont et al., 1994), one of these consequences being the development of an ED. There are various reasons for proposing sport as a factor for the risk or sustained presence of eating disorders: a) physical hyperactivity is one of the criteria established by the World Health Organization (WHO, 1992) in the International Classification of Mental and Behavioural Disorders 10 (ICD-10) for diagnosing an ED when it occurs in conjunction with significant weight loss (BMI ≤ 17.5); b) having recourse to physical exercise and sporting activity as a means of weight control may result in excessive exercising or exercise which wears or reduces specific body areas (Mansfield & McGinn, 1993); c) excessive or compulsive physical activity contributes decisively not only to the pathogenesis of EDs, but also to their sustained presence (Davis et al., 1994); and d) some authors have identified sport as a risk factor for eating disorders, especially among women and in relation to certain specific types of sport (Pope et al., 1997).

Also, a higher prevalence of EDs has been found among sportsmen and women than among the general population (Toro, 2004). The prevalence figures estimated by Wilmore & Costill (1998) are 50% for elite sportswomen, while for the general population it is around 1%, and Houtkooper (2000) estimates that between 1% and 39% of sportsmen and women present symptoms related to eating disorders. Some authors (Sundgot-Borgen, 2001; Sundgot-Borgen & Torstveit, 2004) even claim that the indications and signs of these alterations in the elite sportsmen and women of certain disciplines are often ignored, and are, on occasions, even considered natural. Those sports in which, in addition to performance, body image is also valued, those with weight categories or those which highlight the importance of a fat-free body are the ones which most push athletes towards developing some kind of ED (de la Serna, 2004; Dosil & Díaz, 2002).

On the other hand, however, it has been shown that one consequence of EDs is an increase in sporting activity as subjects reduce their weight and food intake (Davis et al., 1997), and that sports which require strict weight control are chosen by those individuals who already possess certain personality traits which render them susceptible to EDs (Eisler & le Grance, 1990; Leon, 1984). In this sense, it has been found that the relationship between sport and the risk of some kind of eating disorder is mediated by an important factor: the sportsman or woman's own eating history (Vasquez et al., 1997), since in 93% of the cases studied, subjects claimed to have had eating problems prior to taking up sport.

Moreover, some consider sport to be an effective means of preventing these pathologies. These studies sustain that EDs have no relationship with physical activity (Meadows, 2005) or, specifically, with a high number of exercise hours per week (Kjelsas & Augestad, 2004). Furthermore, some authors defend sport as a means of strengthening body image (Esnaola, 2005). Also, the symptoms of EDs seem to be more closely related to feelings of obligation (i.e. being obliged to engage in physical exercise), rather than to the actual amount of exercise carried out (Seigel & Hetta, 2001).

In short, the fact that athletes who engage in sports which place greater emphasis on the need to have a low body weight in order to compete are apparently at greater risk of developing alterations in the perception of their body image, may be explained by a prior (perhaps latent) alteration in eating behaviour or by a risk of such an alteration; in other words, these individuals are attracted to this type of sporting activity precisely because they provide them with a need to control their weight. This seems to imply that the individual in question already suffers from an ED (or at least demonstrates a certain attitude) before taking up the sport in question (Sacks, 1990).

A more conciliatory, middle-of-the-road theory, was proposed some years ago by Epling et al. (1983). These authors suggested that physical activity and food intake are closely interlinked, and that a reduction in food intake prompts an increase in physical activity, and that this, in turn, prompts a further reduction in the amount of food consumed. Thus, a vicious circle is established in which one factor fosters the emergence of the other.

Today, the question of the causal relationship between sport and EDs continues to be a complicated issue requiring further clarification (Pierce et al., 1993). To this end, it is important to clearly define the population studied, in order to facilitate comparisons between results, thus obtaining reliable data regarding the real prevalence of these disorders. Clustering criteria should include important data such as the way in which physical activity is measured (subjective or objective), whether or not the activity in question is an individual or team sport, the age of the sample group and other variables associated with EDs. If these indications are followed, then reliable data will be obtained regarding the true effects of sport on AN and BN, and which traits of sporting activity are linked to this type of pathology.

4. Physical self-concept and EDs

It is clear that EDs are pathologies typical of adolescence, which have become increasingly serious over recent years due to rising incidence and prevalence rates. This rise is partly due to social pressure to achieve the aesthetic model of thinness, which results in increasingly common cases of body dissatisfaction, and is strengthened a priori by certain factors such as age, gender and personality traits. Nevertheless, the body dissatisfaction involved in EDs has been associated exclusively with the body image each individual has of him or herself. And bearing in mind that body image is only one part of physical self-concept directly affected by physical appearance (Stein, 1996), the doubt arises as to what relationship exists between physical self-concept and all its facets with the possible development of AN or BN during this crucial developmental stage.

However, before examining the possible relationship between physical self-concept and the risk of developing AN or BN, it is important to clarify what is actually understood by

physical self-concept, what its connection is with body image and what differences exist between the two constructs.

We could define physical self-concept as "the concept one has of one's body traits and / or physical appearance, physical fitness, strength and physical-sporting abilities" (Esnaola, 2005, p.134). This definition is based on a four-dimensional theory (Esnaola, 2005; Goñi et al., 2006) developed from Fox's model (1988) which divides physical self-concept into the following four dimensions (see figure 1):

- *Physical ability* (athletic and sporting skills in Fox's model): perception of the qualities ("I'm good"; "I have qualities") and abilities ("I feel competent"; "I feel self-assured") required for engaging in sport; ability to learn new sports; personal security and predisposition to sport.
- *Physical fitness:* physical condition and fitness; stamina and physical energy; confidence in one's physical condition.
- *Physical attractiveness:* perception of one's own physical appearance; security and satisfaction regarding one's own image.
- *Strength:* regarding oneself and/or feeling strong, able to lift weights, secure in engaging in exercises which require strength and a predisposition to carry out such exercises.

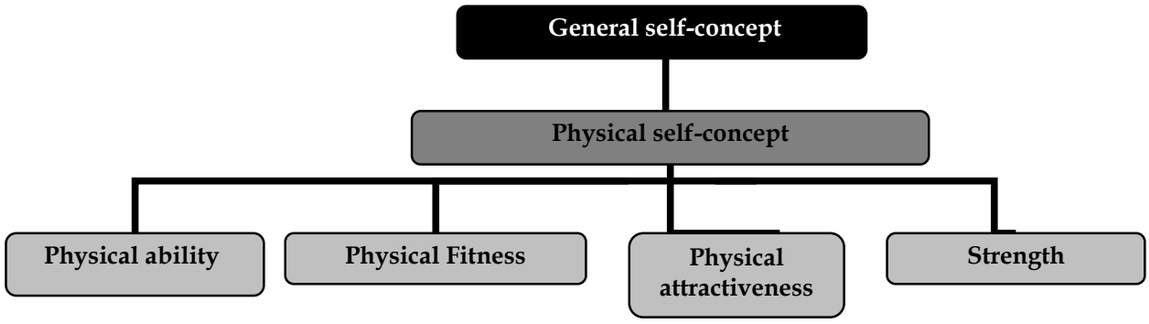


Fig. 1. Model of physical self-concept by Esnaola (2005) and Goñi et al. (2006)

Physical self-concept is a construct which does not function in an isolated manner, but rather works as just one element in a hierarchical, multidimensional system of general self-concept (see figure 2). Indeed, research carried out to date involving both young people / adolescents (Harter, 1987, 1988 1989) and adults (Adams, 1977) highlights the importance of physical self-concept in global self-concept; and within this construct, these studies underscore the importance of the sub-dimensions physical ability and physical attractiveness (Moreno, 1997). This domain seems to be so important that it has even been termed the "public self" (Harter, 1990).

The general trend appears to be to focus on physical appearance as the principal domain of the general self, especially during adolescence, between the ages of 11 and 15 (Atienza et al., 2004; Trent et al., 1994) and for both boys and girls (Pastor, 1998). Any differences found are attributed to the different way in which society treats attractive subjects with greater physical abilities (i.e. such individuals are generally more popular, receive preferential treatment and are more frequently praised for their physical qualities than their less attractive counterparts). As regards the weight of each of the facets of physical self-concept

within the physical self, despite the fact that some authors have observed that physical ability, strength or physical fitness play a key role as domains of physical self-concept, it is attractiveness which is most closely related to physical self-concept, and even to general self-concept or self-esteem in both adolescents and adults (Maïano et al., 2004; Klomsten et al., 2004; Asçi et al., 1999).

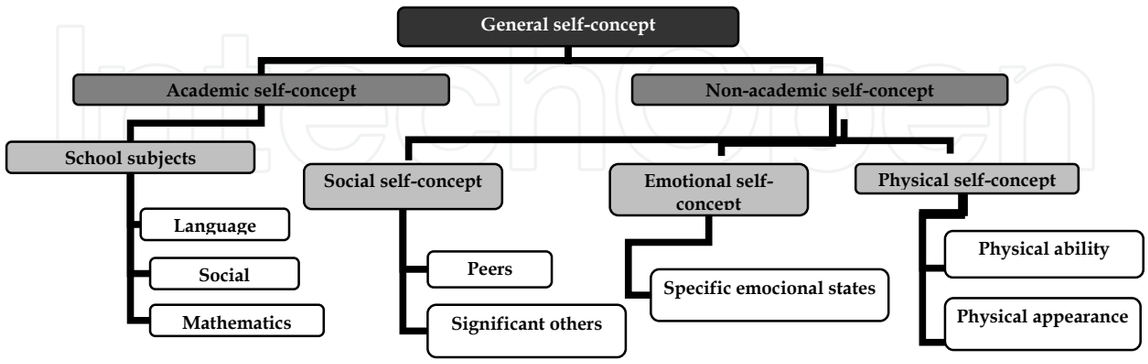


Fig. 2. Self-concept model by Shavelson, Hubner and Stanton (1976)

Since the 1960s, research into body image has received a great deal of attention, particularly from the field of psychology, psychiatry, medicine in general and even sociology. It is considered a crucial concept for explaining key aspects of personality, such as self-esteem or self-concept, as well as the social integration of adolescents. One can therefore say that body image has been explored mainly from both a clinical and psychosocial perspective (de Gracia et al., 1999). On the other hand, the study of physical self-concept is located within a predominantly social-educational or social-psychological research tradition (Jackson, 1992), due to its focus on identifying relationships with other dimensions of self-concept and on analysing its relations with affective (psychological wellbeing, self-esteem, anxiety, etc.) and behavioural characteristics (healthy habits, social skills, sporting activity, etc.).

In addition to being two constructs, which have been studied from different research traditions, there are also other aspects which distinguish body image from physical self-concept.

- The term physical self-concept encompasses a broader range of notions than body image. Although there are various different models of physical self-concept, it is made up by at least four more specific dimensions: physical fitness, sporting skill/ability, strength and physical attractiveness (Esnaola, 2005; Fox & Corbin, 1989; Goñi, et al., 2006). Some authors (Marsh et al., 1994) even claim that a greater number of dimensions is required (strength, obesity, physical activity, stamina, sporting skill / ability, coordination, health, appearance and flexibility) to provide a full idea of the concept. It can therefore be said that physical self-concept encompasses the term body image.
- Body image is defined as a construct with a multidimensional structure which includes self-perceptions, thoughts, feelings and actions related to one's own body, mainly as regards appearance (Cash & Pruzinsky, 1990); there is a certain degree of overlap between body image and the physical attractiveness dimension (perception of one's own physical appearance, security about and satisfaction with one's own image) of physical self-concept.

- However, it is also true that body image is a broader concept than that of physical attractiveness, since according to these same authors (Cash & Pruzinsky, 2002), body image includes experiences relating to the body's functioning (the perception and experience of all kinds of sensations, how we experience the aging process) and level of capacity (kinaesthesia, physical health, etc.).

One general framework, which has been used as a basis for research into the relationship between self-concept and body image distortion, is the self-discrepancy theory proposed by Higgins et al. (1985). This theoretical approach provides a model for analysing the differences between real self-concept (how one sees oneself) and ideal self-concept (ideal attributes that one would like to have; a self-assessment one carries out in relation to certain goals), which may be related to the onset or development of body image alterations. Thus, when the individual fails to achieve their ideal body image, a self-discrepancy occurs which may be the origin of body dissatisfaction (Marsh et al., 2007; Lau et al., 2004).

However, although body image and physical self-concept have mainly been analysed from different yet complementary perspectives, an undeniable relationship nevertheless exists between them. What have been put to the test, however, are a) the interrelationship between body image and general self-concept, and b) the relationship between physical self-concept and body dissatisfaction, with significant correlations being found in both cases.

In relation to the first case, we know that breakdowns in the development of self-concept contribute to alterations in body image, which in turn foster certain weight-related attitudes and behaviours characteristic of eating disorders. In other words, individuals with many negative and few positive ideas about themselves are more vulnerable to cultural messages about weight and body shape, and this vulnerability contributes to the development of the attitudes and behaviours typical of EDs (Stein & Corte, 2007). As regards the second case, i.e. the relationship between body dissatisfaction and physical self-concept, the only three studies carried out in this field all found a clear association between the two variables in both adolescents and university students (Esnaola, 2005; Goñi & Rodríguez, 2004; Goñi & Rodríguez, 2007). We can therefore assume that physical self-concept is a good indicator of possible eating disorders, since dissatisfaction with one's own body (the principal symptom of EDs) is clearly related not only to general self-concept, but also to poor physical self-concept (Esnaola, 2005; Goñi & Rodríguez, 2007), although the scope of this relationship has yet to be explored in any depth. Consequently, perhaps the most novel contribution of this chapter is its review of the results obtained both in these studies and in other more recent ones whose findings will be presented here for the first time, offering a much more enriching overview of the whole issue.

Therefore, the first questions that need to be asked are whether or not physical self-concept is related to the risk of suffering from some kind of ED during adolescence and, if so, how? In order to respond to these questions, an empirical study was conducted on a sample of 880 adolescents and young adults aged between 12 and 23, as well as a total of 48 patients clinically diagnosed in the Eating Disorder Treatment Unit of a hospital in the Basque Country (Spain). The level of physical self-concept was assessed using the Physical Self-Concept Questionnaire (CAF), validated and published in Spanish (Goñi et al., 2006). The probability of suffering from an ED was examined by assessing the presence or absence of eight clinically relevant symptoms which normally accompany AN and BN. These symptoms were assessed using the Eating Disorders Inventory-2 (EDI-2), by Garner (1998).

The CAF questionnaire follows the four-dimensional model outlined above and examines both physical self-concept in each of the four dimensions (physical ability, physical fitness, physical attractiveness and strength) and general perception of physical self-concept. The psychometric properties of this questionnaire are more than acceptable, with the reliability coefficients (Cronbach's alpha) being $\alpha = .84$ for the ability scale, $\alpha = .88$, for fitness, $\alpha = .87$ for physical attractiveness and $\alpha = .83$ for strength. These four components explain 61.34% of the variance of the questionnaire, with a total reliability of $\alpha = .92$. For its part, the alpha coefficient for the general physical self-concept scale is .87.

Outside the clinical field, the EDI-2 is used to help diagnose EDs because it offers a fast method of detecting subjects with sub-clinical EDs or who are at risk of developing a disorder of this type. The result of the inventory should not, however, be used as a substitute for a diagnosis carried out by a mental health professional. This questionnaire is a very common instrument also in the field of clinical research, because it enables the results of different sample groups to be compared and provides interesting descriptive information about said groups. The internal consistency (or reliability) coefficient for the questionnaire is between .83 and .93 for the population suffering from eating disorders, although in the normal population, the alpha indexes for each scale are between .70 and .93. The instrument assesses feelings, attitudes and behaviours characteristic of individuals diagnosed with EDs, such as:

- *Drive for thinness.* Assesses the clinical manifestation of an intense drive to become thinner, or a strong fear of becoming fat, two feelings always present in patients suffering from EDs and a key factor in their diagnosis. The items refer to concern about weight, dieting and fear of weight gain.
- *Bulimia.* Assesses the tendency towards or presence of thoughts related to uncontrolled binging.
- *Body dissatisfaction.* Measures the degree of dissatisfaction with one's general body shape or with certain body parts which typically concern patients with EDs.
- *Ineffectiveness or negative self-assessment.* Assesses feelings of general inadequacy, insecurity, emptiness, self-loathing and having no control over one's life. Conceptually, ineffectiveness is similar to low self-esteem or negative self-assessment, but in this case it goes one step further to include also the feeling of loneliness and emptiness.
- *Perfectionism.* Assesses subjects' conviction that they must always attain perfect performance levels, or do better than they are currently doing, and the degree to which they themselves believe and think others believe that nothing but the very best results are acceptable.
- *Interpersonal distrust.* Assesses subjects' general feelings of alienation and their scarce interest (or total disinterest) in forming close relationships. It also examines subjects' difficulty expressing their thoughts and feelings.
- *Interoceptive awareness.* Assesses difficulties in recognising and responding appropriately to sensations stemming from inside the body (feelings, the sensations of hunger and satiety, etc.).
- *Maturity fears.* Assesses subjects' fear of becoming adults, with all that that entails, and their desire to return to the security of childhood.

The correlations extracted with bilateral significance for the five measures of physical self-concept and the eight measures of ED behaviours and personality traits are shown in table 1.

The results indicate that physical attractiveness is the component of the physical self that correlates most closely with the risk of developing an eating disorder, since it has the highest inverse relationship levels with both body dissatisfaction and drive for thinness. In other words, a poor perception of one's own physical attractiveness is more closely associated with high body dissatisfaction and a greater drive for thinness. The results also reveal that a high level of physical attractiveness serves as a moderate protective factor against BN. Something similar can be observed if we focus on the personality traits typical of individuals suffering from EDs, since low physical ability and low physical attractiveness levels have the greatest degree of interconnection with the risk of developing an eating disorder.

Of all the scales designed to assess eating disorders, ineffectiveness is the one with the highest correlations with all the dimensions of physical self-concept, probably due to the fact that this measure represents a construct that is very similar to that of general self-concept. These correlations are slightly higher than those found for body dissatisfaction, whose values oscillate between r =-.398 for physical ability, and r = -.600 for the global measure of physical self-concept. This means that body dissatisfaction goes slightly beyond a simple assessment of physical attractiveness, since the correlations between the two (r = -.574) are lower than for the global physical self.

Finally, it is worth mentioning that drive for thinness was found to have a very weak association with physical ability (r = -.109) and physical fitness (r = -.184), and no association whatsoever with strength (r = .014). This leads us to conclude that drive for thinness and weight loss behaviours are mainly prompted by subjects' desire to achieve greater physical attractiveness. Although it is true that general physical self-concept has very similar relationships to attractiveness with drive for thinness, it is also true that some authors have found a major overlap between the global assessment of the perceived physical self and the assessment of the more specific dimension of physical attractiveness. In other words, despite the absence of any correlation of note between drive for thinness and physical ability, fitness or strength, the association found with general physical self-concept seems only logical, since individuals tend to bestow considerable importance on physical attractiveness within physical self-concept.

However, correlation analyses are often inadequate for providing an in-depth exploration of the relationship between two variables. Since this is a case in point, the decision was made to divide the whole sample group up in accordance with the level of physical self-concept (low vs. medium/high). This would enable a comparison to be carried out between the different results obtained for each of the EDI scales, based on a T-student mean comparison analysis (see table 2). The results indicate that it is individuals with low physical self-concept levels who always score highest in all the measures of typical ED symptoms assessed using Garner's EDI-2 (1998). In other words, those who perceive themselves as having a poor physical self are those who have greater body dissatisfaction, a higher drive for thinness, a greater number of typically bulimic behaviours and more pronounced personality traits typical of those with EDs (ineffectiveness, perfectionism, interpersonal distrust, interoceptive awareness and maturity fears). Similarly, the data also indicate that the greatest differences due to physical self-concept levels were found for body dissatisfaction.

		Ability	Fitness	Attractiveness	Strength	General physical self-concept
Drive for thinness	r Pearson	-.109***	-.184***	-.362***	.014	-.342***
	p (bil)	.002	.000	.000	.677	.000
Bulimia	r Pearson	-.252***	-.223***	-.222***	-.103***	-.215***
	p (bil)	.000	.000	.000	.003	.000
Body dissatisfaction	r Pearson	-.398***	-.438***	-.574***	-.176***	-.600***
	p (bil)	.000	.000	.000	.000	.000
Ineffectiveness	r Pearson	-.471***	-.424***	-.433***	-.283***	-.499***
	p (bil)	.000	.000	.000	.000	.000
Perfectionism	r Pearson	.056	.133***	.051	.049	.055
	p (bil)	.108	.000	.142	.156	.113
Interpersonal distrust	r Pearson	-.398***	-.347***	-.344***	-.201***	-.377***
	p (bil)	.000	.000	.000	.000	.000
Interoceptive awareness	r Pearson	-.381***	-.343***	-.372***	-.200***	-.386***
	p (bil)	.000	.000	.000	.000	.000
Maturity fears	r Pearson	-.168***	-.112***	-.130***	-.067	-.161***
	p (bil)	.000	.001	.000	.053	.000

*** p < .001

Table 1. Correlations between self-concept and EDs in a non-clinical sample group

		n	M	SD	t	p
Drive for thinness	low PSC	169	5.78	4.963	8.246	**.000*** **
	medium/high PSC	662	3.03	3.522		
Bulimia	low PSC	169	2.99	3.180	6.576	**.000*** **
	medium/high PSC	663	1.53	2.403		
Body dissatisfaction	low PSC	169	13.75	6.569	16.703	**.000*** **
	medium/high PSC	663	5.73	5.286		
Ineffectiveness	low PSC	169	10.74	7.588	14.135	**.000*** **
	medium/high PSC	663	4.11	4.743		
Perfectionism	low PSC	169	6.44	5.643	2.818	**.005** **
	medium/high PSC	663	5.45	3.584		
Interpersonal distrust	low PSC	169	6.76	5.077	9.464	**.000*** **
	medium/high PSC	663	3.53	3.636		
Interoceptive awareness	low PSC	169	8.60	6.481	10.574	**.000*** **
	medium/high PSC	662	4.16	4.373		
Maturity fears	low PSC	169	8.67	4.330	4.751	**.000**** **
	medium/high PSC	663	6.96	3.548		

** p < .01; *** p < .001

Table 2. Eating disorders in accordance with physical self-concept (PSC)

The variability of ED behaviours and traits was also examined in accordance with the general measure of physical self-concept, with the results showing significantly higher levels of all of them in the group with low general physical self-concept. However, two stand out from the rest: body dissatisfaction, for being the trait with the greatest variation between one degree of self-concept and the other, and negative self-assessment, for being the variable in which the second greatest differences were observed.

In short, we can affirm that physical self-concept is indeed associated with eating disorders, since the data repeatedly indicate that low physical self-concept correlates with a greater number of psychological behaviours and traits typical of individuals suffering from EDs. Low physical self-concept therefore poses a significantly greater risk of developing AN or BN than normal or higher-than-average physical self-concept.

4.1 Gender and age

Another interesting question to explore is whether the risk of EDs associated with physical self-concept is similar for everyone throughout the entire adolescent period, or whether associated risk factors also exist, and if so, what these factors are. The data shown in tables 3 to 6 help answer this question. The results fail to confirm differences between the two genders in four out of the eight scales studied (table 3). Nevertheless, both drive for thinness and body dissatisfaction are significantly higher among adolescent girls than among adolescent boys, while boys were found to have a greater number of typically bulimic behaviours, a greater degree of perfectionism and more maturity fears. This means that adolescent girls do indeed have a more intense desire to be thin than boys, and experience a greater degree of body dissatisfaction.

	GENDER	n	M	SD	T	p
Drive for thinness	Male	428	2.83	3.243	-5.655	**.000*** **
	Female	403	4.39	4.559		
Bulimia	Male	428	2.01	2.605	2.025	**.043***
	Female	404	1.64	2.675		
Body dissatisfaction	Male	428	6.31	6.029	-4.921	**.000*** **
	Female	404	8.47	6.664		
Ineffectiveness	Male	428	5.38	6.420	-.371	.711
	Female	404	5.54	5.652		
Perfectionism	Male	428	6.40	4.415	5.569	**.000*** **
	Female	404	4.85	3.580		
Interpersonal distrust	Male	428	4.42	4.337	1.683	.093
	Female	404	3.93	3.988		
Interoceptive awareness	Male	428	4.97	4.885	-.511	.609
	Female	403	5.15	5.500		
Maturity fears	Male	428	7.61	3.863	2.448	**.015***
	Female	404	6.98	3.668		

** p < .01; *** p < .001

Table 3. Eating disorders in accordance with gender

More conclusive are the results for the variability of the risk of EDs in accordance with age range during adolescence. As shown in table 4, the desire to lose weight (drive for thinness) remains stable throughout all adolescence, with similar indexes for both 12-year-olds and 18-year-olds.

Nevertheless, in the other measures studied, body dissatisfaction, bulimic behaviours, ineffectiveness (or negative self-assessment), perfectionism, interpersonal distrust, interoceptive awareness and maturity fears, the values increase as adolescence progresses.

	AGE	n	M	SD	F	p
Drive for thinness	From 12 to 14	474	3.45	3.809	1.858	.157
	From 15 to 17	261	3.97	4.175		
	Over 18	96	3.23	4.466		
Bulimia	From 12 to 14	475	1.30	2.228	32.789	**.000*** **
	From 15 to 17	261	2.19	2.568		
	Over 18	96	3.47	3.722		
Body dissatisfaction	From 12 to 14	475	6.03	5.948	31.336	**.000*** **
	From 15 to 17	261	8.42	6.125		
	Over 18	96	11.02	7.579		
Ineffectiveness	From 12 to 14	475	4.07	4.246	79.414	**.000*** **
	From 15 to 17	261	5.61	4.897		
	Over 18	96	11.90	10.662		
Perfectionism	From 12 to 14	475	5.27	3.263	104.211	**.000*** **
	From 15 to 17	261	4.50	3.306		
	Over 18	96	10.65	5.883		
Interpersonal distrust	From 12 to 14	475	3.37	3.389	47.446	**.000*** **
	From 15 to 17	261	4.38	3.816		
	Over 18	96	7.67	6.303		
Interoceptive awareness	From 12 to 14	474	4.05	4.111	53.352	**.000*** **
	From 15 to 17	261	5.18	4.889		
	Over 18	96	9.70	7.674		
Maturity fears	From 12 to 14	475	7.09	3.663	6.704	**.001** **
	From 15 to 17	261	7.21	3.318		
	Over 18	96	8.61	5.096		

** p < .01; *** p < .001

Table 4. Eating disorders in accordance with age

Given that the results of the multiple comparisons reveal the existence of significant differences for all aforementioned variables between all three age groups, we can conclude that the risk of developing an ED varies throughout adolescence, being strongest in the 18-23 age range, despite the fact that the desire to be thin remains stable through the whole of this developmental stage.

The close relationship between physical self-concept and risk of developing some kind of eating disorder has already been mentioned in previous sections. It is therefore important to

verify whether physical self-concept also differs in accordance with gender or age (tables 5 and 6, respectively). In relation to gender, adolescent boys tend to have a higher level of physical self-concept than adolescent girls in all components: physical ability, physical fitness, attractiveness and strength, as well as general physical self.

	GENDER	N	M	SD	T	p
Ability	Male	428	25.98	6.818	830	**.000*** **
	Female	404	23.29	6.714		
Fitness	Male	428	25.81	7.233	830	**.000*** **
	Female	404	22.02	7.130		
Attractiveness	Male	428	24.76	6.883	830	**.000*** **
	Female	404	22.07	7.571		
Strength	Male	428	23.15	6.148	830	**.000*** **
	Female	404	19.69	6.442		
General physical self-concept	Male	428	26.68	6.870	830	**.000*** **
	Female	404	23.47	7.442		

*** p < .001

Table 5. Physical self-concept in accordance with gender

	AGE	n	M	SD	F	p
Ability	From 12 to 14	475	25.96	6.889	31.831	**.000*** **
	From 15 to 17	261	23.98	6.754		
	Over 18	96	20.21	4.971		
Fitness	From 12 to 14	475	25.29	7.683	23.145	**.000*** **
	From 15 to 17	261	22.92	7.324		
	Over 18	96	20.29	3.916		
Attractiveness	From 12 to 14	475	24.71	7.593	24.896	**.000*** **
	From 15 to 17	261	22.69	7.223		
	Over 18	96	19.32	3.841		
Strength	From 12 to 14	475	22.19	6.982	11.787	**.000*** **
	From 15 to 17	261	21.13	6.220		
	Over 18	96	18.77	3.567		
General physical self-concept	From 12 to 14	475	26.48	7.397	34.717	**.000*** **
	From 15 to 17	261	24.51	7.222		
	Over 18	96	20.05	4.191		

*** p < .001

Table 6. Physical self-concept in accordance with age

Much clearer is the connection between physical self-concept and EDs, in accordance with age, since as reflected in table 6, the pattern of the results is similar in both cases throughout

adolescence. Thus, although the risk of EDs increases with age, reaching its highest point between the ages of 18 and 23, physical self-concept reaches its highest values between the ages of 12 and 14, and then gradually decreases until it reaches its lowest point between the ages of 18 and 23.

This, in addition to corroborating the relationship between physical self-concept and EDs, also demonstrates how physical self-concept may be both a predisposing factor, and an important preventive factor to be borne in mind when trying to protect adolescents against the risk of developing AN or BN. By improving the four dimensions of the physical self, we can improve general physical self-concept, thus reducing the probability of adolescents suffering from some kind of ED.

This strengthening of physical self-concept is particularly important between the ages of 15 and 23, when the risk of EDs becomes higher. However, this does not mean that we should overlook the fact that good prevention work should begin long before the pathology starts to develop. Moreover, bearing in mind that the body changes typical of adolescence are one of the variables which have most frequently been proposed as precursors to body dissatisfaction and eating pathologies, the best option would be to begin prevention work from an early age, even before the age of 12.

4.2 Body mass index

Another factor which is often considered to be one of the basic aspects underlying EDs is body mass index (i.e. the proportion between a subject's weight and height). It is no coincidence that the World Health Organisation establishes a BMI of less than 17.5 (severely underweight) as an informal criterion for the diagnosis of AN. Hence it is important to explore whether this index mediates the relationship between physical self-concept and eating disorders; in other words, whether those with a higher body mass index have a poorer physical self and a higher number of ED symptoms associated with the perceived physical self.

The results both for the personality traits and eating disorder behaviours measured using the EDI questionnaire and for the five measures of physical self-concept are presented in tables 7 and 8. The data show significant differences in all the ED measures, with the exception of perfectionism and maturity fears. All confirm that the higher the body mass index, the greater the number of eating disorder symptoms detected in the adolescent.

However, these differences do not appear in all groups and nor is there a clear pattern which remains constant for all scales. Thus, while bulimic behaviours seem to be higher among those whose weight / height ratio is within normal limits, in comparison with those with a lower BMI, differences were found both between the normal weight and severely underweight groups, and between the overweight group and the three other BMI groups in relation to body dissatisfaction and drive for thinness.

As regards the relationship between BMI and physical self-concept (table 8), the results reveal that those with a higher BMI report having a lower self-concept of their physical ability, fitness, physical attractiveness and strength, as well as a lower physical self-concept understood in its more general sense.

		n	M	SD	F	p
Drive for thinness	Severely underweight	81	2.32	3.40	8.115	**.000*** **
	Underweight	268	3.17	3.59		
	Normal	375	3.73	4.05		
	Overweight	51	5.51	4.76		
Bulimia	Severely underweight	81	1.41	2.10	5.663	**.001** **
	Underweight	269	1.49	2.38		
	Normal	375	2.25	2.93		
	Overweight	51	2.35	2.72		
Body dissatisfaction	Severely underweight	81	5.90	5.39	13.517	**.000*** **
	Underweight	269	5.88	5.69		
	Normal	375	8.28	6.64		
	Overweight	51	10.37	6.11		
Ineffectiveness	Severely underweight	81	4.84	4.80	8.164	**.000*** **
	Underweight	269	4.43	4.90		
	Normal	375	6.24	6.94		
	Overweight	51	8.18	6.79		
Perfectionism	Severely underweight	81	5.26	3.35	2.514	.057
	Underweight	269	5.48	3.34		
	Normal	375	6.08	4.70		
	Overweight	51	4.75	4.60		
Interpersonal distrust	Severely underweight	81	4.31	3.71	8.201	**.000*** **
	Underweight	269	3.41	3.49		
	Normal	375	4.63	4.68		
	Overweight	51	6.18	4.49		
Interoceptive awareness	Severely underweight	81	4.67	4.51	4.846	**.002** **
	Underweight	268	4.35	4.47		
	Normal	375	5.76	5.78		
	Overweight	51	6.29	5.29		
Maturity fears	Severely underweight	81	7.81	3.81	1.963	.118
	Underweight	269	7.14	3.68		
	Normal	375	7.31	3.76		
	Overweight	51	8.39	4.57		

** $p < .01$; *** $p < .001$

Table 7. Eating disorders in accordance with BMI

		n	M	SD	F	P
Ability	Severely underweight	81	25.17	5.500	9.987	**.000*** **
	Underweight	269	25.76	7.210		
	Normal	375	23.91	6.726		
	Overweight	51	20.57	6.709		
Fitness	Severely underweight	81	26.10	5.905	20.285	**.000*** **
	Underweight	269	25.50	7.678		
	Normal	375	23.06	7.152		
	Overweight	51	18.00	6.073		
Attractiveness	Severely underweight	81	24.32	7.285	18.503	**.000*** **
	Underweight	269	25.23	7.179		
	Normal	375	22.44	6.963		
	Overweight	51	18.07	6.517		
Strength	Severely underweight	81	18.86	6.373	5.031	**.002** **
	Underweight	269	21.05	6.449		
	Normal	375	21.69	6.357		
	Overweight	51	22.43	6.090		
General physical self-concept	Severely underweight	81	27.16	7.059	22.445	**.000*** **
	Underweight	269	26.65	6.820		
	Normal	375	24.03	7.213		
	Overweight	51	18.96	6.570		

** $p < .01$; *** $p < .001$

Table 8. Physical self-concept in accordance with BMI

In short, as a general pattern, physical self-concept and EDs are associated with body mass index. Moreover, if we bear in mind the correlation found between the physical self and ED symptoms, we can indeed conclude that adolescents with a higher body mass index have a poorer physical self-concept and are at greater risk of EDs, in the sense that they have a greater number of traits and behaviours defined as symptoms of EDs.

4.3 Physical-sporting activity

To date, the relationship between physical-sporting activity and physical self-concept has been widely corroborated (Goñi & Rodríguez, 2004; Goñi & Rodríguez, 2007; Esnaola, 2005; Ruiz de Azúa, 2007), but it still remains to be seen whether the relationship between these two variables is connected in any way to the probability of developing an ED.

In order to test this hypothesis, we first took only those four traits most closely linked to EDs, namely drive for thinness, bulimic behaviours, body dissatisfaction and ineffectiveness, evaluated, as in all other cases, by the EDI-2 questionnaire. Secondly, subjects were divided into two groups, low physical self-concept and medium/high physical self-concept, in each of the dimensions of the physical self, in accordance with the scores obtained in said dimensions.

			EDI scales							
			DT		Bul		BD		In	
			M	(SD)	M	(SD)	M	(SD)	M	(SD)
ABILITY	Low	Spor	6.17	(5.30)	2.17	(2.72)	10.50	(5.97)	8.81	(6.60)
		Habit	5.45	(5.35)	3.65	(3.49)	13.37	(7.12)	12.73	(8.42)
	Med/High	Spor	4.83	(4.67)	1.33	(1.89)	8.64	(6.62)	5.24	(4.59)
		Habit	3.74	(4.55)	1.56	(2.49)	6.63	(6.20)	4.49	(5.11)
	p	Phy_Act	**.000*** **		**.001** **		.554		.123	
		Ph Self	**.001** **		**.000*** **		**.000*** **		**.000*** **	
		Ph Self * Ph Act	.860		**.000*** **		**.000*** **		**.000*** **	
FITNESS	Low	Spor	5.59	(4.97)	2.49	(2.70)	11.67	(7.61)	9.31	(6.44)
		Habit	7.29	(6.26)	2.63	(3.57)	12.03	(6.98)	9.63	(7.12)
	Med/High	Spor	5.21	(4.96)	1.19	(1.85)	8.06	(5.25)	5.12	(4.66)
		Habit	3.36	(4.07)	1.70	(2.54)	6.74	(6.37)	4.89	(5.91)
	p	Phy_Act	**.016***		.758		**.026***		**.002** **	
		Ph Self	**.000*** **		**.000*** **		**.000*** **		**.000*** **	
		Ph Self * Ph Act	.559		.738		.238		.242	
ATTRACTIVENESS	Low	Spor	8.06	(5.61)	2.14	(2.65)	14.10	(7.28)	11.00	(6.60)
		Habit	8.78	(5.93)	2.56	(3.12)	14.38	(7.48)	8.77	(5.60)
	Med/High	Spor	4.35	(4.30)	1.48	(2.11)	7.62	(5.09)	5.03	(4.40)
		Habit	3.14	(3.89)	1.72	(2.66)	6.38	(5.85)	5.08	(6.32)
	p	Phy_Act	**.037***		.950		**.002** **		**.000*** **	
		Ph Self	**.000*** **		**.004** **		**.000*** **		**.000*** **	
		Ph Self * Ph Act	.071		.258		.549		.107	
STRENGTH	Low	Spor	6.21	(5.52)	1.92	(2.56)	9.88	(6.46)	7.91	(6.31)
		Habit	4.57	(5.64)	1.94	(2.67)	9.18	(6.86)	7.83	(7.36)
	Med/High	Spor	4.09	(3.66)	1.27	(1.73)	8.61	(6.35)	4.77	(4.09)
		Habit	3.68	(4.12)	1.80	(2.79)	6.75	(6.54)	4.51	(5.44)
	p	Phy_Act	**.000*** **		.335		**.000*** **		**.000*** **	
		Ph Self	**.004** **		.575		**.000*** **		**.000*** **	
		Ph Self * Ph Act	**.044***		.654		.173		.375	

*p<.05, **p<.01, ***p<.001

Legend: DT= Drive for thinness; Bul= Bulimia; BD= Body dissatisfaction; In= Ineffectiveness; Spor= Sporadic; Habit= Habitual; Phy_Act= Physical activity; Ph Self= Physical self-concept; Ph Act= Physical activity.

Table 9. EDs in accordance with physical self-concept and physical activity

The data available confirm that, in the majority of cases, the frequency of physical activity does indeed seem to explain the variation observed in the scores obtained for the different behaviours and ideas associated with EDs at a physical self-concept level (table 9), with the general rule being that assiduous physical exercise reduces the risk of AN or BN, except as regards the number of bulimic behaviours according to self-concept in physical ability, where the risk increases.

Also, the risk of EDs varies in accordance with the level obtained in all facets of the perceived physical self, since seeing oneself in a positive light results in a significant reduction in body dissatisfaction, behaviours characterised as bulimic, drive for thinness and ineffectiveness or negative self-assessment. The only exception to this lies in the bulimia scale in relation to the strength dimension, where current data are unable to confirm the existence of statistical differences.

Various interactions have been found between the effect of the frequency of physical-sporting activity and the level of physical self-concept, specifically that of low physical ability with bulimia, body dissatisfaction and ineffectiveness; this behavioural pattern is also followed by drive for thinness in accordance with strength, since frequent physical activity in lower self-concept levels leads to a greater probability of a strong desire to lose weight.

In short, we can conclude that among those with low self-concept, habitual physical-sporting activity is associated with a greater risk of eating disorders.

4.4 Physical self-concept and EDs in the clinical population

However, these affirmations based on a sample group with no prior diagnosis of EDs could not be considered complete until further research had been carried out to establish whether or not they hold up when the population analysed are clinical patients (table 10) previously diagnosed with EDs by qualified staff at the Eating Disorder Unit of a hospital located in the Basque Country (Spain). To this end, a total of 48 patients participated in the study. All were adolescent girls aged between 12 and 22.

The results obtained for patients diagnosed with EDs enable further clarification of the previous affirmations. The correlations continue to be negative, thus confirming that the poorer the concept each individual has of her physical self, the greater the probability of suffering from an ED (with this probability being understood as the presence of a greater number of traits which define this type of psychopathology) and vice versa. Moreover, all the correlations oscillate between moderate and high, with those observed between body dissatisfaction and the physical attractiveness dimension (r = .725) and general physical self-concept (r = .770) being particularly worth noting.

Nevertheless, four important differences were found in the sample of patients with EDs: a) again, the component strength had the lowest relationship indexes, but unlike with the general population, where its correlations were not significant, in this case they did correlate statistically with a moderate level of interrelation; b) despite the fact that physical attractiveness was found in this case to correlate more closely with the majority of behaviours, traits and attitudes, these correlations were lower than those of general physical self-concept and physical fitness; c) although in the non-clinical sample group perfectionism was not associated with any dimension of physical self-concept, in the group of adolescents

		Ability	Fitness	Attractiveness	Strength	General Physical Self-concept
Drive for thinness	Pearson r	-.258	**-.414****	**-.375****	**-.348****	**-.682*****
	p (bil)	.077	.003	.009	.015	.000
Bulimia	Pearson r	**-.302***	**-.393****	-.187	**.314***	**-.456****
	p (bil)	.037	.006	.203	.030	.001
Body dissatisfaction	Pearson r	**-.456****	**-.591*****	**-.725*****	.139	**-.770*****
	p (bil)	.001	.000	.000	.347	.000
Ineffectiveness	Pearson r	-.158	**-.650*****	**-.491*****	**-.304***	**-.452****
	p (bil)	.282	.000	.000	.036	.001
Perfectionism	Pearson r	**.579*****	.269	**.601*****	.271	**.482****
	p (bil)	.000	.064	.000	.063	.001
Interpersonal distrust	Pearson r	**-.615*****	**-.679*****	**-.313***	**-.303***	-.153
	p (bil)	.000	.000	.030	.036	.299
Interoceptive awareness	Pearson r	-.051	**-.621*****	**-.482****	-.197	**-.587*****
	p (bil)	.731	.000	.001	.179	.000
Maturity fears	Pearson r	**-.465****	**-.401****	-.242	**-.540*****	-.139
	p (bil)	.001	.005	.097	.000	.347

*** p < .001; *** p < .01

Table 10. Correlations between self-concept and EDs in a clinical sample group

with EDs, high correlations were found between perfectionism and physical ability, physical attractiveness and general physical self-concept, a finding which confirms that individuals with EDs are extremely perfectionist and want their perceived physical self, not just their attractiveness level, to be perfect; and d) unlike in the non-clinical population, in which drive for thinness had a weak correlation with physical fitness, here the correlation is moderate/high.

5. Physical self-concept and risk of developing EDs: conclusions

The results presented in this chapter confirm that sustained by previous research (Goñi & Rodríguez, 2004, 2007), i.e. that EDs are negatively associated with physical self-concept in all its dimensions, particularly in relation to physical attractiveness, which is revealed as the dimension most closely linked to the four behaviours and thoughts most commonly present in EDs: drive for thinness, bulimia, body dissatisfaction and ineffectiveness (or negative self-assessment).

It is logical to think that EDs occur always in individuals with a low physical self-concept, or the opposite, i.e. that physical self-concept drops when an ED develops. Whatever the case is, ED patients' assessment of their physical self is much lower than that of the normal population. However, it was necessary to demonstrate this idea, and indeed, the obtained results confirm it. When subjects were divided into two groups in accordance with physical self-concept (low vs. medium/high), significant differences were found for all ED symptoms in accordance with the all the dimensions of physical self-concept. We can therefore conclude that individuals who assess their physical attributes negatively have a greater potential risk of suffering from AN or BN at some point in the future.

However, although the various studies which have examined the relationship between physical self-concept and EDs in the non-clinical population (i.e. in those with no prior clinical diagnosis) have repeatedly reached these same conclusions, no studies had hitherto focused on this relationship in the clinical population, which is why the data presented here are totally unprecedented.

Again, a negative relationship is observed between the dimensions of the perceived physical self and ED symptoms, but in this case, the correlations are closer, with strength being the dimension with the lowest relationship indexes, although these indexes are still significant (unlike in the non-clinical population). Despite the fact that among patients with EDs the level of association between perceived physical attractiveness and ED symptoms is higher than among the normal population, it is physical fitness and general physical self-concept which are most closely related to eating disorder symptoms. All this prompts an important question, the answer to which is vital for establishing the risk factors for these pathologies and for planning effective prevention programmes. It is a question which, to date, has also been impossible to answer: is the development of AN or BN what makes poor self-perception spread to other areas of the physical self, or is the opposite true, i.e. that an ED arises not when self-assessment of one's physical attractiveness is negative (something which is very common among the normal, non-clinical population), but when the individual in question begins to perceive themselves negatively in all aspects of their physical self?

Diverse authors have tried to explain why only a small part of the total population ends up developing eating disorders, when around 75% claim to feel dissatisfied with their physical appearance (an important risk factor); and many have defended the idea of restrictive dieting as a mediating and trigger factor (Garner, 1998; Heilbrun & Witt, 1990; Toro, 2004). However, in light of the data presented here, perhaps the answer to this question lies elsewhere. If the results obtained in this study (in the clinical population the highest correlations with ED symptoms are found mainly in low general physical self-concept and low physical fitness, more than in low physical attractiveness) are considered in conjunction with the fact that the percentage of ED diagnoses is surprisingly higher among sportsmen and women than among the normal population (Houtkooper, 2000; Toro, 2004; Wilmore & Costill, 1998), then we can conclude that perhaps, one of the trigger factors may also be perceiving oneself as physically incompetent. In any case, we must not forget that this reflection is only a hypothesis which requires further empirical support.

What is clear, however, is that low physical self-concept is a clear risk factor for developing some kind of ED. Both in the non-clinical population (i.e. those with no previous diagnosis of AN or BN) and the clinical sample group, the relationship found between the components of the perceived physical self and the symptoms of EDs provides a glimpse of how we can work to reduce the risk or severity of these pathologies, i.e. by improving the four facets of physical self-concept. Learning to accept one's own physical attractiveness and assessing that attractiveness more positively will help reduce eating disorder behaviours aimed at achieving a body image more in keeping with the current stereotype of beauty. Moreover, fostering physical ability and physical fitness will also make it possible to reduce, if not avoid, those personality traits which underlie these types of psychological alterations.

However, physical self-concept is not the only risk factor associated with EDs. It can be said that the risk of suffering from EDs (measured using the responses provided to the EDI

questionnaire) is mediated by social-personal variables such as age, gender, body mass index and engagement in physical-sporting activity. It can also be stated that the risk of EDs is greater among adolescent girls than among adolescent boys, among 15-23-year-olds than among 12-14-year-olds and among those who engage in physical activity sporadically than among those who exercise regularly.

In relation to gender, the implications of the data presented here are important for the diagnosis, prevention and treatment of EDs. Although until now, EDs have been considered as pertaining exclusively to women with a set of clearly-defined personality traits, recently the situation seems to have changed somewhat. The increase in incidence rates in both the male and female populations has blurred some of the personality traits which, until recently, were considered distinctive of anorectic or bulimic patients. This makes the early detection of possible future cases even more difficult, since the warning bells now focus only on behaviours such as starvation, vomiting or restrictive dieting, i.e. behaviours which occur once the pathology has already fully developed.

In the association between gender and EDs, physical self-concept also plays a key role, since adolescent girls tend to have a poorer physical self and a greater risk of EDs than their male counterparts. What remains to be clarified is a key question in this gender-physical self-concept-ED trinomial: is it gender that determines whether or not an individual has a poorer physical self-concept, and does this in turn increase the risk of developing an ED? Attempts are currently being made to answer this question using structural equations modelling (SEM), which offers an approach to the study of causal relations.

Of special relevance also is the relationship found between body mass index and risk of ED associated with low physical self-concept. Individuals who are overweight perceive themselves physically in a poorer light in all the dimensions of the physical self, and as weight is reduced, so these self-perceptions improve; physical performance and ability increase, as do physical fitness and perceived strength, and subjects see themselves as more attractive. The psychological implication of this is clear: within healthy limits, body weight control strengthens self-concept in all these physical facets (ability, fitness, attractiveness and strength), meaning that, thanks to the aforementioned connection with behaviours and traits typical of EDs, the probability of developing AN or BN is significantly reduced.

As regards age, if all three variables (EDs, physical self-concept and age) are borne in mind, then the relationship between improved physical self-concept and EDs is observed to be related to age. Thus, while the risk of suffering from EDs tends to increase throughout adolescence, physical self-concept is associated with a considerable reduction in this risk, with those reporting low physical self-concept having a considerably higher risk of developing an ED than their counterparts in the medium/high group.

Improvement of and education about physical self-concept is therefore a good method of fighting against EDs, because it seems to significantly reduce the growing effect of age on these pathologies; however, it is not and should not be the only method used. The fact that, as time goes by, seeing oneself as less physically attractive is associated with an increasing risk of EDs may indicate the presence of another uncontrolled variable which has a negative effect on this relationship. Therefore, education about self-concept should always be accompanied by a diverse range of other methods which aim to cover as many variables as possible linked to EDs.

One good method may be to engage in regular physical-sporting activity, since the data presented here show that physical activity is a modulating variable of the risk of developing eating disorders. This may be due to the fact that engaging in regular exercise improves all the dimensions of the physical self (Esnaola, 2005; Goñi et al., 2004), helping individuals see themselves as more able, fitter, more attractive and physically stronger, all dimensions of physical self-concept which are inversely linked to the risk of developing eating disorders.

6. References

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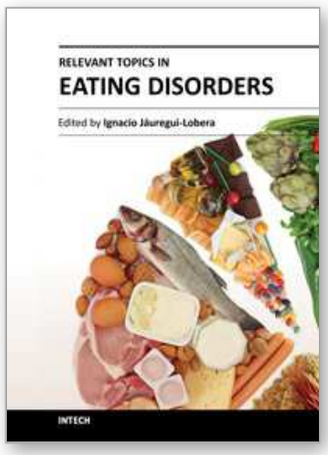
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Eating disorders are common, frequently severe, and often devastating pathologies. Biological, psychological, and social factors are usually involved in these disorders in both the aetiopathogeny and the course of disease. The interaction among these factors might better explain the problem of the development of each particular eating disorder, its specific expression, and the course and outcome. This book includes different studies about the core concepts of eating disorders, from general topics to some different modalities of treatment. Epidemiology, the key variables in the development of eating disorders, the role of some psychosocial factors, as well as the role of some biological influences, some clinical and therapeutic issues from both psychosocial and biological points of view, and the nutritional evaluation and nutritional treatment, are clearly presented by the authors of the corresponding chapters. Professionals such as psychologists, nurses, doctors, and nutritionists, among others, may be interested in this book.

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