

Chapter 9

THEORETICAL JUSTIFICATION AND METHODOLOGY FOR EMPIRICAL RESEARCH

Capítulo 9

JUSTIFICACION TEÓRICA Y METODOLOGÍA PARA LA INVESTIGACIÓN EMPÍRICA

9.1. Theoretical justification.

9.1.1. Health characteristics during adolescents.

9.1.1.1. Conceptualization of health.

The fact that the main causes of death have become heart disease, cancer and cerebral-vascular diseases (WHO, 2002), which are directly associated with environmental factors or individual lifestyles (WHO, 1986b), underlines the need to approach health from the biopsychosocial model (Engel, 1977). With a historic declaration of intentions, in the preamble of the first official statutes of the World Health Organization (WHO, 1948), this organization proposes a definition of health that seeks to cover these external health-related factors. Thus, it proposes to define health as a state of complete physical, mental and social wellbeing, and not merely the absence of diseases or infirmity.

Consequently, together with the gradual inclusion of external health-related factors in the notion of health, the actual concept of health has undergone an important transformation in recent decades. The concept itself has moved from a *negative and reductionist* conception (based on the absence of disease, handicap or disability) to a new dimension that is more *positive and holistic conception*, in which various dimensions of wellbeing have been included, such as psychosocial adjustment, quality of life, daily functions, protection against possible risk of disease and personal development, among others (Godoy, 1999; Singer & Ryff, 2001).

In short, a multitude of experts coincide at pointing out the necessity to outline the attributes underlying the wider concept of health and from there develop quality measures that allow these to be evaluated. This is the only possible way to design and evaluate complex explanatory models that are able to include both positive and dysfunctional elements, and that allow a situation or vital course to be analyzed simultaneously, from both points of view (Diener et al., 2008;

Locker & Gibson, 2006; Patrick & Bergner, 1990; Seeman, 1989; Seligman, 2008; Vázquez & Hervás, 2008).

On the other hand, in the past two decades, scientific research has demonstrated the enormous impact that social determinants such as income, poverty, unemployment, job insecurity, the quality of housing, the neighborhood where people live, level of educational, social class, and sex, amongst others, have on health; these being manifested in a variety of health imbalances (Marmot & Wilkinson, 2006; Wilkinson, 1996). The latest reports on social inequalities in health indicate that socioeconomic and sex inequalities in health are two of the most frequent disparities and with the worst repercussions in society (House of Commons Health Committee, 2009). Therefore, this bibliographical review will first focus on the analysis of socioeconomic disparities in health to then continue with the analysis of divergences in health between men and women.

On the one hand, the course of the study of inequalities in health in Spain began much later than in the rest of Europe. Despite this fact, in Spain the knowledge about social inequalities in health has increased due to the existence of certain research groups who have studied and published their findings in specialized journals and books (Benach, 1995; Borrell & Pasarín, 1999; Regidor et al., 2006). However, the knowledge acquired in recent decades about the existence of social inequalities with regards to health in Spain does not culminate with changes in healthcare policies (Benach, Borrell & Daponte, 2002).

Beyond the debate about the causes that provoke and perpetuate socioeconomic inequalities in health, the concepts and measures used to treat these inequalities have yet to be consistency and clearly established (Carr-Hill & Chalmers-Dixon, 2005). The empiric construction of social class, from a neo-Marxist perspective, is resolving this problem more and more by using information about occupations. In fact, the study of social inequalities and health has traditionally focused on the use of occupation or, rather, the occupational group, as the criteria for socioeconomic classification. The International Standard Classification of Occupations (ISCO) is one of the main economic and social classifications. In fact, the third version of this classification (ISCO-88), adopted by the Fourteenth International Conference of Work Statistics in 1987, is one of the socioeconomic measures used in this work.

Nevertheless, other variables have also been indicated as possible alternatives to differentiate the level of health between the various socioeconomic population groups, such as the level of income or, rather, various wealth indicators (Carr-Hill & Chalmers-Dixon, 2005). Several studies have used wellbeing and wealth indicators, such as housing regime and its characteristics, owning a car or a computer, to obtain a reliable and valid measure of the socioeconomic level (Smith et al., 1990; Wardle et al., 2002). In this sense, this doctoral thesis uses the Family Affluence Scale to measure the purchasing power of families with adolescent children, starting from these indirect indicators (Wardle et al., 2002; Boyce et al., 2006).

On the other hand, there is repeated proof in the literature that the health of men and women is different and unequal. It is different because there are biological factors that appear differently in their health and in the risk of disease, and it is unequal because there are social factors—partly explained by gender roles—which establish unjust differences in the health of men and women (Rohlfis et al., 2000; Verbrugge, 1985). The situation of health and of inequalities in health between men and women in Spain has not been explored in depth until about two decades ago. However, despite being an incipient subject, with few publications in Spain, there is growing interest in sex inequalities in the public health agenda, through initiatives such as those of the Gender and Public Health Group in the heart of the Spanish Society of Public Health and Health Administration (Sociedad Española de Salud Pública y Administración Sanitaria, SESPAS) and, more recently, the Thematic Network on Health and Gender Research (Red Temática de Investigación de Salud y Género, RISG) (Artazcoz, 2004; Borrell, García-Calvente & Martí-Boscà, 2004; Ruiz et al., 2005).

9.1.1.2. Health and adolescence.

A growing amount of literature has focused on the relationship between the health of adolescents and the notion of risk. The interest in risk behaviors resides in the fact that most of the deaths and a substantial quantity of adolescent illnesses are related to behavioral and psychosocial characteristics, more than with acquired diseases or congenital factors (Schlueter et al., 2004). Another reason that explains the interest in the study of risk behavior at this stage is explained by the researchers who have proven the existence of a maturity interface between the superior behavioral control centers—the prefrontal cortex—and the mesolimbic reward centers during adolescence. This neurobiological explanation seems to be responsible for the apparent difficulty that it is evidenced in adolescence when controlling behaviors that offer a reward, despite the possible dangers (B. J. Casey et al., 2000; Ernst & Fudge, 2009).

However, despite the abundant study of risk behaviors during adolescence, most of these behaviors take place, essentially, as a natural part of life (Lupton, 1999). From there, in recent years, ever more experts consider that the term *risk* should be reserved for situations in which the type of circumstances, the nature of the interaction with others and the particular moment in the development of the adolescent, really create the conditions for the appearance of a behavioral problem. In the search for a more appropriate term than that of *risk behaviors*, some European authors have proposed the use of other terms such as *experimental or exploratory behavior* for the behaviors that are common during adolescence (Michaud et al., 2006).

Stemming from this debate, there has been a line of research since the nineties that defends the study of the factors *resilience* or protection, with the objective of evaluating the probability that an adolescent finds their own solution and the support to achieve results of positive health within their environment. Those protection factors are seen as elements of *resilience* (Garmezy, 1991), *assets* (Benson, 1997) and, more recently, as positive youth development (Blum, 2003). This new more positive vision of adolescent development still suffers from some shortfalls, such as the lack of valid instruments or tools to evaluate positive development and the absence of a specific vocabulary (Lerner et al., 2005).

In this sense, this doctoral thesis will use a wide and integrative perspective of adolescent lifestyle, which will bear in mind both the behaviors that imply some type of health risk, as well as those other behaviors that protect or promote health. In addition, this work proposes the challenge of a global health evaluation, taking into account both the weaknesses, as well as the strengths. To achieve this objective, the starting point will begin with some of the measures most commonly used during adolescence to evaluate those attributes of health classified by the literature as basic, in a positive and integrative conception of the health, such as: life satisfaction, health-related quality of life, self-reported general health and psychosomatic complaints; such as those explained below.

With regards to life satisfaction during childhood and adolescence, in recent years it has been demonstrated how this measure is negatively related to multiple indicators of non-adaptive functioning (depression, anxiety, neuroticism, somatic complaints, stress, school/learning problems, etc.) and positively with indicators of adaptive functioning (internal control locus, self-esteem, extroversion, perception of control in school, social interest and participation in extra-scholar activities, good relationships with peers and family, etc.) (Huebner, 2004). In this work, one of the most internationally known measures will be used to measure life satisfaction in a quick and reliable manner, specifically, the “Cantril scale” (Cantril, 1965).

Secondly, the use of the term *quality of life* has been used greatly in recent years, but unfortunately there is no universally accepted definition (Spieth & Harris, 1996; Harding, 2001). In fact, it is standard to find references to the same instruments, in research works, using terms such as Health-related of Quality of Life (HRQL), emotional wellbeing or even mental health. In this sense,

one of the most useful definitions of HRQL has been proposed by Shumaker and Naughton (1995) who, in a review of existent definitions, conclude that the HRQL is the subjective evaluation of the influence of the state of health, of the health care and of the promotion of health, on the individual's capacity to maintain an operational level that allows them to carry out the activities that are important and that affect their general state of wellbeing. This doctoral thesis will use one of the most generic and internationally accepted instruments of HRQL, known as Kidscreen or Kidl (specifically the Kidscreen-10 version), which provides a global CLRH index with 10 items that cover physical, psychological and social facets, recommended for use in broad surveys (The Kidscreen Group Europe, 2006).

On the other hand, the perception of the general state of health has, in many studies, proven to be a mortality index predictor. Specifically, Idler and Benyamini (1997) refer to twenty-seven studies that have shown coherent results in the relationship between perception of health and future mortality, as well as persistent results with numerous indicators of health and other co-variables included in the analysis, such as sex. These authors created a self-reporting health measure that consists of a single item in which adolescents are asked what they believe their health is like at that moment, being able to choose between four answer options: excellent, good, passable or poor. This self-reporting health measure is one of the most commonly used indicators for health, as it demonstrates good reliability from test-retest (Lundberg & Manderbacka, 1996) and it has proven to be a valid means to measure health (Manor et al., 2001; Silven-toinen et al., 2007).

To conclude, subjective health problems refer to the symptoms experienced by the individual with or without a defined diagnosis. These symptoms refer to both daily experiences and health problems, and are common causes of disease and certified disabilities in adulthood. The HBSC study made a list of eight psychosomatic symptoms, known internationally as *HBSC-symptom checklist* (King et al., 1996), designed to measure this problem in the adolescent population. Most of the items on that list were used previously in other health measures with adults and adolescents, although today, this measure has been corroborated (Haugland & Wold, 2001). Some researchers suggest that this measure reflects two facets, one psychological (nervousness, low spirits, irritability or bad moods and sleep problems) and another somatic (headaches, stomachaches, back pain and a feeling of dizziness) (Haugland et al., 2001; Hetland et al., 2002). However, the scale can also be considered as the measure of psychosomatics problems throughout unidimensional character (Ravens-Sieberer et al, 2008; Hagquist & Andrich, 2004).

9.1.2. Healthy lifestyles during adolescence.

9.1.2.1. Conceptualization of the terms lifestyle and healthy lifestyle.

The interest in studying lifestyle is not new, as has been indicated in diverse historical reviews carried out about this concept (Ansbacher, 1967; Abel, 1991; Coreil et al., 1992). Its origins go back to the end of the 19th century, with philosophers such as Karl Marx and Max Weber, who emphasized the socioeconomic determinant of the lifestyle. At the beginning of the 20th century, a personalist orientation represented by Alfred Adler and his Individual Psychology appeared, thus producing a displacement from socioeconomic factors to individual factors in the study of lifestyles. Anthropology was another discipline that also incorporated the term *lifestyle* during the second half of the 20th century, which focuses on the importance of culture. Nevertheless, during the second half of the 20th century, the greatest impact of the term *lifestyle* has been on the area of health.

The first research carried out on *lifestyle* from the field of the health adopted a medical-epidemic perspective. From this approach, the importance of the social context was not recognized; like-

wise, psychological factors such as conditioners for the acquisition of lifestyles were not taken into consideration, but rather, the victim was blamed for their unhealthy habits or lifestyles. Therefore, this conception of lifestyle has been greatly criticized (Mechanic, 1979).

However, despite the criticism, the biomedical model recognizes two good contributions in the study of lifestyle. On the one hand, this focus has contributed to making lifestyle a subject of study and research for health sciences and for the general public being more aware that some of their behaviors imply risks for their health. On the other, the biomedical model was responsible for introducing the term *healthy lifestyle* and, to a certain degree, for establishing its use while the term *lifestyle* extended to day-to-day language and health-related literature. In fact, today, the term *lifestyle* is used to a greater extent in the area of health than that of Sociology, Anthropology or Individual Psychology (Coreil et al., 1992).

In the 1980s, dissatisfaction with the biomedical model finally materialized, and psychosocial models were progressively introduced into the study of a healthy lifestyle. In this sense, the European Committee of the World Health Organization (WHO, 1986a) carried out several measures supporting this new integrative philosophy. In the first place, it approached the study of a healthy lifestyle from a more social rather than medical focus. Secondly, it distinguished between the concepts *lifestyle* and *healthy lifestyle* (this latter term assimilated *health-related behaviors*). Finally, it approached the study of lifestyles specifically in the adolescent years due to the enormous implication of these during this stage of development, for which the study *Health Behavior in School-aged Children* (HBSC) was created, within which this doctoral thesis has been carried out.

Later, in the 1990s, there was a need to combine efforts to agree upon and clarify the concept of the term *healthy lifestyle*. With this objective, some researchers approached the classic theories, especially the psychosocial and sociological orientation models (Abel, 1991; Coreil et al., 1992; Elliot, 1993).

Although the term *healthy lifestyle* is used in this work, the use of the term *health-related lifestyle* is considered more appropriate, since it includes both the behaviors that enhance health and those that put it at risk (Donovan et al., 1993). However, on occasion, it is too elaborate or even confusing; for example, when we talk of its relationship with other variables, therefore both terms will be used indiscriminately in this work.

Therefore, the term *healthy lifestyle* bears in mind both those behaviors that imply a risk to health and those that protect it, as stated by Dellert S. Elliot (1993), one of the most internationally renowned specialists on this subject. According to this author, healthy lifestyle is becoming more and more understood as a model of behaviors related to health that take place in a relatively stable way. One of Elliot's most important contributions has been his statement on the fundamental characteristics of a healthy lifestyle, summarized in the following four sections:

1. It has a *behavioral and observable nature*. In this sense, attitudes, values and motivations are not part of it, although they may determine it.
2. *The behaviors making it up must be maintained over a period of time*. Conceptually, lifestyle denotes habits that have some type of temporary continuity, since it assumes a routine way of life.
3. Lifestyle denotes *combinations of behaviors or behavioral domains that occur consistently*. In fact, lifestyle is considered as a way of life that embraces a broad range of behaviors organized in a coherent way in response to the different living situations of each person or group.
4. The concept of lifestyle does not imply a common etiology for all the behaviors that are part of it, but it is expected that the different behaviors have *some common causes*.

9.1.2.2. Study of healthy lifestyles in adolescence.

Once the meaning of the concept *healthy lifestyle* has been clarified, it is necessary to indicate that its study takes on special relevance during adolescence, as this is a time in which young people are continuing to develop the social and intellectual tools that will prepare them for their roles and responsibilities as adults. During this period, adolescents reach physical and sexual maturity, they develop more sophisticated reasoning abilities and they make important educational and occupational decisions that will determine their adult careers. These biological, cognitive and psychosocial changes provide abundant development opportunities for adolescents to fulfill both behaviors that put their health at risk and that reveal a healthy lifestyle (Coleman & Hendry, 1999; Crockett & Petersen, 1993; Heaven, 1996; Michaud et al., 2006).

Coinciding with increased interest in recent decades on the subject of lifestyles and their relationship to health, experts have become more and more aware of the need to offer a realistic image about this subject, which avoids traditional alarmism with which unhealthy behaviors in adolescence has been treated (G. R. Adams, 2005).

The initial studies of healthy lifestyles arose from the background of preventing cardiovascular diseases; therefore the variables employed in those first studies were the classic risk factors for this type of disease: consumption of tobacco and alcohol, physical exercise and eating habits. In addition, the samples used in these studies were essentially made up of adults with and without cardiovascular problems (Badura, 1982). However, the progressive increase in concern for health education by the World Health Organization, together with other public bodies dedicated to the improvement of the wellbeing of the infantile and juvenile population has sparked an increase in the number of studies carried out on children and adolescent samples, as well as an increase in the study of the number of variables making up these lifestyles.

Despite the diversity of variables that have been studied within the analysis of healthy lifestyles, the variables that will be studied in this doctoral thesis are those that research has proven to have greater importance during adolescence: eating habits, dental hygiene, physical activity, consumption of substances, sexual behavior, injuries and free time. The intervention of these variables is essential when faced with improving the state of young peoples' health.

However, an isolated and independent analysis of each of those lifestyle contents only shows an excessively dissected reality of the complex behavior of individuals and, therefore, it is difficult to reach conclusions about how to continue to modify or reinforce the said behavior. In other terms, those approaches that focus only on independently analyzed variables making up a healthy lifestyle are considered simplistic if they do not advance further seeking to learn how these variables relate to one another. Thus, when that relationship is approached, the term *lifestyle* has retained its original meaning (Coreil et al., 1992; Donovan et al., 1991; Elliot, 1993).

Although the research carried out on an adult and elderly population has shown weak and incongruent relationships between the behaviors making up a healthy lifestyle, adolescence has different characteristics. In this developmental phase, it is possible to analyze the dimensions of the behaviors making up healthy lifestyles. Specifically, the research has demonstrated that many health-related behaviors are interrelated and tend to systematically covary during adolescence (Jessor, R., 1984). In the study of the dimensions of health-related lifestyles, there have been three research traditions that differ in the number of proposed dimensions, specifically the unidimension, bidimension and multidimension (Elliot, 1993; Pastor et al., 1998a; Steele & McBroom, 1972; Williams & Wechsler, 1973).

The authors of the first tradition stated that the risk behaviors for health, along with other problematic behaviors of the adolescence (such as, delinquency or school truancy), are expressions of a general propensity towards deviation, a bias toward non-conventionalism. The same authors of

the above tradition were also responsible for studying the relationships of the behaviors that enhance or protect health (eating habits, physical activity, dental hygiene...) (Donovan et al., 1993), thus connecting to the *bidimensional* tradition. This perspective postulated that the different health-related behaviors are grouped in two dimensions, one of them embracing those behaviors that compromise or put health at risk, while the other dimension would include health-enhancing behaviors. On the other hand, the multidimensional tradition includes the works of multiple grouping dimensions when studying diverse behaviors related to both lifestyles that compromise health and those that protect it. In this case, the studies show greater heterogeneity and less agreement according to the number of dimensions that are created on grouping the lifestyles, which range from 4 to 10 dimensions (Belloc & Breslow, 1972; Krick & Sobal, 1990; Tapp & Goldenthal, 1982; Williams & Wechsler, 1972).

Currently, experts seem to have concluded this debate with greater support for the multidimensional tradition of lifestyles during adolescence, although there is no agreement as to the exact number of factors that make up lifestyles at this stage. Considering the implications of multidimensionality in the study of the lifestyle, subsequently, other authors have begun to ponder how health and risk behaviors are related, bearing in mind that these behaviors can be grouped in dimensions. In this sense, Rutten (1995) has systematized the possible models to be used when studying the association between health and risk behaviors, classifying them into three types, bivariable, additive and multivariable. Despite the fact that Rutten focused on risk behaviors, as he was working at a time when this negative focus prevailed, his conclusions can also be considered when evaluating the relationship between protective and health behaviors.

The first model refers to the most commonly used method for a descriptive analysis of the relationship between risks behaviors and health. The studies carried out from this *bivariable model* are based on simple cause and effect relationships, rejecting the complex interrelationship between the variables of lifestyles. Regrettably, this simplistic analysis seems to dominate the evaluation systems for behaviors related with health, so the intervention measure policies have been centered on a logic based only on the relationship between a cause and an effect.

The second focus, known as the *additive model*, is typical of those analyses of risk behaviors to health that are more complex and is based, to a great extent, on multiple regression methods. Despite the fact that this type of analysis controls the strength of explanation related to certain risk factors (that is to say, quantity of explained variation) it has some deficiencies. Specifically, these models presuppose a lineal, additive and recursive conception (that is to say that the causal relationships work in only one direction). Implicitly, this focus overlooks the non-linear associations and the probable existence of interaction due to the interdependence between the behaviors that make up the lifestyles. As in the case of the bivariable model, the policies deriving from this focus tend only to focus on the causes and the effects; it is only now that the stress is to identify the variable which represents the greatest variation within the model.

Lastly, the third focus, known as the multivariable model, differs notably from both previous ones, since it focuses on complex forms of interaction that constitute patterns of risk behavioral, and associate these patterns with specific diseases. Following this model, a health risk is not viewed as an isolated behavioral tendency, but rather as a component of a durable constellation of risks that take shape as lifestyles. Then it is the lifestyle pattern that is evaluated on a continuum from poor health to ideal health.

The research of health-related lifestyle constellations avoids the concern of the individual or dominant causes of a risk behavior, since it places the specific risks within a more complex pattern. Therefore, the policies and interventions deriving from the multivariable model should be capable of facing the complexity and the specificity of the health behavior patterns, according to the specific characteristics of the population under consideration (Rutten, 1995).

Bearing in mind the importance of studying healthy lifestyles for intervention, either from a bivariable, additive or multivariable focus, the strategies to approach the lifestyles related to health are among the most effective and available interventions at reducing the incidence and seriousness of the main causes of disease and disability, above all in the case of the four classic behaviors: alcohol, tobacco, physical activity and eating (Whitlock et al., 2002). There are numerous reviews that demonstrate significant progress in the development of effective interventions to modify different risk factors, in an isolated way, each at a specific time. However, this does not happen with the development of the most effective methods to face multiple risk behaviors, despite the research that demonstrates how the coexistence of multiple risks is a generalized fact in adolescence, adulthood and old age (Pronk et al., 2004).

Faced with this panorama, researchers, politicians and professionals specialized in health promotion, should be willing to break away from the paradigm of isolated-risk that has dominated the latest research linked to changing lifestyles, by developing new multiple-risk, inter-behavioral and interdisciplinary models and research paradigms (Orleans, 2004). Thus, an integrated focus aimed towards the multiple risk behaviors should also be more efficient than one that is focused on a single risk factor, saving time, effort and resources for the health system (Pronk et al., 2004). Therefore, faced with this new intervention perspective, more and more professional people demand intervention guides and models for the multiple changing of health-related behaviors, which also bear in mind the specific characteristics of the population under consideration.

The first systematized steps of this new paradigm can be found at the end of 20th century with the birth of the Behavioral Change Consortium, BCC, through the union of 15 Projects or national health institutes of the United States of America, the Robert Wood Johnson Foundation and the American Heart Association. Some limitations of the BCC focus on its desire to promote health by means of, paradoxically, the prevention of disease and the study of only the classic lifestyles (alcohol, tobacco, physical activity and eating). However, despite those limitations, this collective has the importance of being part of the first intents to demonstrate the need to intervene in multiple health behaviors or lifestyles, to take advantage of the synergy created from this interrelation. In fact, the experts making up this consortium denounce the limited clarity in the research into the interrelationship between different behaviors related to health, despite the decades of research in this area (Ory et al., 2002). Along the same lines, the Robert Wood Johnson Foundation and the Bayer Institute for Health Care Communication of the United States of America founded in 2001 the project known as *Addressing Multiple Behavioral Risk Factors in Primary Care*, with the objective of reviewing the existence of evidence about the intervention strategies in multiple risks and developing recommendations for research, intervention and policies (Orleans, 2004).

A review of the literature shows that research concerned with multiple analyses of lifestyles are generally focused on the behaviors that put health at risk, as well as on the prevention, at secondary and tertiary level, of those patients with certain ailments or with risks of developing them, such as cardiovascular diseases or diabetes. However, research has not yet supplied enough information about multiple intervention in the population and primary and secondary prevention environment; in other words, for the population that has not yet established these risk behaviors in a permanent manner, such as is the case of the adolescent population. In addition, at this stage of development, it is particularly important not to only prevent the setting-up of constellations of multiple behaviors that put health at risk, but also those interventions aimed at promoting and maintaining the multiple behavior patterns demonstrated to protect health.

In conclusion, the research available to date now offers sufficient evidence about the prevalence of isolated lifestyles risky to health and about their associations with the demographic characteristics, including bivariable associations between lifestyle behaviors and other health-related factors. However, only an extremely modest part of this research approaches the relationships between multiple lifestyles that protect or promote health, as well the clusters of these variables and their demographic

correlations. In this sense, the need to identify how the contents of lifestyles that risk or protect health are related is obvious; likewise, the same hold true for the influence of socio-demographic and socioeconomic variables in this relationship (Atkins & Clancy, 2004; Coups et al., 2004). Thus, as has been indicated by the guest editors of the special issue of the journal *Preventive Medicine*, which was dedicated to the focus of *Multiple Health Behavior Change*, MHBC, the field of research in this environment is new and its limits are still not defined (J. J. Prochaska et al., 2008).

9.2. Methodology for empirical research.

9.2.1. Objectives and hypothesis.

The objective of this research is to learn how lifestyles are interrelated to predict health during the various phases of adolescence, bearing in mind the influence of socio-demographic and socioeconomic variables. To achieve this objective, and considering the review of previous research, several specific objectives and hypothesis are proposed.

Firstly, the hypothesis that the different variables making the main contents of the lifestyles in adolescence, influenced by socio-demographical variables such as sex, age and a combination of both, as well as by socioeconomic variables, such as the Family Affluence Scale and the occupational level of the parents is proposed. Therefore, the *first objective* of this doctoral thesis focuses on analyzing the existing relationship between these socio-demographical and socioeconomic variables and each of the variables used to analyze the lifestyles:

- Number of days per week that adolescents eat a full breakfast,
- Frequency per week of fruit consumption,
- Frequency per week of vegetable consumption,
- Frequency per week of sweets (candy or chocolate),
- Frequency per week of soft-drink consumption,
- Frequency of tooth-brushing,
- Frequency of moderate to vigorous physical activity,
- Frequency of vigorous physical activity,
- Number of hours per day that adolescents watch television (including videos and DVD's),
- Number of hours per day spent playing on the computer or a console (Playstation, Xbox, GameCube, etc.),
- Number of hours per day dedicated to using the computer for other tasks (such as chatting, surfing the internet, sending e-mails, doing homework, etc.),
- Current frequency of smoking,
- Current frequency of alcoholic consumption,
- Frequency of episodes of drunkenness,
- Frequency of cannabis consumption in the last 30 days,
- Frequency of illegal drug consumption throughout life,
- Prevalence of sexual relationships,

- Use of safe protective methods to prevent pregnancy an/or sexually transmitted disease,
- Prevalence of two or more injuries needing treatment by a doctor or nurse in the last 12 months,
- Monthly frequency of creative leisure and
- Prevalence of associative participation in creative leisure.

Secondly, as has been commented previously, although the predominant social representation of young people is very much associated with risk lifestyles, this doctoral thesis suggests the hypothesis that boys and girls following these lifestyles do not represent the majority adolescent population. Therefore, the *second objective* of this research focuses on learning about the real distribution of Spanish adolescents in the seven independent lifestyle contents studied in this research: eating habits, dental hygiene, physical activity, substance use, sexual behavior, injuries and free time.

Thirdly, the relationship with the influence of lifestyle on health—understood from a broader and integrative point of view, incorporating the current study of salutogenesis —has not yet been researched in depth. Therefore, the proposed *third objective* of this doctoral thesis is to create a global health score that bears in mind both the dysfunctional elements and the strengths that protect health, starting with self-reported indications of life satisfaction, health-related quality of life, self-reported general health and psychosomatic complaints.

Once a broad and integrative health score of Spanish adolescents has been obtained and analyzed based on the socio-demographical (sex, age and combination of both) and socioeconomic (Family Affluence Scale and occupational level of parents) variables, the *fourth objective* of this doctoral thesis focus on analyzing the prediction of each of the seven lifestyle contents (eating habits, dental hygiene, physical activity, substance use, sexual behavior, leisure time) in this global health score. This analysis will carried out using the hypothesis that lifestyles do not only affect health—understood from a negative or dysfunctional point of view—as has been studied so far, but rather they also influence biopsychosocial adjustment and health.

To conclude, in spite of the limited research that study a multivariable analysis of lifestyles, the theoretical review carried out previously suggests the need to know the correlations between the different lifestyle contents in the prediction of health during adolescence. Therefore, the *fifth objective* of this doctoral thesis is to learn the patterns or lifestyle constellations and socio-demographical and socioeconomic variables in those adolescents with the best and worst scores for physical, psychological and social wellbeing, according to the most positive and holistic definition of health. Moreover, the hypothesis is suggested that these lifestyle constellations and socio-demographical and socioeconomic variables, in the prediction of health, vary throughout adolescence; therefore this research also suggests learning about these constellations, independently, for each age groups analyzed (11-12, 13-14, 15-16 and 17-18 year olds).

9.2.2. Description of the sample.

This doctoral thesis is classified within the 2006 edition of the international study, *Health Behaviour in School-aged Children (HBSC)*. This research has been recognized as a World Health Organization collaborator study while, in Spain, it has been carried out thanks to support and financing by the Ministry of Health and Consumer Affairs.

Thus, this work has been included within a national reference project in the field of lifestyle studies and health in adolescence. Consequently, the participants in this study are a representative sample of the adolescent population in Spain. The resulting sample from this selection process was made up of a total of 21,811 participants between 11 and 18 years of age.

The same was selected with a random multi-stage sampling, stratified by conglomerates, bearing in mind—in addition to the age of the adolescents—the geographical area (region of the country), habitat (rural and urban) and type of education centre (public or private).

9.2.3. Description of the instruments.

With regards to the topic under studied in this doctoral thesis, specific items from the 2006 HBSC questionnaire were used, which are listed in order: socio-demographical and socioeconomic variables, lifestyles and indicators of physical, psychological and social health.

Firstly, the socio-demographical variable used in this doctoral thesis is shown: sex (boy and girl), age (11-12, 13-14, 15-16 and 17-18) and sex and age combination.

Next the two socioeconomic variables used in this research are shown.

- Family Affluence Scale (FAS), an index that estimates from the following four items: Number of times that the adolescents went on holiday with the family in the last 12 months, the family owning a car or van, having their own bedroom and number of computers in the family (Boyce et al., 2006; Wardle et al., 2002).
- *Standard International Classification of Occupations of the parents*, according to the degree of specialization required to perform the professional functions of the post they occupy (Standard International Classification of Occupations—ISCO—, 2004).

Secondly, to learn about the lifestyles of the Spanish adolescents, their living habits are analyzed in different areas, such as eating, physical activity or substance use. Below, each of the items included in this doctoral thesis is presented and classified by topic (Currie et al., 2008).

- *Eating habits*: days per week that the adolescents say they have more than a glass of milk or a piece of fruit for breakfast (*from 0 to 7 days a week*) and times per week that the adolescents say they eat the following foods or drinks: fruit, vegetables, sweets (candy or chocolate) and soft drinks (*never / less than once a week / once a week / 2-4 days a week / 5-6 days a week / once a day, every day / every day more than once*).
- *Dental hygiene*: frequency they brush their teeth (*more than once a day / once a day / irregularly or never*).
- *Physical activity* (Biddle et al., 1998):
 - Vigorous Physical Activity: frequency with which the adolescents carry out some physical activity in their free time that makes them end up sweating or panting, outside of the school time-table (*every day / from 4 to 6 times per week / from 2 to 3 times per week / once a week / twice a month / less than once a month / never*).
 - Moderate to Vigorous Physical Activity: number of days that the adolescents felt physically active, during a total of, at least, 60 minutes per day, in the last 7 days (*from 0 to 7 days a week*).
 - Sedentary behaviors: hours per day that the adolescents usually spend time watching television (including videos and DVDs), playing on the computer or a console (Playstation, Xbox, GameCube, etc) and using the computer to chat, surf internet, send e-mails, do homework, etc. (*none / approximately half an hour per day / approximately one hour per day / approximately 2 hours per day / approximately 3 hours per day / approximately 4 hours per day / approximately 5 hours per day / approximately 6 hours per day / approximately 7 hours or more per day*).

- *Substance use.* The HBSC study obtained the questions related to use of illegal drug using the instrument used by the European School Survey Project on Alcohol and Other Drugs - ESPAD - (Hibell et al., 2009).
 - Current frequency using tobacco (*every day / at least once a week, but not every day / less than once a week / I don't smoke*).
 - Current drinking frequency of different types of alcohol such as beer, wine, liquors, alcopops and others (*every day / every week / every month / rarely / never*).
 - Frequency of episodes of drunkenness (*never / once / 2-3 times / 4-10 times / more than once*).
 - Frequency of cannabis use in the last 30 days (*never / once or twice / from 3 to 5 times / from 6 to 9 times / from 10 to 19 times / from 20 to 39 times / 40 times or more*). This question is only asked of adolescents age 13 and older.
 - Frequency of use of other illegal drugs: designer drugs (ecstasy, pills, LSD, acid, trip), amphetamines or speed, opiates (heroin, methadone), drugs to get high, cocaine, glue or solvents and others (with the same answer options as for cannabis). This question is also specifically for adolescents age 13 and older.
- *Sexual behavior:* whether or not they have had a sexual relationship and whether or not they have used a safe method to prevent pregnancy or a sexual transmitted disease (safe method - *exclusive use of condoms or their combination with the birth-control pill* - and unsafe method - *not having used any method / not sure / birth-control pills / condoms / withdrawal / some other method*). These questions are part of the instrument used by the Youth Risk Behavior Survey - YRBS - (Brener et al., 2004; Grunbaum et al., 2002). The questions related to sexual behavior were asked adolescents age 15 years and over.
- *Injuries:* prevalence of two or more injuries requiring medical or nursing attention in the last 12 months.
- *Free time:* monthly frequency of creative free time activities (*taking part in sports, writing [stories, poems, letters that is not part of homework], drawing / painting / craftwork, photography, reading books, playing or composing music, singing in a choir, playing an instrument in a band or orchestra, singing / playing in a group [pop-rock], learning music, acting [theater / vaudeville], going to exhibits / concerts / sessions [museums, theater, music] and dancing*) and carrying out these free time activities in an organized context, in other words, within a club, organization, academy or as extra-scholar activities.

On the other hand, the indicative variables of the state of health of the adolescents are presented below.

- *Life satisfaction* measured by the "Cantril Scale" (Cantril, 1965) which consists in asking the adolescent to indicate, on a scale from 0 to 10, the value that best represents the global perception they have of their life, 0 being the lowest perception of life satisfaction and 10 the highest.
- *Related-Health Quality of Life (RHQL)*, using the Kidscreen-10 Index, which provides a global index of Related-Health Quality of Life or emotional wellbeing with 10 items that cover physical, psychological and social aspects (Ravens-Sieberer et al., 2001). These 10 items that show an Alpha Combrach of 819, refer to feeling well and fit, full of energy, sad, lonely, having enough time for themselves, doing the things that they want to in their free time, receive just treatment from their parents, having a good time with their friends, doing well in school or college and being able to pay attention /concentrate.

- *Self-reported health*, using a measure created by Idler and Benyamini (1997) made up of a single item in which the adolescents are asked how healthy they consider themselves at that moment, being able to choose from four response options according to the perceived level of health: excellent, good, fair or poor (Lundberg & Manderbacka, 1996; Manor et al., 2001).
- *Psychosomatic complaints*, measured by the HBSC - symptom checklist instrument, which measures two aspects: psychological problems (nervousness, lack of spirit, irritability and sleeping problems) and somatic manifestations (headache, stomach-ache, back pain and feeling dizzy), with an Alpha Combrach of .802 (Haugland & Wold, 2001; King et al., 1996; Ravens-Sieberer et al., 2008).

9.2.4. Description of the procedure.

- Data collection

They are three the basic conditions that the international coordination of the HBSC study indicates must be complied with during the data collection procedure. Firstly, it must be the students themselves who respond to the questionnaire; secondly, the anonymity of the answers must be strictly guaranteed and, lastly, the administration of the questionnaires must be carried out within the school context.

In those geographical areas where there was more than one official language, the surveyors presented a bi-lingual questionnaire, so that on one side, the questionnaire appeared in one language and on the other side the same questionnaire appeared in the other language. Thus, each student could freely choose the language they felt more comfortable with to complete the questionnaire.

- Data analysis

For the first objective, analyzing how the socio-demographical variables (sex, age and a combination of both) and the socioeconomic variables (Family Affluence Scale and occupational level of parents) influence the different behaviors making up the lifestyles of Spanish adolescents, several tests of statistical significance were used, specifically chi-square, Student's t-distribution and analysis of variance (ANOVA) (Tabachnick & Fidell, 2007).

In addition, in all explanation of the results in this thesis, information has been added about effect size tests. Specifically, for the crossings of two qualitative variables three effect size tests were used, depending on the characteristics of the variables. If two variables with two answer values each were to be crossed, the coefficient *phi* was used as the effect size test; if a nominal variable was crossed with another nominal or ordinal variable, whenever at least one of these had more than two answer values, the Cramer V test was used. Lastly, if two ordinal variables crossed, the Kendal Tau test was used, using the coefficient Tau-b if the two variables had the same number of answer values and the coefficient Tau-c if they had a different number of answer values.

For the second objective, which sought to learn the distribution of Spanish adolescents in the different subjects related to their lifestyles, cluster analysis were carried out (conglomerate in two phases) on those lifestyles created starting with several items, specifically, eating habits, physical activity, substance use and free time (Milligan & Hirtle, 2003).

With regards to the third objective—creating a single health score, which bears in mind both the dysfunctional elements and the strengths that protect health—first an Exploratory Factorial Analysis was carried out and later, a Confirmatory Factorial Analysis to obtain a latent variable of the measures of life satisfaction, health-related quality of life, self-reported general health and psychosomatic complaints (Hair et al., 2008). The FIT coefficients or robust adjusting goodness indexes that have been considered to evaluate the goodness of the measurement model were: χ^2 (chi-square) and χ^2/df (chi-square divided by the degrees of freedom). In addition, the following relative

adjusting indicators were calculated: RMSEA (*Root Mean Square Error of Approximation*), non-standard Bentler-Bonett Index and the incremental indexes (IFC, NFI and TLI) (Tabachnick & Fidell, 2007).

On the other hand, according to the fourth objective of this thesis, various General Lineal Models were carried out to understand the prediction of each of the lifestyles in the global and integrative health score, bearing in mind the influence of the socio-demographical and socioeconomic variables (Tabachnick & Fidell, 2007). To measure the effect size, the partial eta-squared was used in this case, as it provides the model for each principal effect and interaction effect.

To terminate, in an effort to understand the constellation of lifestyles, the sex and the socioeconomic variables in the prediction of the health of adolescents with lower and higher health scores, an AnswerTree was carried in each age group. The objective of this data analysis is to select the relevant variables in the prediction of a certain variable—in this case, the prediction of the high and low health scores (Gondar, 2002). The algorithm used in this test was the thorough CHAID (*Chi-squared Automatic Interaction Detection*) and the chi-square test, at the 0.05 level (Duda, Hart & Stork, 2001) was used as the statistical significance test used to limit the number of variables.

Chapter 10

MAIN RESULTS OF THE RESEARCH

Capítulo 10

PRINCIPALES RESULTADOS DE LA INVESTIGACIÓN

10.1. Lifestyles of Spanish adolescents.

In this results section, the classification of Spanish adolescents for each lifestyle content, depending on the socio-demographical (sex, age and combination of both) and socioeconomic (Family Affluence Scale and the occupational level of the parents) variable will be presented. Firstly, the statistical analyses will be presented for each specific lifestyle content, as well as the distribution of the sample of Spanish adolescents in these variables. Secondly, in those lifestyle contents that include more than one variable, cluster analyses will be carried out or combined variables will be created to learn the distribution of the adolescents in these subjects.

• Eating habits

- The number of days per week that adolescents have a full breakfast diminishes as the adolescent become older, especially in the case of girls. In addition, it is the adolescents with higher purchasing power who have breakfast more days per week, when compared with those of low income.
- With regards to the consumption of healthy food, almost a third of Spanish adolescents eat fruit and vegetables daily. Although eating vegetables is not related to any type of social variable, a decrease in fruit consumption is detected with age, especially in the case of girls. On the other hand, there is a clear increase in fruit consumption among those adolescents with greater purchasing power and whose parents have a more specialized occupational level.
- The consumption of unhealthy foods is somewhat less generalized, with 18% and 25.5% of Spanish adolescents having sweets and soft drinks daily, respectively. In both cases, an increase in consumption is detected with age, but the increase in eating sweets is more marked in girls, while drinking soft drinks is more evident in boys. On the other hand, socioeconomic differences are detected in the consumption of soft drinks, in which case, adolescents with a low purchasing power and whose parents held low occupational level who stated that they drank soft drinks more frequently.

- To conclude, the cluster analysis performed on the previous variables gives us four groups of adolescents. The most numerous group (48.1%) is characterized by both a low consumption of healthy foods, and having a full breakfast almost every day of the week. This is followed by the group of adolescents that frequently eat unhealthy foods, while they consume very few healthy foods (20.1%). Lastly, almost in the same proportions, are the last two groups of adolescents, which correspond to two extreme eating habits. On the one hand, the group of adolescents with the least healthy eating habits—low frequency of having breakfast with healthy and unhealthy foods (15.3%), where adolescent girls age 15 and older prevail. On the other hand, the other group of adolescents has healthier eating habits—higher frequency of having breakfast with healthy foods, and low frequency of unhealthy foods (16.5%). For the most part, this group is made up of 11-12 year-old adolescents (practically with the same proportion of boys and girls), however, the percentage of 17-18 year-old girls in comparison to boys of this age is greater in this group of adolescents.

- **Dental hygiene**

More than half of the Spanish adolescents brushed their teeth more than once a day. Tooth brushing is more frequent in girls, and even more so as of the age of 15. Among boys, the frequency of this habit diminishes at the onset of adolescence.

- **Physical activity**

- While 37% of adolescents fulfill the criteria of performing Moderate to Vigorous Physical Activity (MVPA) at least 60 minutes, 5 days a week, 60% performed some type of Vigorous Physical Activity (VPA) at least 2 or 3 days a week. In both measures of Physical Activity, boys show more frequency than girls; both cases register a decrease with age, but more markedly in girls. Likewise, both measures show higher percentages in adolescents from high income families.
- Adolescents dedicate an average of 2.37 hours per day to watching television in their free time, with this time increasing at the start of adolescence; this was especially true in the case of girls. The time dedicated to this sedentary behavior is more eye-catching in the adolescents from low income families and whose parents have a low occupational level.
- On the other hand, adolescents dedicate an average of 1.09 hours per day to playing on the computer or a game console. The time boys dedicated to this activity increases progressively with age, while, in the case of girls, the increase in this activity comes at the start of adolescence, stabilizes at about 15-16 years of age and from that point, begins to decrease. It is adolescents with high purchasing power that spend more hours per day playing on the computer or a game console.
- If the hours adolescents spend using the computer for chatting, surfing the internet, sending e-mails, doing their homework, etc. in their free time are analyzed, an average of 1.11 hours per day are registered; it is somewhat higher in the case of boys, when compared to girls. The progression with age of the hours dedicated to the computer for other uses different to those of playing, increases significantly at the start of adolescence, but it decreases again from the age of 13.
- To conclude, the cluster analysis carried out on the previous variables led to the detection of three groups of adolescents. Specifically, the most numerous group (52.5%) is characterized by low frequency of both physical activity and sedentary behaviors, and it is represented, above all, by girls. The other two groups of adolescents correspond to the two more extreme groups (the most and least healthy) and are represented above all by boys. Specifically, the group of adolescents with healthy habits with regards to physical activity (25.4%) presents

a high frequency of MVPA and VPA, as well as low sedentary behaviors. In this group, the existing low percentage of girls decreases with age. Lastly, the group with the least healthy habits presents low frequency of MVPA and VPA, as well as high frequency of sedentary behaviors (22.1%).

- **Substance use**

- In general, there is a high percentage of adolescents who do not use legal drugs; specifically, over 83% are not currently smokers, 45% do not have any type of alcoholic beverage and almost 70% have never been drunk. In all cases, an increase in consumption is observed with age, more marked and more progressive in girls, with regards to smoking; while in the case of drunkenness, the increase with age is clearer in boys, especially as of 13-14 years of age.
- The use of illegal drugs, analyzed in adolescents between 13 and 18 years of age shows that more than 85% of the adolescents have not used cannabis in the last 30 days and almost 94% have not tried other illegal drugs in their life. With both substances, use increases with age, and is more marked in boys when it comes to the use of cannabis.
- To conclude, the cluster analysis carried out on the previous variables produces four groups of adolescents. Specifically, the most numerous group (58.9%) is characterized by a low degree of substance use. It is followed by the medium group (31.5%) and, further off, the group with a high degree (7.9%) and a very high degree (1.7%). As adolescents become older, an increase in the use of substances is perceived, somewhat more marked in the case of girls.

- **Sexual behavior**

- This study shows that 66.2% of adolescents between the ages 15 to 18 have not had sexual relationships; this percentage decreases with age both in boys and girls.
- Of the total number of adolescents who have had sexual relationships (33.8%), 85.8% have used a safe protective method in their last sexual relationship (condom exclusively or condom in combination with birth-control pills).

- **Injuries**

28.3% of adolescents state that they have suffered two or more injuries in the last 12 months, this incidence being greater in the case of boys.

- **Free time**

- Adolescents spent 7.81 hours as an average of hours per month on creative recreation; in the case of girls, it was a somewhat higher index. In spite of the fact that with age, there is a clear decrease in the frequency dedicated to these activities in both (boys and girls), this decrease is greater in girls. On the other hand, a progressive increase is observed in the hours dedicated to these activities as the family income increases.
- Slightly more than half of the adolescents (59.7%) perform some of the free time activities analyzed previously within the context of an association (club, organization, academy or extra-scholar activities). A clear decrease in belonging to an association index is detected with age, above all at the start of adolescence, coinciding with the obligatory transition to secondary education, although, in the case of girls, the decrease continues until the age of 17-18.
- To conclude, the cluster analysis carried out with the two previous variables produces four groups of adolescents. The most numerous group (37.1%) is characterized by a low frequency

of creative free time activities, but with high frequency of belonging to associations. This is followed by the group of adolescents that have a low frequency of free time activities and do not belong to associations (22.7%) and, closely behind is the group with high frequency and belonging to associations (22.1%). Lastly, the less numerous group is that in which adolescents have high frequency of free time activities without belonging to associations (18.1%). In these last two groups, which share the characteristic of a high frequency of free time activities, independently of belonging to associations, the proportion of girls is greater than that of boys; while in the first two groups, whose frequency of free time activities is low, boys stand out. On the other hand, the number of adolescents in the group with high frequency and belonging to associations decreases with age; while those in the group with low frequency and belonging to associations increases with age, especially in girls.

10.2. Creation of an integrative health score in adolescence.

A global health score has been created starting with four instruments related to life satisfaction, emotional wellbeing or quality of life, perception of health and the psychosomatic complaints. Starting with the Exploratory Factorial Analysis and later the Confirmatory Factorial Analysis, the existence of a single latent health factor has been confirmed.

This global health score differs depending on the socio-demographical variables. In short, higher health scores are observed in boys, in comparison with girls. Also, this health score decreases with age, but it is especially true in the case of girls. On the other hand, it is the adolescents from families with low income who present the worst health scores.

10.3. Relationship between lifestyles and health in Spanish adolescents.

When measuring the relationship between the different contents of the lifestyles and the global health score independently, there is a clear relationship in the case of eating habits, dental hygiene, physical activity and substance use.

Firstly, it is observed that it is the adolescents with healthy eating habits (high consumption of healthy food, low consumption of unhealthy food and high frequency of breakfast per week) who show a higher health score, against that of the group of adolescents with low frequency of healthy and unhealthy food and low frequency breakfasts per week.

Secondly, those adolescents who brush their teeth more than once a day have a higher health score than those girls and boys who have never done so or only do so from time to time.

Thirdly, better health is detected in those adolescents who have a high frequency of physical activity (Moderate to Vigorous Physical Activity and Vigorous Physical Activity), independently of the frequency of sedentary occupations.

Fourthly, those adolescents with a low degree of substance use have better health than those of medium degree, and these, in turn, have better health than those of high and very high degree. However, the lifestyles related with sexual behavior, injuries and free time do not show a clear relationship with the global health score.

On the other hand, no interaction effect between the lifestyles associated with health (eating habits, dental hygiene, physical activity and consumption of substances) and the socio-demographical (sex and age) and socioeconomic (Family Affluence Scale and the occupational level of the parents) variables was seen, which shows an appreciable effect size in the relationship with the integrative health score used in this work as a dependent variable.

10.4. Lifestyles and their relationship with health in Spanish adolescents: Constellation analysis.

10.4.1. Lifestyle constellations in the prediction of health in 11-12 year-old adolescents.

The AnswerTree created for the 11-12 year-old adolescents, shows that dental hygiene and eating habits are basic variables in the prediction of the health score, with physical activity and having experienced injuries being highlighted next.

In the 11-12 year-old adolescents, there are two constellations of variables that explain a large proportion of their high health score. The first constellation includes brushing teeth more than once a day and having healthy eating habits, while the second includes brushing teeth more than once a day, moderately healthy eating habits and a high frequency of physical activity with a low index of sedentary activities.

Eating and dental hygiene behave as the two lifestyle contents that best predict the health of 11-12 year-old adolescents. Thus, when these behaviors take place with optimum criteria and frequency, the highest proportion of adolescents with high health scores (81.1%) are registered. However, should the eating not be good, they continue to have a high health score if the teeth brushing frequency is correct (more than once a day) and if there are good habits in terms of physical activity (high frequency of physical activity and low index of sedentary activities).

On the other hand, in the prediction of low health scores, four lifestyle constellations have been detected. First, there are those adolescents who brush their teeth more than once a day, but who have unhealthy eating habits (as can be appreciated, following the recommendations for dental hygiene does not, in itself, predict good health scores, except when that behavior is accompanied by others contemplated in the constellation. In other words, the predictive value of the constellations does not refer to the influence exercised by the isolated variables on the predicted variable, but rather by the combination of variables included in the constellation). Secondly, there are those who have never brushed their teeth, or who do so irregularly. The third group includes adolescents who brush their teeth once a day and have experienced multiple injuries that have required medical care. Fourthly, there are those who brush their teeth more than once a day, have moderately healthy eating habits, a low frequency of physical activity with a high index of sedentary activities and are shown to have had multiple injuries that have needed medical care in the last year.

Therefore, in the 11-12 year olds, despite the importance of good dental hygiene when configuring healthy lifestyles, should this behavior be accompanied by poor eating habits, it becomes a lifestyle that puts the health of the adolescent at risk. Likewise, the presence of multiple injuries in the 11-12 year-old adolescent is shown as a variable that polarizes a low health score.

10.4.2. Lifestyle constellations in the prediction of health in 13-14 year-old adolescents.

In the case of 13-14 year-old adolescents, the AnswerTree reveals that eating habits are the basic variable in the prediction of health, with dental hygiene, physical activity, substance use, injuries, free time, sex and the Family Affluence Scale being on a secondary plane.

In the 13-14 year-old adolescents, there are three constellations of variables that predict a large proportion of their high health scores. In all three cases, the adolescents have healthy eating habits or, on occasion, show a low consumption of healthy food (fruit and vegetables), but they are adolescents who eat a full breakfast every, or almost every day. Moreover, they are characterized as having a high frequency of physical activity with a low index of sedentary activities. Thus, adolescents from the first and third constellation, in addition to these two characteristics, brush their teeth more

than once a day; however, in the first case they are boys, while in the third case, they are girls. The specific characteristics of the second constellation are brushing their teeth once a day or less and belonging to families with high income.

In other words, eating, physical activity and dental hygiene are contents of the basic lifestyles in the prediction of good health in 13-14 year-old Spanish adolescents. However, under the same conditions, the proportion of boys with high health score is greater than that of girls. Also, in both (boys and girls), to achieve a high health score, dental hygiene does not have to occur with the optimum frequency (more than once a day) if it is compensated by a family with high income.

On the other hand, and on the other side of the coin, there are two lifestyle constellations that provide the best prediction for a low health score in the 13-14 year-old adolescents. The first is poor eating habits and a medium, high or very high degree in the substance use. Secondly, there is the group with a high consumption of unhealthy food (sweets and soft drinks) and low consumption of healthy food (fruit and vegetables), females and high index of sedentary activities with low frequency of physical activity. Therefore, the lifestyles that characterize the 13-14 year-old adolescents with low health score are poor eating and the medium, high or very high degree in the use of substances. On the other hand, and despite the fact that some of these adolescents have good eating habits, in the case of girls, the low frequency of physical activity and the high index of sedentary activities predict high indexes of a low health score.

10.4.3. Lifestyle constellations in the prediction of health, in 15-16 year-old adolescents.

The basic variable in the prediction of health produced by the AnswerTree created for the 15-16 year-old adolescent sample is sex, and in a secondary plane, substance use, sexual behavior, injuries, free time and family income.

Among 15-16 year-old adolescents, there are, once again, three constellations of variables that predict a large proportion of the high health scores. Firstly, being a boy, having a low substance use (tobacco, alcohol and illegal drugs) and belonging to a family with medium-high income. Secondly, being a boy, having a medium substance use and having a low frequency of free time activities that take place within the context of associations. Thirdly, being a girl, no use of substances, not having had sexual relationships, coming from a family with a medium/high income and carrying out free time activities in associations (independent of the frequency).

Therefore, the variables that best contribute to health in 15-16 year-old adolescents are the male sex and a low or medium level of substance use, above all when this is accompanied by a medium-high family income or when free time activities take place within associations with a low frequency. On the other hand, for girls to have a high health score, they need a larger number of requirements, such as: having low substance use, not having had sexual relationships, belonging to families with a medium or high income and attending some type of association to carry out their free time activities.

On the other hand, there are two other lifestyle constellations that, in this case, predict low health scores. Firstly, being a girl and having a high or very high degree of substance use. Secondly, being a girl, having a medium degree of substance use and having had several injuries requiring medical attention in the last 12 months.

In summary, in all the nodes, girls stand out for their poor health scores, especially when there is a high degree of substances use or when the degree of consumption decreases, but when they have suffered injuries on several occasions.

10.4.4. Lifestyle constellations in the prediction of health in 17-18 year-old adolescents.

In the case of the 17-18 year-old adolescents, the AnswerTree again shows that the basic variable in the prediction of health is the sex of the adolescent, but on a secondary plane, eating habits, dental hygiene, physical activity, substance use, sexual behavior, injuries, free time and Family Affluence Scale.

There are two constellations of variables in the 17-18 year-old adolescents, which predict a large proportion of the high health scores. Firstly, being a boy, having a high frequency of physical activity with a low index of sedentary activities and having had sexual relationships. Secondly, being a boy, having a high frequency of physical activity and having a low index of sedentary activities, not having had sexual relationships nor having suffered multiple injuries.

That is to say, in general, what best predicts the high health scores in 17-18 year olds is, once again, being male, and being physically and sexually active. However, if boys are not sexually active, they also obtain high health scores if they have not suffered multiple injuries.

On the other hand, there are three lifestyle constellations that provide the best prediction for low health score in 17-18 year-old adolescents. Firstly, there are girls with medium family income who brush their teeth once a day or less and who use drugs to a medium, high or very high degree. Secondly, there are girls with high family income but who have suffered from multiple injuries that have required medical attention several times. Lastly is the group of girls with low family income.

In summary, with the 17-18 year olds, in addition to the inequalities in health which arise due to sex, those caused by economic reasons are also important, and even more so in girls. It appears that in girls, coming from families with low income has a negative influence; although those from families with medium income also have a low health score when they have poor dental hygiene habits and when they suffer substance use (at least to a medium degree). Should the family income be high, the presence of multiple injuries is associated with a lower health score.

Chapter 11

MAIN CONCLUSIONS AND IMPLICATIONS FOR INTERVENTION AND RESEARCH

Capítulo 11

PRINCIPALES CONCLUSIONES E IMPLICACIONES PARA LA INTERVENCIÓN Y LA INVESTIGACIÓN

Having presented the main results obtained in this doctoral thesis, the most important conclusions will be summarized in this section. Considering these conclusions, the implications of this work on the field of intervention will be outlined first, followed by its implications on research.

Therefore, the main conclusions and implications for the practical intervention of this work are summarized below:

1. With regards to eating habits, it was found that, on the one hand, the most widespread unhealthy habit in the adolescent population of Spain is the low consumption of fruit and vegetables while on the other, skipping breakfast is the behavior with the most negative effect on the physical, psychological and social wellbeing of adolescents, in addition to always being accompanied by a low consumption of fruit and vegetables. Therefore, this work suggests that combination intervention programs should be designed to promote the consumption of fruit and vegetables, as well as eating a full breakfast on a regular basis.
2. In spite of the fact that more than half of the young people between the ages of 11 to 18 brush their teeth frequently enough, there is proof of the major impact that this lifestyle content has on the wellbeing of the adolescents. Therefore, it is a good idea to warn about the need to continue those policies aimed at correct dental hygiene habits, which should not stop at the end of childhood. Rather, it should continue throughout adolescence, so that this healthy habit becomes a routine, independently of parental control which may be an influence throughout childhood and the onset of adolescence.
3. One of the most eye-catching results of this work refers to the high amount of sedentary behaviors found in the Spanish adolescent population, which very clearly surpasses the experts' recommendations in this regard. Despite the fact that this work does not show a direct relationship between sedentary behaviors and the global health score, its relationship with long term health is well proven in the literature. Therefore, the need to prioritize interventions with regards to this lifestyle becomes evident, to prevent sedentary activities and

promoting other types of activities that imply greater physical activity throughout adolescence. In this sense and more specifically, this research work detects that adolescents from a low socioeconomic level who spend several hours a day watching television are a specific risk population. It is therefore recommended that a high-priority intervention against a sedentary lifestyle during adolescence, especially in the case of television, be carried out on the population from a low socioeconomic level.

4. The analysis of constellations demonstrates a strong relationship between three lifestyle contents of those between the ages of 11 to 14: eating, dental hygiene and physical activity. Therefore, according to the most recent advances in research with regards to the need to carry out multiple changes in lifestyles, this work shows that these three lifestyles could be good candidates for this new multiple-intervention focus.
5. Bearing in mind that those adolescents using substances to a medium, high and very high degree have lower health scores, as is the case of the high percentage of adolescents categorized within the group using substances to an average degree (characterized by an excessive consumption of alcohol). This doctoral thesis calls attention to the insufficient repercussion that the current legislative policies have with regards to the consumption and sales of alcohol. Remember that for the age group under study, the consumption of alcohol is illegal. Likewise, the results found in this work suggest the need to continue with intervention programs aimed at preventing alcohol and cannabis use, especially during secondary education (ESO or Enseñanza Secundaria Obligatoria), according to the developmental characteristics of the sample that this work has detected are most affected (13 to 16 year olds).
6. It has been possible to demonstrate the indirect, but important influence that free time activities carried out within the context of an organization have on wellbeing during adolescence, but most particularly on those age 15 and older. Therefore, based this work, institutions are urged to promote this type of leisure activities, whenever possible, facilitating free access to these associations and by the actual decision of the adolescents. Likewise, the relationship existent in several constellations between free time activities within the context of an association and the low use of drugs demonstrates that these two variables could also be good candidates for the design of multiple interventions in the promotion of healthy lifestyles.
7. In spite of the existence of unhealthy lifestyles in boys (specifically injuries, an inadequate frequency of teeth brushing, the consumption of soft drinks and, as of 15-16 years of age, the prevalence of drunkenness and the use of cannabis) and other unhealthy lifestyles in girls, especially in older girls (particularly, worse lifestyles with regards to physical activity, the use of tobacco, membership of associations during free time, the consumption of sweets and the lowest frequency of having breakfast), the global health score is always lower in girls. In addition, the AnswerTrees carried out in the last section of the results also demonstrate that being female is an important variable in those constellations that best predict a low health score; the intensity of this fact increases in the older age groups. Therefore, these results demonstrate the need to take into consideration two fundamental aspects in this regard: first, the prevention of unhealthy lifestyles, bearing in mind the unequal influence according to sex, and secondly, the design of programs aimed at promoting healthy development during adolescence, which are centered on the gender inequalities that become crystallized towards the end of adolescence.
8. By the same token, strong socioeconomic inequalities have been found in several lifestyle contents; for example, a lower consumption of fruit, eat breakfast less frequently, a greater consumption of soft drinks, a lower level of physical activity and more hours per day watching television in the case of adolescents from families with lower income. Likewise, analysis of the

AnswerTrees demonstrates that the low income of family is an influential variable in the prediction of the low health score, especially in older adolescents, this also being more harmful in the case of girls. The results of these analyses demonstrate the need to create policies that aid accessibility for those adolescents with more unfavorable socioeconomic conditions, with regards to the correct management of several lifestyles (specifically, eating, dental hygiene and physical activity), as a way of improving their physical, psychological and social wellbeing.

On the other hand, the main implications of this work for consideration in the field of research are explained below:

1. It has become evident that there is a need to go beyond the global analysis of sedentary behaviors to perform a detailed analysis of the relationship of each type (above all, watching television, playing with a computer or a game console and using the computer for chatting, the internet, sending e-mails, doing homework, etc.) with the level of physical activity. This is a subject that, despite its importance, has still not achieved consensus in research. On the other hand, an independent analysis of sedentary behaviors would enable us to learn about the influence of each type on the healthy development of adolescent boys and girls. Thus, we could really learn what kind of risk each type of the sedentary behaviors implies individually. This could be extremely beneficial when it come to putting together the health requirements for these behaviors which, being increasingly frequent, still do not have clear health indicators.
2. Bearing in mind that Spain is one of the European countries with the worst indicators of dental hygiene in adolescence and that this lifestyle has major repercussions on the biopsychosocial health of this population, it is notable that there are very few national studies researching this behavior in the depth it requires, not only with regards to its prevalence, but also its repercussion on healthy development, as well as the influence that other more structural and independent variables have on the will of the individual.
3. On the other hand, a matter that is important to study in depth is the implication of sexual behavior in the healthy development of adolescents. The data from this work demonstrate that sexual relationships in the youngest girls (15-16 years) seem to be a negative factor, while in the older boys (17-18 years) it is just the opposite. However, these results need more scientific support to refute and demonstrate the difference in the maturity of the sexual desire between boys and girls.
4. This work clearly demonstrated the need for research related to the detailed study of the type of injuries depending on whether these were intentional or not. Specifically, the study of the causes of these injuries could permit, not only a more detailed knowledge about this lifestyle content in Spanish adolescents, who show a particular pattern for their prevalence, but also the way in which they polarize the low health score at the onset of adolescence or the way in which this is related with the use of alcohol in 15-16 year-old adolescents.

In any case, it would be desirable that this work contributes to a more complete and diverse understanding of adolescent development in such a way that these conclusions become an inspiration to the professions in practical intervention and research.