The influence of multiple determinants on health related quality of life and mental health of a representative sample of Spanish adolescents and youths

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Abstract

The thesis is based on the Kidscreen Follow-up study. A representative sample of Spanish adolescents and youths and one of their parents were assessed twice (3 years apart) to evaluate adolescents and youths health related quality of life and mental health. The specific objectives of this thesis were to assess the effect of life events, and family and social variables (parents' mental health and home life) on three different health related outcomes: heath related quality of life, mental health, and psychosomatic complaints of adolescents and youths. The Coddington Life Events Scales were adapted into Spanish using the translation and back-translation process. Multiple linear regression and structural equation modelling were used to analyze the effect of the determinants selected. Life events and parents' mental health acted as risk factors for the outcomes selected, specially on mental health outcomes, whereas family factors like the relation with family members in home life were protective factors. Social factors inside the family should be promoted and reinforced to protect adolescents and youths from the effect of risk factors.

Resum

Aquesta tesi és part de l'estudi KIDSCREEN Follow-up. Utilitzant una mostra representativa d'adolescents i joves de l'estat espanyol, es van mesurar diferents aspectes relacionats amb la salut, avaluant la mostra dues vegades (amb una separació de 3 anys). Concretament, l'objectiu de la tesi va ser avaluar l'efecte dels aconteixements vitals i factors familiars i socials (salut mental dels pares i vida familiar) en tres resultats en salut: la qualitat de vida relacionada amb la salut, la salut mental i els problemes psicosomàtics dels adolescents i joves. Per això, es va adaptar l'escala Coddington Life Events Scales seguint la metodologia de traducció-retrotraducció. Es van utilizar models de regressió i models d'equacions estructurals per analitzar l'efecte dels determinants en salut. Els aconteixements vitals i la salut mental dels pares van ser dos factors de risc importants, especialment en la salut mental dels adolescents i joves. Per altra banda, les variables familiars com la relació dels membres de la família van actuar com a factors protectors. La cohesió dels membres de la família s'ha de promoure per tal de protegir els adolescents i joves de l'efecte de factors de risc.

Preface

The present doctoral thesis consists of the following sections: introduction, scientific papers, general discussion and overall conclusions. Moreover, a summary of the thesis and other documentation is included. The results presented here are part of the KIDSCREEN Follow-up study, which began in 2005 and was supported by Grants: FIS Exp. PIO42315 ISCIII, FEDER and AGAUR, Generalitat de Catalunya (2005SGR00491). My work has been supported by the Grants already cited and CIBER-ESP. Also, CIBER-ESP and the Ministry of Education have supported a stage at the University Medical Center Hamburg-Eppendorf in order to obtain the European Mention of the PhD. The main objective of the present thesis has been to investigate the effect of life events and other risk factors on health related outcomes of a representative sample of Spanish adolescents and youths. To achieve the main objective I have been involved in the design of the questionnaires, in the pilot test and the fieldwork of the study. I have prepared part of the protocols and participated in the statistical design of the study. I have performed part of the statistical tests using both, qualitative and quantitative methods. Qualitative methods have been used to prepare part of the study and to test the implementation of the questionnaires. Complex quantitative methods have been used to test part of the theoretical hypothesis of the thesis. Finally, I have written the four articles that form the content of the dissertation.

Contents

Summary

Background: Adolescent's and youths' health involves constant changes while growing. A developmental perspective of adolescent's and youths' health is needed to allow for intertwined influences and capture the dynamic interactions among changing contexts. These multiple influences co-occur, which implies that individuals are influenced by several determinants of health. Following this developmental model, health related outcomes need to be studied taking into account a broad framework where several determinants of health interact. We are interested in the environmental determinants of health related outcomes: life events and family factors (parents' mental problems and family relations). We are going to test the effect on health related outcomes of family, socioeconomic factors and life events (LEs) classified into typologies (desirability and related or unrelated with family context) as contextual circumstances.

Objectives: 1) to test the effect of LEs typologies on health related quality of life, mental health and psychosomatic complaints; 2) to test the effect of parents' mental health on mental health and psychosomatic complaints; 3) to test the performance of socioeconomic variables and their impact on mental health and psychosmatic complaints; 4) to test the relative contribution of each determinant of health included in the mental health and psychosomatic complaints tests using complex theoretical models; and, additionally, 5) to adapt the Coddington Life Events Scales (CLES) for measuring LEs into Spanish, assess its psychometric properties, and test differences between parents' appraisal of mental health problems and self-reports.

Methods: Participants were a representative sample of Spanish adolescents and youths and one of their parents (N = 454 in 2 assessments, 3 years apart). For the instrumental objective, Coddington Life Events scales were adapted following the translation and back-translation procedures and psychometric properties were assessed. In addition, LEs were classified depending on their desirability (desirable or undesirable) and

their relation with the family context (family or extra-family). Multiple linear regression models were constructed to evaluate the effect of life events on HRQoL assessed by KIDSCREEN questionnaires. Finally, two theoretical models were adapted and structural equation modelling was used to investigate the effects of several factors on mental health and psychosomatic complaints. It was hypothesized that mental health of adolescents and youths would be affected by: a) determinant factors such as parents' mental health and life events; b) intermediate factors like financial and social capital; and c) sociodemographic factors. All variables included in the model followed the time line (from baseline to follow-up). Differences between self and parent reports in the mental health variable were assessed. Determinants of psychosomatic complaints were hypothesized to act as follows: a) contextual factors at distal level (baseline): financial resources, home life and social support and peers and parents' mental health; b) triggering factors: life events; c) intermediate factors: same as distal level variables but measured at follow-up; d) immediate cause: mental health stability in a proximal level, combining baseline and follow-up scores; and e) gender and age. The model for mental health was tested using Maximum Likelihood with standard errors estimated using first-order derivates. The psychosomatic complaints model was tested using Unweighted Least Square Estimations with mean and variance corrections to provide robust p-values and standard errors.

Results: 1) For the adaptation of the Coddington Life Events Scales. The adapted Spanish version of the CLES was understandable and had a test-retest ICC reliability for total scores of 0.63. The ICC between children and parents was 0.42. These results are very similar to those of the original version. 2) For the HRQoL test. The strongest associations found were between undesirable events and the Psychological Well-being dimension ($\beta = -0.029$, $p < 0.008$), the School Environment dimension ($\beta = -0.031$, $p < 0.009$) and the Overall score of HRQoL ($\beta = -0.024$, $p < 0.008$) in boys; and the School Environment ($\beta = -0.024$, $p < 0.008$) and Physical Well-being ($\beta = -0.025$, $p < 0.009$) dimensions in girls. 3) For the mental health problems test.

The model to assess mental health using parental appraisal of adolescents and youths mental health had good fit (CFI: 0.94, TLI: 0.92, RMSEA: 0.046) and showed that parents' mental health affected adolescents' and youths' mental health both at baseline and follow-up. At baseline, emotional, conduct and hyperactivity problems were negatively influenced by parents' mental health ($\beta = -0.17$, $\beta = -0.14$ and $\beta = -0.25$, respectively, $p < 0.05$). At follow-up, emotional and hyperactivity problems were also negatively influenced by parents' mental health ($\beta = -0.15$ and $\beta = -0.1$, respectively, $p < 0.01$). Apart from this direct effect, parents' mental health had an effect on the outcome variable (mental health problems of adolescents and youths) mediated by home life. Undesirable events also negatively affected hyperactivity at follow-up ($\beta = 0.09$, $p < 0.05$). This effect was also mediated by home life ($\beta = -0.21$, $p = 0.05$). When the outcome variable was based on self-reports home life exerted a stronger protective effect. The difference with the parental appraisal model was that the negative effect of parents' mental health was significantly protected against by home life for emotional problems ($\beta = -0.14$, $p = 0.07$) and hyperactivity ($\beta = -0.2$, $p = 0.08$). However, the model with self-reports yielded poor fit (CFI: 0.83, TLI: 0.75, RMSEA: 0.07). 4) For the psychosomatic complaints test. Finally, the model that tests the psychosomatic complaints also had good fit (CFI: 0.95, TLI: 0.93, RMSEA: 0.04) and showed that boys had more psychosomatic complaints than girls ($\beta = -0.40$, $p < 0.05$). Only undesirable LEs showed a significant negative effect on psychosomatic complaints, though the relationship was indirect (total indirect effect -0.10 ($p < 0.05$)). Home life and mental health stability were protective factors in the presence of LEs ($\beta = 0.41$ and $\beta = -0.15$, $p < 0.05$) and mediated their relationship.

Conclusions: The final adapted version of the CLES has psychometric properties similar to the original version and it can be considered as an acceptable instrument to measure LEs in a Spanish population. HRQoL is negatively influenced by undesirable LEs. However, several undesirable LEs have to be experienced to have considerable decrements. Mental

health and psychosomatic complaints are affected by multiple interactions of determinants of health. Some of them are risk factors (parents' mental health and undesirable life events) and others act as protective factors (social relations, specially in family environment). Results in both tests show that a relatively frequent undesirable LE (eg. Decrease in family income) is enough to make subjects more prone to suffer mental health problems and psychosomatic complaints. The combining effect of several risk factors makes adolescents and youths more vulnerable. Adolescents and youths would benefit from an increased support from their family members and social relations which should be reinforced to prevent mental health problems. Future research should test in depth the combining effect of several risk factors at the same time, using Structural Equation Modelling. In addition, the assessment of the effect of socioeconimic factors in the presence of other risk factors should be further tested.

Chapter 1

INTRODUCTION

1.1 Health in early ages

Adolescents are generally viewed as healthy when they are assessed from the adult point of view. However, several studies suggest the need of further improvement in adolescents' health in numerous health related outcomes like mental health, obesity, chronic conditions, and psychosomatic complaints, among others [1, 2, 3]. Recent reports highlight the increasing incidence and prevalence of these problems and conditions. For example, 1 out of 10 adolescents suffer from a chronic illness or disability [3]. A recent systematic review has found that, in developed countries, the prevalence of obesity ranges from 8.7% to 33.2% [1]. Several studies report prevalence rates of mental health problems ranging from 8% in the Nederlands, to 47% in the United States [4] . Patel et al manifest that taking these studies together, at least one out of every four young people in the general population will suffer from at least one mental disorder in any given year [2].

What happens to children and adolescents early in their lives can have important implications for later health and well-being during adulthood [5]. Early experiences in life establish a physical, psychological, and social

foundation on which future development and adult health are based [5]. At each stage, previous health has the potential of affecting current and future status. The effects of adversities can be seen very early, as has been suggested in some studies [6], where a few months are enough to see the health effect of an undesirable life event [7, 8]. The cumulative effects of early differences in health may result in profound differences later. Moreover, considering that health at early ages can affect adult health, those above mentioned health related problems with high prevalence and incidence at early ages are of interest, and would be informative on which public health problems are going to be important for future health.

Health outcomes are determined by multiple influences, both in adults and in adolescents, reflecting complex processes. It is important to understand that healthy development is not the product of single, isolated influences or even types of influences. Although we consider that health in early ages is part of adult health, it can not be assumed that determinants of health act equally during childhood and adulthood. While many factors may be relevant to both child and adult health, a wide range of factors affect them differentially [5]. Some of them are only important determinants in early ages. In the case of early ages, it has been pointed out that warm and nurturing parenting is an important family influence, and prematurity can make an infant unresponsive to a mother's initial nurturing. Mothers may react with apathy or disinterest as a result of mental problems, which produces even more withdrawal on the part of the infant. So, all these effects are due to the influence of several factors [9]. The effect of several risk factors can increment the probability of suffering mental health problems, as has been suggested in diverse reports due to a combined effect. The lack of nurturing, the living of stress situations and poor parental mental health at the same time can increment considerably the risk of health problems in children, adolescents and youths [10].

Despite health being determined by complex processes, health related outcomes have been very often described using simple causal models in which cause and effect are immediate. The determinants of health that

involved health outcomes have been measured using these simple models where the focus has been the study of impairment, as revealed in recent revsions provided by the WHO [11]. Recently, some theoretical models have been proposed to study determinants of health in the same modelling representing real situations. One of special interest is the biopsychosocial model adapted by WHO, early in 2000, in the International classification of Functioning, Disability and Health (ICF) [11]. In the model, the scope is to understand not only the classical determinants of health (e.g.the functions and structures of the body) related with a health condition, but also external and personal factors as determinants; a novelty not developed in previous WHO classifications. Several existing models try to specify which are the determinants of health considering different aspects of daily living. That proposed by G Dahlgren and M Whitehead is one of the most often cited models that may be considered very complete and a reference for present and future studies [12]. However, the committee that presents the report Children's Health, the Nation's Wealth suggested that some models are unsuitable for use with early ages as they do not reflect the dynamic and developmental nature of children's health and are too narrow in their view of determinants or influences on health [5].

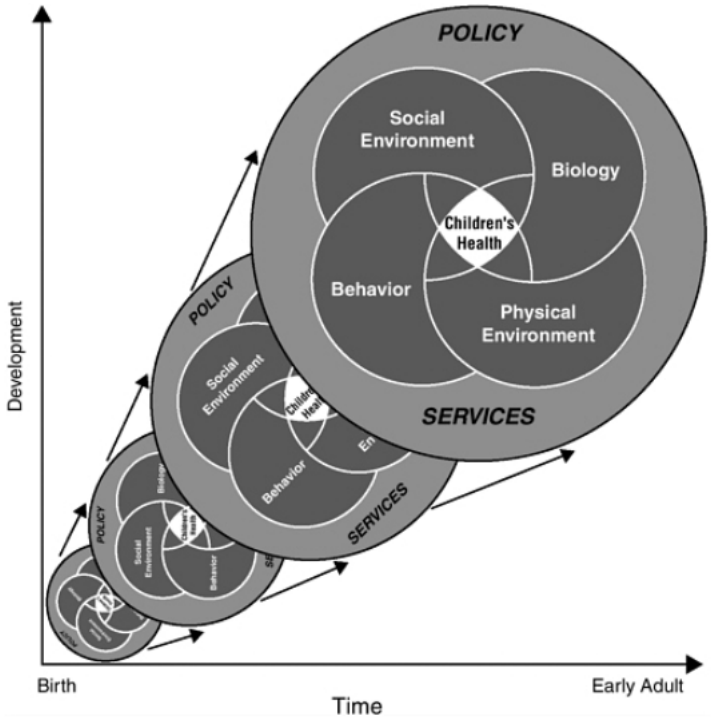
1.2 A developmental model of children's health

Historically, the definition of children's health has received little consideration. This may be because, for a long time, as pointed out before, it was not recognized that determinants of health affect children and adolescents differently from adults. The definition proposed by the Ottawa Chapter for Health Promotion [5] states that children's health is the extent to which individual children or groups of children are able or enabled to develop and realize their potential, satisfy their needs, and develop the capacities that allow them to interact successfully with their biological, physical, and social environments. This definition involves reaching a state of complete physical, mental and social well-being. The definition

suggests that factors like biological, psychological, behavioural, social, cultural, economic, and physical influences are determinants of health, that they are individually important and that they operate simultaneously and interact with one another. These multiple influences can act as risk or protective factors and can co-occur. It suggests that individuals are influenced by their families and the social networks and organizations in which they participate (e.g., child care, schools), the community of which they are part, and the society in which they live [5]. This model is a reference for the present study because it reflects the developmental perspective lacking in other models considered for adult populations. It considers function over time and changes when children are growing, and the presence and interaction of multiple determinants of health including not only behaviour, biology and social structures (policy and services), but also the social and physical environment. This concept of intertwined influences [13] also captures the dynamic interactions among these constantly changing and interacting contexts [14, 15].

The model in Figure 1 illustrates the definition of health in early ages where the effect of influences will vary based on both time and stage of development. Development is an uneven process, with periods of rapid growth and periods of relative quiescence, differing from child to child, and the interaction of various influences changes with both time and developmental stage. Particularly, at some ages, these changes are very rapid, reflecting substantial developmental change; at others they are less. All affect the child's/adolescent's present and future health into adulthood and old age. Following the proposal of the Institute of Medicine, many determinants of health have been reported to be either risky or protective for children. These factors are influences from the environment, from their own biology and behaviour that affect children's health as a result of the dynamic interaction of the effect of multiple determinants[16, 17]. At any given moment in time, adolescents are exposed to a range of risk and protective influences. To the extent that one or the other predominates, it may be possible to characterize adolescents' social or biological environments as relatively protective or risky [5].

Figure 1.1: The developmental model of children's health



The environment marks part of the opportunities the adolescent has in developing from adolescence to youth. Eccles et al suggest in the stage-environment hypotheses that children and adolescents developmental outcomes result from the match between the needs of developing youth and the opportunities afforded them by their social environments [18]. When environmental opportunities do not allow youth to address their needs, there will be a decline in interest, self-efficacy, and ultimately performance [19]. If demands exceed resources and occur when internal biological changes and social changes occur, their health can be threatened. Thus, if internal biological changes and social changes coexist, pubertal development may be moderately stressful for all youth. Hence, this is a

period where more determinants of health have an influence [20]. Excessive stressors in this age period have been associated primarily with increased rates of injury and emotional and behavioral problems, although there is also evidence of increases in acute illnesses and increased vulnerabilities [20]. On the contrary, social relationships with peers and family can buffer stressful demands during this period.

It is necessary to emphasize several aspects in the present thesis that moved a group of investigators to design the study that frames it, and prepared the articles that compose it. First, longitudinal studies focused on adolescents' and youths' health should consider the common and potentially significant bio-psychosocial transitions that characterize children's changes from childhood to the period of entry into adolescence and youth. Second, the committee that presents the report Children's Health, the Nation's Wealth specified that part of the evidence of the effect of determinants that affect health related outcomes has been drawn from randomized experiments. And few if any of the nonexperimental studies included all relevant variables in their data and analysis. Thus, the findings reported in these studies are likely to suffer from exclusion of potentially important categories of influences, so that the associations that are reported as being important may be due to their associations with a more important or equally important characteristic, or due to interactions with other types of factors and consequently their effect may be manifested primarily or only in certain groups. A related problem is that few of the cited studies include data that represent the whole population of children or adolescents. Thus, findings reported as significant may be significant only in the population studied or similar populations. The second one considers the appropriate measurement of determinants and outcomes. The committee of the Institute of medicine considers that the appropriate measurement is sometimes lacking in the literature, explaining that the study of adolescents' health should be assessed with measures specifically designed to do so. They refer to valid, reliable, culturally appropriate, sensitive to change and feasible measures. The third topic we would like to emphasise is that following the developmental model of children's and adolescents' health

we can see the importance, relevance and uniqueness of considering a non static period. We consider necessary to include a wide age range to study possible differences between children, adolescents and youths, and the study of determinants and outcomes in a follow-up study, to see the evolution. The fourth topic involves our interest in the assessment of several determinants of health but focusing on environmental factors following the theories developed by Eccles et al and Earls et al, where environmental opportunities and environmental context can mark development.

The tracking of data on children's and adolescents' health and its influences is an essential part of efforts to improve their health and the health of the adults they will become and, particularly, to know which determinants of health involve more risk immediately and in the future. Considering that effects of possible risk factors on adults and on children can be different, only with more data on early ages can researchers contribute to identify which are the vulnerable populations, and to implement strategies to help them. The present study tries to provide more evidence for the effects of determinants on outcomes assessed with adapted measures in a follow-up study based on a general population sample, and including a wide age range of participants.

1.3 Environmental determinants of health of adolescents and youths

Social determinants of health include individual resources, neighbourhood or community resources, exposures to social environment and social structures. Addressing the social determinants of health is necessary to achieve sustained improvements in health outcomes [21]. Individuals are interconnected to each other, and family and group activities can be associated with their health related outcomes. It is important to address three particular determinants of health related with environmental activities, which will be presented in the next section: life events, the relation

of children with their family members, and parents' mental health.

1.3.1 Life events

A large body of evidence suggests that one of the most important risk factors that involves several health related problems is the experience of life events (LEs). Life events refer to changes that may be stressful and require an adaptive response by the individual [22, 23, 24]. An example of an extreme event that would require significant social readjustment is the death of a parent; an example of a minor event, requiring less social readjustment, is being invited to join a social organization. In the developmental model, LEs are reflected as external and determinant circumstances from the social environment which can produce an effect on individual health. Childhood, adolescence and youth are periods of development when important life changes and transitions can be experienced and, as a consequence, they can have an effect on several conditions [6]. They can contribute to the excessive stress in the age period that has been asociated primarly with increased rates of injury and emotional and behavioral problems. Adolescents would be involved in a number of potentially stressful events such as going on the first date, or deciding to leave home, or becoming involved with drugs. These events are relatively common and some of them can be experienced more than once in a short period [22, 23, 24].

Negative life events (eg. Separation of the parents) have been more frequently associated with negative outcomes in comparison to positive life events (eg. To have the first date) and have more contribution to the excess of stress [25]. They have been more associated to disorders, the strongest association being between negative events and depression [25]. However, positive events have also been found to have an impact on health outcomes. Although the relation seems to be minor compared with undesirable life events, it has been suggested that there is an association between positive life events and health related outcomes due to the readjustment

produced by the experience of the life event [22, 23, 24].

Nevertheless, merely experiencing a life change or event does not necessarily result in a negative outcome. Although an event that is negatively perceived has a greater potential to have a negative health impact [6], this will ultimately depend on the perception of each person that suffers it, and the effect of other risk factors at the same time. Additionally, some reports explain that there are differences among population groups. Differences by age and gender have been reported, girls being more prone to be affected by life events, compared with boys [26, 27]. However, despite these results, recent studies report that gender differences tend to diminish [25, 28, 29]. Those studies reporting less gender differences conclude that girls tend to be more protected by social support and tend to not externalize symptoms than previously, which decreases gender differences [28, 29].

The experience of life events at early ages has been shown to be associated with specific health related outcomes, in particular with the onset of mental health problems, worse health related quality of life, psychosomatic complaints, poor physical functioning, higher risk of disabilities, and greater use of health services, among others [30, 31, 32, 33, 34]. This relation is strongly related with the fact that the experience of excessive stressors has an impact. Also, that different risk factors act at the same time, not only life events, and all of them contribute to the deterioration of health, negatively influencing health related outcomes. As Siegel et al suggest, when environmental circumstances do not allow youth to address their needs and interests, self-efficacy and performance will decline. When the excessive stressors suffered from the environment in this age period where stressors and, particularly life events, are common, health related outcomes show an important decline.

1.3.2 Socioeconomic environment: family and social determinants

The family relations, its nature and other family factors have an influence on health at early ages [9]. Apart from genetic influence, family environment and relationships between the family members can be a source of possible differential health outcomes. They determine the level of social support an adolescent or youth can perceive. Parental bonding can be viewed as a specific aspect of the non-shared environment [35]. Correspondingly, parenting experiences, particularly lack of care, have been found to be potentially related to a wide range of adult psychopathology, including depression, personality disorders, and substance abuse [35, 36].

The lack of nurturance, the lack of family cohesion, and the lack of financial resources all play a role in the onset and maintenance of child psychopathology [37, 38]. A number of studies have reported that some family characteristics would be related to many childhood disorders because of their contribution to excessive stress a child or adolescent experience during a period of internal biological changes. For example, families of children with depression tend to have high levels of control, conflict, and negativity, and low levels of coherence, communication, and affection [2]. Specific familiar events (eg, divorce, separation, and low family income) can also play a role in the onset and maintenance of child psychopathology because of their contribution to excessive stress during a period of internal biologic changes. Those events related to family life and those related to negative situations are more prone to involve health related problems in the near future [22, 23, 24]. Considering environmental conditions and, specifically, contextual factors like family relations a special issue for children and adolescent health, we would focus part of the research on evaluating the behavior of determinants of health related with the family. It is important for the effect it can have on the development of adolescents, but also because this context plays a different and possibly more important role for children than for adults [39]. Previous research based on adult populations can't be taken as a reference. Hence,

the effect of environmental factors related with family context and other determinants selected in the present work -including other socioeconomic factors like social support and financial resources- are going to be considered.

1.4 Health related outcomes in adolescents and youths

We are going to address several determinants of health that are part of environmental factors and their relationship with health related quality of life, mental health and psychosomatic complaints. All the outcomes are related with perceived health and mental health, have been considered crucial for children and adolescents determining the health of future adults, and reliable measures exist to measure them in general population samples. We are going to test determinants' influences on the selected health related outcomes considering unique models, and determining variables roles using path analysis, if possible. The next section introduces three of the main health related outcomes in adolescents and youths.

1.4.1 Health related quality of life

Some of the determinants of health we have mentioned have been related with perceived health [12, 21]. As Louis S. Matza et al explain, Health related quality of life (HRQoL) is subjective, and therefore, it should be assessed from the patient's perspective whenever possible. Second, HRQoL is a multidimensional construct that integrates a broad range of outcomes [39]. One definition from the adult health outcomes literature that includes both of these components describes HRQoL as an individual's subjective perception of the impact of health status, including disease and treatment, on physical, psychological, and social functioning [39, 40]. Although this general definition also applies to HRQoL of

children, the specific aspects of a child's life that comprise these three domains of functioning are different, considering all the influences a child receives during pubertal development due to internal biological changes and social changes. Thus, when studying HRQoL in early ages, it is important to ensure that the context is directly relevant to the ages of the sample.

The relationship between determinants of health and HRQoL is particularly interesting because perceived health has not been widely measured in early ages. Some questionnaires have been adapted to measure Health related quality of life in children and adolescents, but this has only been done recently [41, 42, 43]. Most of the research on the topic has been performed from clinical trials and clinical practice [44, 45] to observational studies, and health surveys in both diseased and healthy populations. The measurement of HRQoL in adolescents has perhaps taken longer to become established than in adult populations, but is nevertheless becoming increasingly relevant, and some generic and disease-specific HRQoL instruments are now available for use in early ages [46]. This measure has not been extensively explored in early ages and it seems that determinants of health can have a considerable impact in them [47]. Hence, it would be considered as an important health related outcome to be explored.

1.4.2 Mental health problems

Mental health disorders in childhood, adolescence and youth are of increasing interest. Several risk factors have been studied as associated to mental health problems at these ages. Population studies of children and adolescents have reported prevalence rates of depression in early ages ranging between 0.4% and 2.5% in children and between 0.4% and 8.3% in adolescents. Recently, it has also been reported that, among young people, one out of four in the general population will suffer from at least one mental disorder in any given year [2]. The lifetime prevalence rate of major depressive disorder (MDD) in adolescents has been estimated to range

from 15% to 20%, which is comparable with the lifetime rate of MDD found in adult populations [4, 48]. These data suggest that depression in adults often begins in adolescence [49, 50, 51].

Current evidence puts forward a large group of risk factors involved in the development of mental health problems in adolescents and youths. Specifically, factors related with social environment, behaviour, and factors like negative life events/life stress, problematic peer relationships, negative parenting behaviour and poor parental mental health, low socioeconomic level, and attention regulation difficulties, are among the variables most consistently associated with mental health problems across studies [52]. Of these, the disorder most widely tested is depression. Anxiety and behavior disorders have been also related with the factors enumerated. Depression in early ages has been studied due to the relation established between depression in mothers and their offspring, but other disorders can co-occur and several determinants of health can contribute to mental health problems and have an effect simultaneously. We would like to focus our research on the study of several risk factors that can have an impact on adolescents' and youths' mental health. There are many, and the present study has some of them available to assess their relative contribution.

1.4.3 Psychosomatic complaints

The third health related outcome selected in this study are psychosomatic complaints. A psychosomatic illness originates with emotional stress or damaging thought patterns, and progresses with physical symptoms, usually when a person's immune system is compromised due to stress. These complaints are quite common and are usually connected with internal and external stress factors [27]. Some examples of psychosomatic complaints are low back pain, headache, and stomach ache, among others. Pubertal development is a period when the immune system can be compromised due to stress. This stressful environment can be common due to the expe-

rience of life events, changes in biology and changes in the social context. The emotional stress experienced in adolescence makes psychosomatic complaints more common in early ages than other health related problems.

Psychosomatic complaints have been investigated in adolescents [53, 54, 55, 56]. Several health determinants have been related with them. However, none of the published studies include multiple factors at the same time when analyzing psychosomatic complaints as an outcome measure. Several determinants can influence psychosomatic complaints, but stress is one of the main factors [31, 57]. However, we don't know if stress is more important than other determinants of health, or which can be the protective factors that can establish a safer environment. Some theoretical proposals examine the effect of determinants of health on psychosomatic complaints [53]. However, there are no studies that assess these theoretical proposals using empirical data. Our contribution is focused on the study of situations that provoke stress and other determinants of health in the same modeling using empirical data, to evaluate the contribution of each determinant and to know which factors can be considered risky or protective for the development of psychosomatic complaints.

1.5 Complex theoretical models

Full understandings where several determinants of health and health related outcomes interrelate are needed. The developmental model suggests the interaction of different factors that affect health outcomes. Hence, studies with a number of simultaneously interacting factors are needed. Several theoretical models have been recommended in the literature to try to solve the problem of the fragmented body of knowledge. They have been developed for a number of health related outcomes. For example, there are some proposals for the assessment of mental disorders, but rather fewer proposals exist for several health related outcomes like

psychosomatic complaints. The theoretical frameworks involve investigating simultaneously the relative contributions of determinants of health considered potential risk or protective factors in order to determine which have more influence on the outcome measured and thus should be taken into consideration in intervention programs.

Theoretical models can be tested using Structural Equation Modelling (SEM). In SEM, the researcher hypothesizes how sets of variables define constructs and how these constructs are related to each other. The hypothesized model should be created based on theory and empirical research and the goal of SEM is to determine the extent to which the theoretical model is supported by sample data. Consequently, SEM tests theoretical models using the scientific method of hypotheses testing to advance our understanding of the complex relations among constructs or observed variables [58, 59]. In the present thesis, the evaluation of two theoretical models is going to be performed, to study hypotheses related with the effect of several determinants of health on mental health and psychosomatic complaints. The work will be based on previous theoretical models and the models will be tested to ascertain the relative contribution of each determinant of health on the outcomes assessed and the complex relations among them. In such models, it is important to examine the specific aspects of the family environment and whether these family characteristics are uniquely related to specific disorders. In addition, the combination of family variables, socioeconomic variables, and life events related with different contexts like family or extrafamily and negative or positive in the test of mental health problems can contribute to the literature.

Chapter 2

JUSTIFICATION

Environmental conditions are different for children than for adults. Contextual factors have been shown to have an influence on children's and adolescents' social and psychological development. Developmental outcomes result from the match between the needs of developing youth and the opportunities afforded them by their social and family environment. For example, peer rejection in childhood is associated with numerous negative outcomes like dropping out of school. In addition, children have less power than adults to make significant changes to their context. In summary, context plays a different and possibly more important role for adolescents than for adults, and adolescents' health related outcomes depend on the interaction between multiple social contexts [39]. The assessment of health related outcomes should consider contextual variables such as family relations, other social environment and multiple environmental factors. It is therefore necessary to directly examine health related outcomes among adolescents, considering that differences exist between early ages and adult samples.

To explore the effect of the environmental conditions in early ages we should consider the context in which they live. Furthermore, we should also consider certain recommendations developed by the Institute of Medicine, among others, in an attempt to improve on data that already exists. Previ-

ously, in this introduction, we have explained which topics need to be addressed. We have remarked on the need for studies assessing the general population; using appropriate measures of determinants and outcomes; including follow-up samples; and including wide age ranges in order to permit comparing the evolution of early ages; also the need to include several determinants of health in the same modelling using theoretical models. The inclusion of theoretical models gives a more real and complete perspective of the situations that adolescents experience.

Several topics remain unclear when analyzing health determinants and their impact on health outcomes, such as mental health, HRQoL or psychosomatic complaints in adolescents. In the study of HRQoL the assessment of the relation of LEs typologies in several HRQoL dimensions in early ages is a novelty, including the analysis of gender differences. This topic has not been extensively explored in early ages with this level of detail in data. Hence, it is an important novelty using representative data of the Spanish population. Moreover, the adaptation of the Coddington Life Events Scales offers a new instrument that can be used in several contexts like research, education and the clinical field. In the study of psychosomatic complaints, we perform a test using empirical data that offers information about the performance of several determinants of health on the outcome. The outcome has not been widely explored using theoretical models, nor including other determinants of health apart from stress. A similar test is performed in the study of mental health problems in adolescents. Although this health outcome has been widely explored, we offer a complex theoretical model where several outcomes are tested in a single model to consider co-morbidity and several reports are used, to test differences. It is also necessary to remark that, at the time of the reception of the project, we were not aware of any similar study in Spain. Hence, we consider the results presented an important novelty in Spain considering the representativeness of the sample and the follow-up data. Another of our contributions is to try to provide results based on the empirical test of theoretical models constituting more complete perspectives. The complex models tested with Structural Equation Modeling can help to

provide information about the differences in the performance of determinants of health in early ages, compared with adults. Also, we should test in more depth possible gender and age differences when specific determinants are studied. Some recent studies suggest that traditional gender differences are tending to change and that adolescents are more vulnerable, compared with youths. Finally, the design and analysis carried out in the present study has tried to address specific questions in the areas presented.

Chapter 3

OBJECTIVES

The general objective is to test the effect of determinants of health on several health related outcomes: HRQoL, mental health problems and psychosomatic complaints. Specifically, the thesis is composed of four scientific articles following substantive and methodological research. The specific objectives are:

- 1. To assess life events based on mutually exclusive categories (desirable vs. undesirable; family vs. extrafamily events) and to test their impact on HRQoL, mental health problems and psychosomatic complaints of adolescents and youths.
- 2. To assess mental health problems in parents and test their impact on mental health and psychosomatic complaints of adolescents and youths.
- 3. To test the effect of socioeconomic variables on mental health and psychosomatic complaints.
- 4. To test the relative contribution of each determinant of health included in the study on mental health problems and psychosomatic complaints, using the same modelling.
- 5. To test gender and age differences in the analysis of each outcome investigated.

Methodological objectives:

- 6. To adapt into Spanish the Coddington Life Events Scales to measure life events in children, adolescents and youths in a representative sample of Spanish adolescents and youths. To test its psychometric properties and to offer a research and clinical tool for future Spanish studies.
- 7. To analyze the relative contribution of the determinants of health considering different appraisals of adolescents' and youths' mental health.

Chapter 4

HYPOTHESES

The hypotheses elaborated regarding the research questions are:

- 1. Undesirable and Family events are going to have more negative relation with HRQoL, mental health and psychosomatic complaints, than desirable and extrafamily events.

- 2. Mental health problems in parents would be a risk factor for mental health and psychosomatic complaints in adolescents and youths. However, the impact is going to be bigger in their relation with mental health problems in adolescents and youths.

- 3. Socioeconomic factors are going to be protective factors for the development of mental health problems and psychosomatic complaints in the presence of risk factors.

- 4. Life events and parent's mental health are going to be risk factors for the development of mental health problems and psychosomatic complaints. The risk factors for mental health problems would be strongly associated with self-reported measures of adolescents/youths mental health compared with the same modelling using parental appraisal.

- 5. No gender differences are going to be found in tests of HRQoL, while girls are going to be more prone to suffer mental health problems and psychosomatic complaints. Adolescents are going to have more problems in the outcomes investigated compared with youths.

Chapter 5

STUDY DESIGN

The Kidscreen follow-up study was designed to follow-up the Spanish sample of the Kidscreen European project. The European Kidscreen project started in 2001 to develop the Kidscreen instrument to measure HRQoL in children and adolescents transculturally. The project had 3 phases: 1) the developmental phase of the Kidscreen project included a literature search, a Delphi study with experts, and a focus group study with children, adolescents, and their parents. A first Kidscreen instrument was developed in English and translated into four languages using internationally accepted translation guidelines. The first Kidscreen instrument was administered in a pilot study. Following this pilot study, a further item reduction process was carried out including extensive psychometric analyses resulting in a 52-item version. 2) Administration of the questionnaire in representative national samples in order to obtain reference data. 3) Implementation. The countries that were part of the European project were Austria, Czech Republic, France, Germany, Greece, Hungary, Ireland, Netherlands, Poland, Spain, Sweden, Switzerland and United Kingdom.

The target population of the Kidscreen study was children and adolescents aged 8-18 years old. A sample size of 1800 children and adolescents per country was considered necessary to detect a minimally important differ-

ence of half a standard deviation (SD) in HRQoL scores within each age strata between children with and without special health care needs or a chronic condition. A response rate of approximately 70% was expected, so the initial sample size was set to 2400 children and adolescents per country. The sample was drawn to take into account distribution of the target population by age, sex and region. Three approaches to sample selection and administration were used: 1) telephone sampling followed by a mail survey; 2) school sampling and survey administration during classtime, or school sampling followed by a mail survey and 3) multistage random sampling of communities and households followed by questionnaire self-administration at home [43].

The data of the Spanish Kidscreen sample was recruited between May and November 2003 using, in this case, telephone sampling with a Computer Assisted Telephone Interview (CATI) with random-digital-dialling (RDD). The RDD randomly generated suffix numbers for each geographical area's prefix number until the desired quota was achieved. Interviewers who had received study-specific training called the random numbers generated to identify households with children or adolescents aged 8–18 years. When such a household was identified, the interviewer asked one of the parents if they would be willing to participate together with their child. If the parent agreed to participate, the questionnaire and other study materials were mailed to the requisite address with a stamped, and addressed envelope for return of the completed questionnaire [60, 61]. Two reminders were sent in cases of non-response (after two and five weeks). In the Spanish sample, participation at baseline reached 47.2% (n=926 of 1,956 families).

Spain was the only country where the sample of the Kidscreen European project was followed-up. The principal objectives to follow up the sample were to characterize trajectories of perceived health and the use of health services among Spanish children and adolescents from a 37 months monitoring, taking into account family, social and parents' factors.

The fieldwork of the KIDSCREEN Follow-up was carried out between May and November 2006. Questionnaires were posted by mail to all adolescents and youths and their parents who had previously agreed to participate in the follow-up (n= 840 of 926 participants at baseline). A three year time period for the study was considered sufficient to reflect any substantive changes which might take place in the sample. The fieldwork followed the same methodology applied at baseline [60, 61]. Postal reminders were sent four and eight weeks after the first mailing to those who had not returned their completed questionnaires. A third reminder was sent after twenty weeks and any remaining non-respondents were contacted by phone. Finally, 454 families were re-assessed with a response rate of 54%. For the present thesis, the follow-up sample was the object of the study where the hypotheses just presented were tested.

Chapter 6

PAPERS THAT FORM THIS THESIS

Four manuscripts comprise the present thesis. All of them are related with the scope of the thesis and try to answer the main questions of the study. Since one of the factors affecting health related outcomes in adolescents and youths are LEs, one of the scopes of the study is to assess them, but as no appropriate tools in Spanish existed, the first article is the adaptation and validation of the Coddington Life Events scales into Spanish. The manuscript presents the adaptation process and the test of its psychometric properties. The second article assesses the LEs experienced by the study sample and tests the association of these experiences with Health related quality of life. Since previous literature explains different results regarding gender differences in the effect of LEs, the analysis is focused on gender differences. In addition, LEs are classified into typologies, to determine their effect on the different HRQoL dimensions. The third article evaluates the relationship of the determinants of health selected with mental health problems. The statistical testing employed in this article is more complex than the previous articles, because several factors are included in the same modelling to measure their relative contributions, but hypothesizing the relationship between them and drawing paths, to have a more real and complete perspective of the situations in which adolescents

live. One of the objectives of the present article is to assess the effect of LEs taking into account several factors simultaneously, to assess their relative contribution. The test has been done taking into account previous theoretical models and adapting them to our study design. A fourth article has been included in the thesis, where determinants of health are again the focus of the assessment and the test is in consonance with the third article just presented. In this case, LEs have been related with the onset of psychosomatic complaints adapting a previous theoretical model and including all the factors available in the study, to test the influence of risk and protective factors possibly involved in the onset of psychosomatic complaints.

Finally, it is necessary to mention that CLES are the first LEs scales for early ages adapted for use with the Spanish population and are available to be used in future studies. The results of these articles give an idea of which ages are more vulnerable to the experiences, which kind of LEs are more prevalent, which have stronger effects and how they affect the selected health related problems included in the thesis. In addition, the theoretical models proposed can illustrate how determinants of health act when other factors are also taken into account. The prevalence of important health related outcomes like mental health and psychosomatic complaints and the performance of risk and protective factors give valuable information for future studies dealing with early ages.

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Environmental risk and protective factors on adolescents' and youths' mental health. Differences between parent's appraisal and self reports.

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Authors' contributions: JMV, LR, and JA participated in the conception and design of the study. EVO, CGF, AMO, and JAP analysed the data. EVO, JMV, MF, LR and JA participated in the drafting of the article. All authors contributed to a critical revision of the manuscript and made a substantial contribution to its content, and read and approved the final manuscript.

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Abstract

Purpose: Parent's mental health plays an important role in the risk of developing mental health disorders in adolescents. We wanted to investigate the role of a number of risk/protective factors simultaneously, whether such a role varies when several variables are assessed jointly and also if the informant source modifies estimates of such role.

Methods: We studied a representative sample of 454 Spanish adolescents/youths studied longitudinally (2 assessments, 3 years apart). We considered factors possibly associated with adolescents/youths mental health and conduct, emotional and hyperactivity scores (all measured by the SDQ): risk factors (parents' mental health and life events) and mediators (social and financial support). Structural equation modelling was applied. We constructed two models: a) with parents' SDQ responses; and b) with self-reported SDQ responses (in a subsample of N= 260).

Results: Model fit was adequate for parent's appraisal. Parents' mental health ($p<0.05$), and undesirable life events ($p<0.05$) were the most important risk factors. Conversely, the same model showed poorer fit when self-reported measures were used as home life exerted a stronger protective effect on adolescents/ youths' mental health. In this case, the negative effect of parents' mental health was significantly protected by home life in emotional (-0.14 (0.07)) and hyperactivity scores (-0.2 (0.08)).

Conclusions: Even in the presence of other factors, parents' mental health has an important role. on adolescents/youths mental health. Good levels of family relations are protective against this and other risk factors, especially when adolescent/youth mental health is self-reported. Intervention programs should promote family cohesion and parents' support.

Implications and contributions: Our study is novel as it is based on a representative general population sample and uses multiple-reporter assessment to assess factors that influence adolescents' mental health. Specially, the focus on family relations based on the promotion of parents' availability, and the perception of adolescents of being supported.

Key words: adolescents' and youths' mental health, parents' mental health, undesirable life events, home life, structural equation modelling, parental appraisal/self-report.

Negative parenting behaviours have been invoked as a major mechanism affecting children's and adolescents' mental health. Conspicuously, parental mental health has been identified as the most important influence on children's disposition towards mental pathology [1;2]. But parent's mental health is just one among a large number of potential risk factors affecting adolescents/youths' mental health. Life events, peer relationships, self-esteem, body-image, pubertal status, resilience, socioeconomic status, or attention regulation have been identified as factors related to children's mental health [3;4]. However, the evidence has been gathered separately, frequently in clinical or school-based convenience samples [5-7].

Goodman and Gotlib (1999) proposed a model to integrate the way in which risk factors of adverse outcomes are transmitted from parents to their children. In their model, parent psychopathology (depression) interacts with other variables through risk mechanisms, children's vulnerabilities and protective factors. Elgar et al. [2] presented a synthetic version of this in which biological, psychological, and social capital factors mediate parental psychopathology and child adjustment. Other studies have related parental conditions, family and environmental factors with child development [8]. In others, an environmental variable such as socioeconomic level stands out as one of the main factors influencing psychosocial adjustment [9]. A number of studies have also reported differences between parent's and children's or adolescents' appraisals of adolescent/youths mental health using the same instruments [10]. Also, some studies report adolescence as a more vulnerable period, above all due to conflicts with family members and peers [11]. However, the literature emphasizes the need for more follow-up studies to understand the developmental trajectories of children and adolescents and the relationships among the variables. We also consider it necessary to measure such differences using the same modeling framework [12]. Despite some evidence, there are few reports and multiple-reporter assessment has not been used. It might be the case that interrelationships between disorder risk factors and mediators change depending on who informs about the mental state. This is not a minor issue: mental health services usually follow parental demands, and therefore access to services often depends on parental appraisal. There is still a gap to be filled about the variables that affect parent's and children's/adolescents' appraisals, and whether there are any differences at all between the two.

In this study, we developed a comprehensive model including different risk factors and mediators that might have influence on early mental health problems. The model was tested longitudinally in a community sample. In addition, we tested for differences between two appraisals of adolescents and youths.

Methods

Design & sample

The Spanish KIDSCREEN baseline sample was recruited as part of the European KIDSCREEN fieldwork [13]. The target population was children and adolescents aged 8-18 at baseline. The sample was representative in each participating country, according to census data. Telephone sampling was performed using a CATI with random-digital-dialling. Households were contacted and asked to participate by interviewers who had received study-specific training. If the family member contacted agreed to participate, the questionnaire, study materials and informed consent were mailed together with a stamped, addressed envelope for return of the completed questionnaire. The parent could be the father, mother or a tutor, depending on the choice of the family. In total, 840 families participated in Spain.

Follow-up data collection took place 3 years after baseline, in 2006, a sufficient interval to allow for substantive changes in participants' mental health status. The same methodology applied at baseline was used. Up to three reminders were sent after twenty weeks and any remaining non-respondents were contacted by phone. In total, 454 follow-up questionnaires were received. By design, 87.5% of them had paired parent/child information necessary for the analysis of the present work (N=398). Participants were slightly younger than non-participants and tended to have a higher level of education but no differences were found in response rates by gender. More details about the adequate representative of our sample is provided elsewhere [13;14]. The study was approved by an ethics committee.

Measures

Adolescents /Youth's Mental Health: This was the final outcome of the present study and it was assessed with the Strenghts and Difficulties Questionnaire (SDQ). We used the Conduct, Emotional and Hyperactivity disorder scales. The SDQ has been shown to be valid and reliable

both in the original and the adapted Spanish versions [15;16]. Continuous SDQ scores were used to indicate the degree of mental health problems. Scores ranged from 0 to 10, with higher scores indicating poorer mental health. The SDQ was answered by 100% of parents included in the sample and a subsample of adolescents/youths, including 35% of them. These two appraisals were analysed separately in the present study.

Parents' mental health status: Parent mental health was assessed using the SF-12 V2 [17], in its Spanish version, which has been reported to have good validity scores [18]. It is composed of 12 questions covering eight dimensions of health. The mental health component scores (MCS-12) were computed and standardized to T-values with a mean of 50 and a standard deviation of 10, based on US general population data. We used the continuous value of MCS.

Life events: Life events were measured using the Coddington Life Events Scales (CLES) [19]. The instrument measures the occurrence during the previous year of 53 stressful life events. The impact of the life events is measured in terms of Life Change Units (LCU). Severe, recent and repeated events imply higher scores. The CLES have been adapted into Spanish and shown to be psychometrically equivalent to the original [20]. Scores were calculated as the weighted sum of the respondent stress suffered in negative situations.

Socioeconomic status: Financial support was an indicator of financial capital of adolescents and youths [21]. We used the dimension Financial support of the KIDSCREEN-52 questionnaire[22], a measure of health related quality of life with 52 items and 10 dimensions. We selected the dimensions "Social support and peers" and "Home life" to reflect the social capital of the respondent which collects information about the following two aspects: 1) the relation with peers considering the time spent with them, satisfaction with these relationships and the level of confidence; 2) home life, considering the happiness with family relationships, family support and availability, and the perception of being loved. The items of the KIDSCREEN are scored using a Rasch one-parameter logistic model [23]. To facilitate interpretation, Rasch scores were translated into T-values using the representative sample of the European general population (The KIDSCREEN Group Europe 2006, 2008). Higher scores indicated better resources. The

Spanish version has demonstrated acceptable psychometric properties [24]. Variables with item examples are shown in Table 1.

- Table 1 about here –

Development of the model

We developed a model to test the effect of selected risk factors on the presence of specific mental scores in adolescents/youths. Four guiding principles were taken into account: 1) as previously suggested, the model should consider different roles for the variables, [25] and use socioeconomic variables as mediators [9]; 2) it should be tested on both parental appraisal and self-reports of mental health; 3) it should respect the study timeline; and 4) the co-occurrence of mental health problems should be taken into account.

We included variables available in the KIDSCREEN follow-up study, selecting risk and mediators reported in the literature as to be related with adolescents' and youths' mental health: a) factors with negative impact such as poor parents' mental health status and having experienced undesirable life events; b) socioeconomic mediators in the presence of risk factors (financial support, social support and peers and home life); c) socio-demographic variables (age).

Adolescents/youths mental health was reported both by themselves and by their parents at baseline and follow-up. Parents' mental health status was reported by parents at baseline and follow-up. Socioeconomic status was reported by adolescents/youths. Undesirable life events were reported by adolescents/youths only at follow-up.

It was hypothesized that low levels of mental health in parents would be a risk factor for levels of mental health in adolescents and youths [26;27]. Financial support was hypothesized to positively affect home life and social support and peers [2]. In addition, we considered that social support would positively affect relationships with the family [28]. It was hypothesised that age would have an effect on relationships with the family and on social support, as social relations tend to worsen in adolescence[11]. Finally, our hypothesis about the baseline situation was that family relationships would be directly related to emotional, conduct and hyperactivity problems. Previous studies have highlighted the importance of social relations as being protective in the presence of risk factors [29], and a direct effect was hypothesised.

For consistency with the data collection, all the mentioned variables were included also at a follow-up level. Life events happening between the two assessments were included in this part of the model. In the follow-up level, parents' mental health, home life and social support and peers would be related in the same way as at baseline, and that their mutual influences would also remain. Financial support was excluded from this part of the model as it remained very stable between baseline and follow-up. LEs were hypothesized to be risk factors for mental health outcomes of adolescents and youths[11;30]. Since good family relationships can protect against the possible stress due to life events [31], we hypothesised that life events would exert an effect through family relationships. Finally, we hypothesised that parent's mental health and family relationships would affect the mental health of adolescents/youths at follow-up, these being the ultimate dependent variables.

Statistical analysis

Analyses were performed in three steps: 1) A general model based on parental appraisal of adolescents' and youths' mental health (N=398). 2) A multigroup test in the same general model to assess gender differences, where the analyses were done for boys, and for girls, separately. 3) Finally, the same model was tested on SDQ self-reports (available in a subsample N=260, a loss due to sample design).

The estimator of choice was Maximum likelihood with standard errors estimated using first-order derivatives (MLF). Model fit was assessed using Comparative Fit index (CFI), Tucker-Lewis index (TLI) and Root Mean Square error (RMSEA). Conventional cut off criteria indicating good fit are CFI and TLI greater than 0.90, while RMSEA uses a typical cut-off value of less than 0.05. Analyses were performed with Mplus 5.2.

Results

The baseline questionnaire was answered by 840 pairs of adolescents/youths and their corresponding parent, of whom 454 pairs were followed-up (54% response rate), and 398 pairs had sufficient information available to be included in the present analysis. Missing values were compatible with a pattern of missing completely at random (MCAR), ($p = 0.33$), so there was no evidence indicating that results would be different if no data were missing.

Table 2 presents the characteristics of the sample at baseline and follow-up. About 52% of adolescents/youths and 76% of responding parents were female. Boys showed higher hyperactivity than girls at baseline and follow-up. At follow-up, boys and girls did not significantly differ on the mean number of undesirable LEs. KIDSCREEN scores worsened at follow-up for both boys and girls. Parents' mental health as assessed by the SF-12 MCS significantly decreased 2.8 points between baseline and follow-up.

- Table 2 about here -

Figure 1 depicts the model assessing the factors affecting the presence of mental health problems in adolescents and youths in the general model. Regarding risk factors, parents' mental health affected their children's mental health both at baseline and follow-up. At baseline, emotional, conduct and hyperactivity scores were negatively influenced by parents' mental health (β= -0.17, -0.14 and -0.25, respectively, $p<0.05$). At follow-up, emotional and hyperactivity scores were also negatively influenced by parent's mental health (β= -0.15 and β=-0.1, respectively, $p<0.01$). Undesirable events negatively affected hyperactivity at follow-up (β=0.09, $p<0.05$). In addition, they showed indirect effects through home life (β=-0.21 $p=0.05$).

Home life had a protective effect on emotional scores at baseline. There was also an effect of financial support and social support and peers on adolescents/youths' mental health. This effect passed through home life. In addition, the effect of parents' mental health also passed through home life. Increasing age was associated with worse family relations. At follow-up, hyperactivity and conduct problems were protected by family relations. There were significant correlations between SDQ scores, especially between emotional and hyperactivity scores both at baseline and follow-up.

The overall model explained 44%, 10% and 20% of the variance in hyperactivity, conduct and emotional scores, respectively. The final model showed good fit as indicated by absolute (chi-square= 116.82, df=64) and relative fit indices (RMSEA = 0.046). Incremental fit indices also showed excellent values (CFI= 0.94; TLI =0.92).

Regarding socioeconomic variables, home life was affected by financial support, social capital, parents' mental health and age ($p<0.001$). Home life had a protective effect on parent mental health at baseline, decreasing the likelihood of having an emotional disorder (β=-0.21 (0.05)). The same was found at follow-up, although the protective effect was less intense. Also, there were significant protective effects of home life on conduct (β=-0.1 (0.05)) and hyperactivity scores (β=0.09 (0.04)).

-Figure 1 around here-

The multigroup model testing gender differences yielded similar model fit and relationships between variables as the previous model. However, gender differences in hyperactivity were found, with boys being more prone to suffer from them. Gender explained more of the variance in hyperactivity scores (51%), though no other substantial difference was detected.

When using SDQ self-reported mental health in a subsample (N=260) the most important finding was that home life exerted a stronger protective effect against risk factors (protective effect for emotional (-0.14 (0.07)) and hyperactivity scores (-0.2 (0.08)). Table 3 shows a summary of the most important results of both models, for parental and for self-reported appraisal of mental health. However, model fit was much poorer (CFI: 0.83, TLI: 0.75 and RMSEA: 0.07). Using Lagrange Multiplicators to identify new paths in this model suggested relationships from home life to undesirable LEs and from social support and peers to emotional scores. These paths significantly increased model fit. Correlation between emotional and hyperactivity scores was statistically significant, at follow-up.

Table 3 about here –

Discussion

Adolescents' and youths' mental health measures are affected by complex interactions between risk and protective factors. Our study gives support to previous theoretical models indicating that parents' mental health is a major risk factor [2;3;32]. Undesirable LEs are also risk factors, but they show smaller effects than parent mental health. Our results indicate the importance of focusing on family support when trying to prevent mental health problems, given the risk associated to a poor relationship with the family members. Nevertheless, the importance of this factor varies depending on who is reporting the adolescent/youths' mental health (parental appraisal vs. self-reported): self-reported appraisals showed a strong protective factor for family support. Hence, the influence of inclusion of risk and protective factors can be different considering both respondents.

When interpreting our findings, certain limitations of the study should be taken into account. First, the response rate at follow-up was relatively low (54%), which is usually the case in postal surveys [33;34]. Despite of this fact, the sample was representative of the Spanish population [14]. Secondly, self –report measures of adolescents/youths' mental health were only available in a subsample, thus lowering statistical power and limiting the generalizability of results. Thirdly, although the SDQ is a well-established instrument, its sensitivity and positive predictive values may be low for community samples [15]. In addition, SDQ psychometric properties have been widely tested [15;35;36]. However, we don't have previous information about the internal consistency of the independent scales. Also, the SDQ had been originally developed for adolescents up to age 16, while our sample included youths aged 21. The same happens with the KIDSCREEN questionnaire. However, feasibility of the instruments application was demonstrated in the KIDSCREEN pilot study, to be sure of its appropriate functioning among older population[14]. Finally, the life events measure was not included at baseline, because of the lack of scales availability in Spanish at that time.

Conversely our study has several strengths. Results are based on a population-representative sample, and hence allow generalization of the observations. It is also less prone to selection bias. Moreover, the longitudinal design allows to assess time causality, which is not possible with cross-sectional designs [4;29]. Also, our model includes a wide array of factors

and relationships previously reported as influencing early mental health problems [4;37]. To our knowledge, no previous study has attempted to fit a similar model using a representative sample and allowing the comparison of results with multiple-reporter assessments.

Parents' mental health is a risk factor for developing the mental health problems considered here with the exception of conduct problems at follow-up. Specifically and according to our results, a decrement of 12 points in parents' mental health measured with the MCS of the SF-12 (which is equivalent to 1.33 SD) would imply an increment of emotional scores of 0.2 SD. Decreasing MCS by 25 points (2 SD) would increase adolescents'/youths' emotional scores by 0.5 SD, which is considered a clinically important difference [38]. This finding, consistent with prevous literature, is particularly important due to a high prevalence of poor mental health scores in adults [39]. In our sample, poor SF-12v2 scores were present in about more than 10% of the parentes (most of them mothers). While the effect of mothers' depression had been widely reported, there is a lack of studies measuring specific parent disorders and their effect on mental health in adolescents. Such studies would be expected to contribute identifying the disorders which have the highest influence therefore facilitating targeting patients for potential preventive interventions.

Adolescents/youths reporting severe undesirable life events or a combination of several LEs were at risk of hyperactivity scores. This association is especially true for boys, who showed higher prevalence of these scores and seem to be more affected by undesirable life events than girls [40]. This effect has been reported to be improved when parental depression and negative environmental influences take place simultaneously [30]. While the relation between life events and hyperactivity is well documented, the typologies of life events have not often been considered [30] and differential effects have not been properly assessed [41]. In our study, and in consonance with previous studies, only undesirable events had significant effects [40]. These results reinforce the necessity of protecting young ones when undesirable life events are experienced [37].

Socioeconomic factors showed positive effects in the model, indicating that mental health scores would benefit from social and financial support. In our sample, the variable having most influence on adolescents/youths' mental health was home life: it explained a considerable proportion of the variance and it was a node from which other variables acted. This suggests

that special attention should be devoted to family relations. This involves family cohesion, parents' availability, and the perception of adolescents of being supported by them, in the prevention of mental health problems in adolescents/youths.

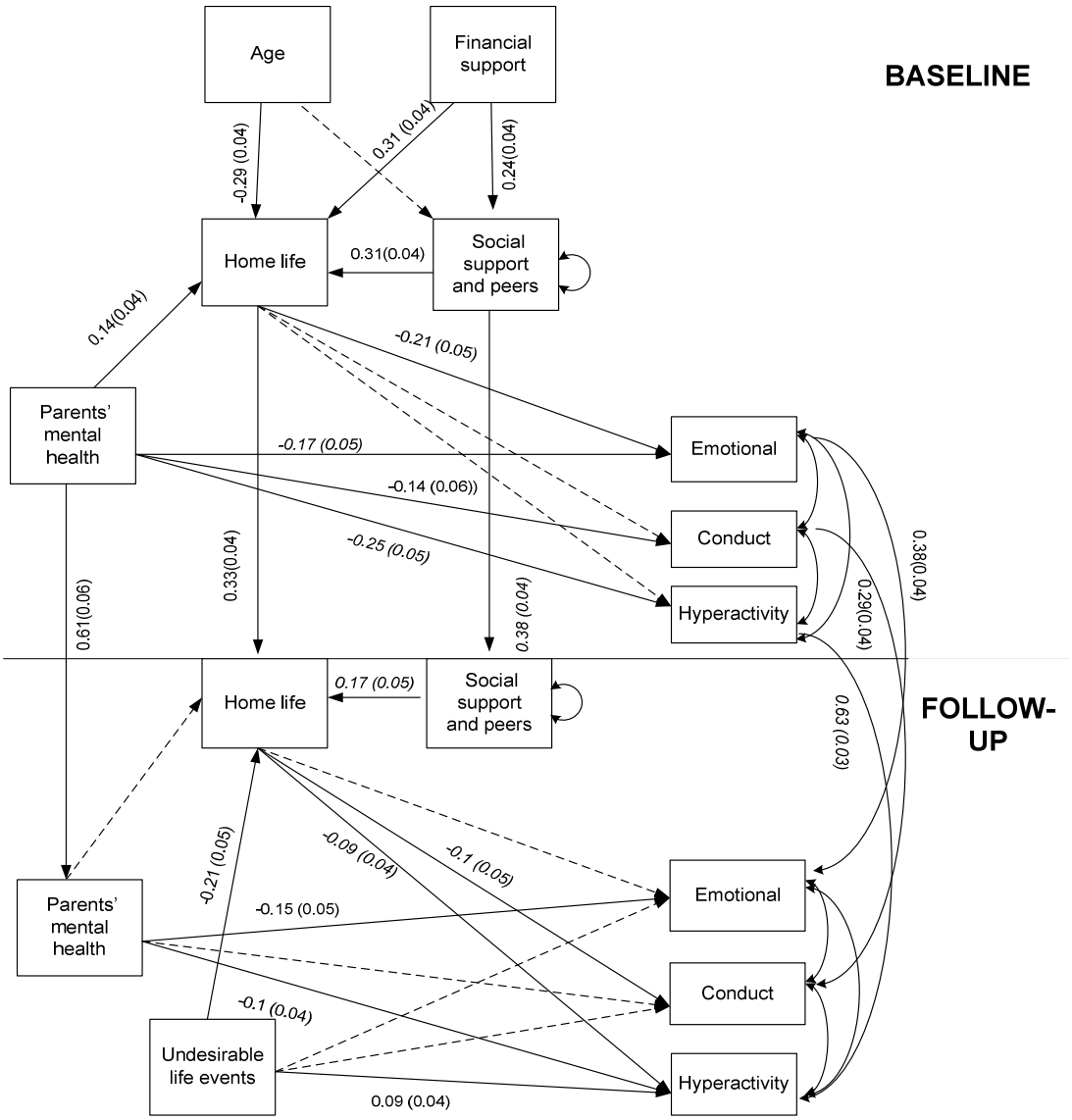
Consistently with previous reports, age was found to affect home life: as adolescents grow their family relations tend to get worse. Including a broad age range (i.e., adolescence and youth) allowed us to identify vulnerable lifetime periods previously not sufficiently studied. Previous studies have mainly focused on pubertal transition [30;42]. Our results also suggest post-adolescence as a vulnerable period. In the case of gender, the multigroup model test indicated that males were prone to presenting high hyperactivity scores [43]. Contrary to our expectations, females did not show any trend of association with any mental health problem [25;44]. Nevertheless, girls are three times less likely than boys to exhibit symptoms of attention difficulties and hyperactivity [37] and have better scores in relations with peers which have been identified as a resilience factor in girls [37]. This is also the case in our study and suggests that females are more protected against risk factors.

The main difference found depending on the informant of the adolescents/youths mental health status is the changing role of socioeconomic factors. The discrepancy among different informants is a finding itself. Previous literature suggests that parents cannot assess their children well, and they also tend to overestimate problems when their children have mental health or other health related problems [45;46]. Our results give light on respondent characteristics and suggest differences in perceptions which can be important for treatment decisions. Considering that the use of mental health services usually follows parental demands, our results suggest the importance of taking into consideration adolescents reports: a strong positive effect of home life was found in self-reported information. This finding is consistent with the suggestion that home life and family relations are most relevant in the presence of risk factors where strained relations may act as stressors [47].

In summary, our results suggest that attention should be devoted to family support in order to prevent early mental health problems. The present study highlights the importance of focusing on family relations based on the promotion of family cohesion, parents' availability, and the perception of adolescents of being loved and supported, when trying to prevent mental health problems among adolescents/youths. Both financial and social resources of the family

are important protective factors. But there still remains a need to explore in more depth the reasons why home life and peer support seem to play different roles depending on the informant of mental health status.

Figure 1. Final path model of risk factors and mediators that might affect adolescents' and youths' mental health. The Spanish KIDSCREEN follow-up study.



Note. Dashed lines represent non-significant paths. Only significant parameter estimates and their standard errors are shown. Standardized coefficients and SE are presented. Goodness of fit indexes: $\chi 2$= 116.81, df=64; CFI: 0.94 TLI: 0.92 RMSEA: 0.46.

Table 1. Variables and assessment instruments used in the Spanish KIDSCREEN follow-up study

Observed variables	Instruments	Time data collected	Recall period	Respondent	Item example
Adolescents/youths' mental health	Strengths and Difficulties Questionnaire (SDQ)	Baseline and Follow-up	Previous 6 months	Parents/proxy and adolescents/youths	-I try to be nice with other people. I care about their feelings. Conduct: lies, fights, temper, steals* Emotional: fears, worries, clingy, unhappy, somatic Hyperactivity: distractible, persistent, restless, fidgety, reflective
Parents' mental heath status	SF-12 V.2	Baseline and Follow-up	Previous week	Parents/proxy	-Have you felt downhearted and depressed?
Undesirable life events	Coddington Life Events Scales (CLES)	Follow-up retrospectively	Previous 12 months	Adolescents/youths	-Becoming involved with drugs
Financial resources	Kidscreen dimension	Baseline and Follow-up	Previous week	Adolescents/youths	Have you had enough money to do the same things as your friends?
Social support and peers	Kidscreen dimension	Baseline and Follow-up	Previous week	Adolescents/youths	-Have you and your friends helped each other?
Home life	Kidscreen dimension	Baseline and Follow-up	Previous week	Adolescents/youths	-Have your parent(s) had enough time for you?

Table 2. Baseline and follow-up characteristics of the study sample. Kidscreen follow-up study.

		Boys n = 189		Girls n = 209	
		Mean (SD) [proportion]	SE mean	Mean (SD) [proportion]	SE mean
Baseline	**Adolescents and youths**				
	Age	15.1(2.82)	0.2	15.66 (2.83)	0.2
	Conduct disorder *	2.13 (1.15)	0.81	2.21 (0.94)	0.65
	Emotional disorder *	1.38 (1.47)	0.1	1.63 (1.68)	0.11
	Hyperactivity disorder *	3.95 (2.49)	0.18	2.71 (2.1)	0.14
	Financial resources	51.13 (9.57)	0.66	51.34 (8.66)	0.63
	Social support and peers	54.53 (9.61)	0.66	54.73 (9.59)	0.69
	Home life	52.39 (8.9)	0.64	51.77 (10.39)	0.71
	Parents				
	Age	41.97 (4.69)	0.34	42.46 (4.99)	0.34
	Mother responding	[80%]	0.03	[0.76]	0.03
	SF-12 MCS score	51.78 (8.89)	0.64	53.1 (6.98)	0.43
Follow-up	**Adolescents and youths**				
	Conduct disorder	2.19 (1.04)	0.07	2.3 (0.98)	0.06
	Emotional disorder	1.64 (1.67)	0.12	1.76 (1.64)	0.11
	Hyperactivity disorder	3.53 (2.47)	0.18	2.37 (1.88)	0.13
	Undesirable life events	59.5 (86.24)	6.27	62.42 (84.38)	5.83
	Social support and peers	49.96 (8.2)	0.59	52.65 (9.13)	0.63
	Home life	49.7 (8.8)	0.64	49.93 (9.52)	0.65
	Parents				
	SF-12 MCS score	46.97 (11.08)	0.8	49.31 (9.14)	0.63

Note. * Parental appraisal is reported in all the SDQ values

Table 3. Correlations between study variables. The Spanish KIDSCREEN follow-up study.

	BASELINE							FOLLOW-UP							
	Emotion	Conduct	Hyper-activity	Home Life	Social Support	Financial Support	Parents' MH	Emotion	Conduct	Hyper-activity	Home Life	Social Support	Financial Support	Parents' MH	LCUs
BASELINE															
Conduct	0,18**	1,00													
Hyperactivity	0,27**	0,03	1,00												
Home Life	-0,25**	-0,07	-0,10	1,00											
Social Support	-0,20**	-0,03	-0,01	0,43**	1,00										
Financial Support	-0,17**	-0,09	-0,22**	0,39**	0,24**	1,00									
Parents' Mental Health	-0,22**	-0,15**	-0,26**	0,21**	0,14**	0,05	1,00								
FOLLOW-UP															
Emotional	0,41**	0,10*	0,27**	-0,23**	-0,17**	-0,18**	-0,15**	1,00							
Conduct	0,08	0,31**	0,07	-0,11*	-0,07	-0,04	-0,14**	0,15**	1,00						
Hyperactivity	0,21**	0,09	0,67**	-0,11*	0,00	-0,16**	-0,18**	0,36**	0,04	1,00					
Home Life	-0,13**	-0,07	-0,12**	0,39**	0,18**	0,22**	0,07	-0,13**	-0,13**	-0,19**	1,00				
Social Support	-0,13**	-0,03	-0,03	0,24**	0,39**	0,09	0,06	-0,19**	0,03	-0,09	0,24**	1,00			
Financial Support	-0,13**	-0,12*	-0,17*	0,35**	0,18**	0,47**	0,11*	-0,17**	-0,07	-0,21**	0,39**	0,16**	1,00		

Parents' Mental Health	-0,12*	-0,13**	-0,17**	0,17**	0,10	0,04	0,49**	-0,21**	-0,11**	-0,21**	0,06	0,07	0,11*	1,00	
Life Events	0,01	0,04	0,08	-0,09	-0,08	-0,12*	-0,02	0,09	0,05	0,16**	-0,23**	0,08	-0,16**	-0,03	1,00
Age	0,13*	-0,03	-0,10*	-0,32**	-0,08	0,00	-0,02	0,04	0,04	-0,05	-0,11*	-0,09	-0,14**	-0,05	0,06

Note. N=390; * p<0.05; ** p<0.01

Table 4. Summary of differences in the parental appraisal and self-reported models of adolescents' and youths' mental health.

		Coefficient (SE)		R2	
Baseline					
Outcome	**Variable**	**Parental report**	**Self-report**	**Parental report**	**Self-report**
Home life	Parents' mental health	0.14 (0.04)	0.14 (0.06)		
	Age	-0.29 (0.45)	-0.18 (0.07)	0.30 (0.06)	0.36 (0.04)
	Financial support	0.31 (0.04)	0.31 (0.06)		
	Social support	0.31 (0.04)	0.32 (0.06)		
Conduct disorder	Parents' mental health	-0.14 (0.06)	-0.15 (0.07)	0.05 (0.04)	0.02 (0.01)
Emotional disorder	Parents' mental health	-0.21 (0.05)	*ns	0.11 (0.05)	0.09 (0.02)
	Home life	-0.17 (0.05)	-0.34 (0.08)		
Hyperactivity disorder	Parents' mental health	-0.25 (0.05)	-0.21 (0.11)	0.06 (0.04)	0.06 (0.03)
Follow-up					
Outcome	**Variable**	**Parental report**	**Self-report**	**Parental report**	**Self-report**
Home life	Home life baseline	0.33 (0.04)	0.41 (0.07)		
	Undesirable events	-0.21 (0.05)	*ns	0.21 (0.05)	0.21 (0.03)
	Social support	0.17 (0.05)	*ns		
Emotional disorder	Emotional disorders baseline	0.38 (0.04)	0.50 (0.04)		
	Parents' mental health	-0.15 (0.05)	*ns	0.19 (0.05)	0.19 (0.03)
	Home life	*ns	-0.14 (0.07)		
Conduct disorder	Conduct disorder baseline	0.29 (0.04)	0.27 (0.08)	0.09 (0.04)	0.1 (0.03)
	Home life	-0.1 (0.05)	*ns		
Hyperactivity disorder	Hyperactivity disorder baseline	0.63 (0.03)	0.40 (0.07)		
	Parents' mental health	-0.1 (0.04)	*ns	0.26 (0.05)	0.45 (0.03)
	Undesirable LEs	0.09 (0.04)	0.21 (0.08)		
	Home life	-0.09 (0.04)	-0.20 (0.08)		

Note.*Non significant

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Chapter 7

GENERAL DISCUSSION

The study that frames this thesis is, to our knowledge, the first project in Spain to follow up a general population sample of adolescents and youths that provides new knowledge about the influence of environmental conditions on health related outcomes. Results are important, due to differences addressed between samples involving early ages and adult samples, when environmental conditions are studied. Overall, we have been able to adapt a life events scale for use with Spanish populations which has allowed us to assess the influence of life events on several health related factors. The adapted version has similar psychometric properties to the original version and can be useful in diverse areas: research, education and as a medical tool to measure stress. Part of the new knowledge is based on theoretical frameworks, which is more in consonance with complete perspectives of real situations. In them, several measures have been used to test the relative contribution of determinants of health and the paths between them on selected outcomes, in the same modelling, to contribute to the current body of knowledge. In the assessment of perceived health, the role of life events has been tested considering life events typologies and their effect on several dimensions of HRQoL. All of the tests have been assessed with the representative sample of the general population of Spain just mentioned, where combined answers of parents/tutors and adolescents/youths have been used.

Results regarding the research questions will be summarized and discussed in this part of the thesis. We are going to present them taking into account the determinants of health and their relation with health related outcomes.

7.1 Determinants of health related outcomes: life events

Regarding life events typologies tested in all the models, only undesirable LEs (neither desirable, family or extrafamily events) have had a significant and negative relation with the health related outcomes evaluated [52]. Undesirable LEs have had a strong negative relation with adolescents' and youths' hyperactivity and psychosomatic complaints. However, its effect on HRQoL has been moderate, with less impact compared with the other outcomes investigated. We expected that family events would have an important relation with negative outcomes, but this only happened when the family events were undesirable. Our results also suggested rejecting the idea on which we based our hypothesis [22, 23, 62] that all life events, positive and negative, always have an effect. This has been reproduced in both theoretical models and in the test of influences on HRQoL. Our hypothesis was constructed considering previous reports by the author of the Coddington scales, as explained in the introduction. In them, it was explained that both positive and negative LEs can require adaptation to the new situation and the expenditure of physical and emotional energy. In that work, they were considered stressors from the environment independently of the source of the stress, due to its contribution to the excessive stress experienced during adolescence and youth [22, 23, 24]. As a result, both positive and negative events have been linked to increased risk of physical and emotional problems in some studies [24]. However, our results refute this hypothesis. In contrast, a group of reports suggest that the negative effect of LEs derive primarily from their undesirability [49]. In other words, the negative impact on, for example, HRQoL of an unde-

sirable LE with a weight of 50 Life Change Units (LCUs) -the measure proposed in CLES to quantify the level of stress- will be greater than the corresponding positive effect on HRQoL of having a desirable event with the same weight. Our results are more in consonance with the latter explanations, and support them. Hence, in our study, a life event would be considered an important stressor due to its undesirability.

Experiencing one undesirable LE with a high LCU score is enough to have an important and negative impact on hyperactivity, and also to affect psychosomatic complaints. However, one undesirable LE has a moderate impact on HRQoL. At least two important LEs are necessary to have a moderate to high impact on HRQoL. In our sample, 6.5% have a LCU sum score that involves a minimal important difference (a change of at least 0.2 SD in the HRQoL variables) to consider for clinical interventions. However, several important undesirable events have to be lived to be part of a risk group. These results are slightly different compared with the theoretical models tested. The experience of one relatively frequent undesirable LE (eg. the loss of a job by the father/mother or tutor that weights 45 LCUs) can have an important impact on the outcomes assessed in the theoretical models measuring mental health and psychosomatic complaints, and 22 % of the respondents have at least an equal or higher score arising from undesirable LEs.

The way in which LEs act has been hypothesized to be somehow different in both models tested. However, the findings lead to similar conclusions. First, in the mental health model, the effects of undesirable LEs were hypothesized to go directly to mental health outcomes and indirectly to the outcomes through home life. Second, in the psychosomatic complaints model, the relation was hypothesized to be indirect, passing through home life, despite a direct effect also being assessed. The hypothesis was related with the possible full mediaton of the socioeconomic variables included in the model. Results demonstrated an important relation from undesirable LEs to the outcomes. The common finding in both models was that home life protected subjects from the stressors derived from life events

experienced. In the mental health model, both effects became significant, but with an important effect of mediators. In the psychosomatic complaints model, the direct effect become nonsignificant when intermediate variables (socioeconomic variables) were considered, demonstrating that they were acting as full mediators. Hence, our conclusion is that good internal family cohesion can be strongly protective against negative experiences. This is reproduced in both models and reinforces the earlier hypothesis of the buffering effect. As we have suggested in the papers, this strong relation should be further tested, specially to see if the buffering effect is also seen when other health related outcomes are investigated. We suggest that family cohesion should be considered in public health and in future intervention programs, to protect early ages from risk factors derived from the environment. In fact, we can't conclude there is any buffering effect from the analyses performed looking at influences of LEs on HRQoL. Although we have seen that again the undesirability is the key of the effect, in this case we have not introduced any buffering variable to look for a possible protective effect. One important variable not available in our study is resilience [63]. So, we recommend to improve our study by adding possible protective variables like resilience, or school performance, among others. In this last test, we used the KIDSCREEN dimensions as outcomes, using the full instrument. Hence, the HRQoL index was available as a summary of perceived health in adolescents and youths, and the KIDSCREEN dimensions were not included as part of mediating factors as had been done in the other tests.

7.2 Determinants of health related outcomes: family and social relations

Parents' mental health and family relations have been extensively evaluated in this study. The role of parents' mental health was tested in the two theoretical models assessed in the study. Its effect was hypothesized to be different in both. In the first model, for mental health problems, it was hypothesized to be an important risk factor while introducing other risk and

buffering variables. However, its behaviour was hypothesized to be different depending on the source of information about the adolescent/youth mental health problem (parents' appraisal or self-report), the effect being more important in the case of self-report measures. In the second model, for psychosomatic complaints, the hypothesis was that parents' mental health would be an intermediate variable acting as a possible risk factor. A direct path was hypothesized, but it's effect was hypothesized to be less important than that of the LEs.

In the model to test influences on mental health problems of adolescents and youths we found that parents' mental health affected adolescents' and youths' mental health both at baseline and follow-up. At baseline, using the general model based on parents' appraisal, emotional, conduct and hyperactivity problems were negatively influenced by parents' mental health. At follow-up, emotional and hyperactivity were also negatively influenced [64]. These relations were important, and showed that a decrement in parents' mental health scores in the SF-12 equivalent to 1 SD, would imply a decrease in adolescents' and youths' mental health of 0.2 SD. Considering the reports of the parents and tutors of our sample, almost 10% of the parents and tutors would have low levels of mental health, using the recommended cutoff score for the SF-12. This percentage is important and is in consonance with previous literature[48]. However, we can't provide information about specific disorders, which limits our findings. We can point out that 10% corresponds mostly to mothers, and involves an important percentage of the sample. This tourns the finding into a public health problem to be considered in intervention programs. The other finding we should mention is that the effect of parents' mental health was also mediated by home life. Again, family relations account for an important protective effect, which reinforces our suggestion of the necessity of considering the family variables as an important factor in intervention programs. In addition, the protective effect of home life proves to be more important when self-reported measures are considered. The differences found between the general model based on parent's appraisal and self-reports reflects respondents characteristics and suggests

differences in perceptions. We consider these findings important for treatment decisions [65] and a result to be considered in future analyses of the role of family relations. Results suggest that they are perceived to be more important for offspring than for parents. In the case of the psychosomatic complaints model, the effect of parents' mental health was almost significant. Its relative contribution was not important compared with the other variables included in the model. But it was retained in the model based on theoretical grounds. Our results are coincident with previous literature, where parents' mental health has been widely reported as a risk factor for offspring' mental health problems [36]. On the contrary, parents' mental health has been reported to be a factor that can affect psychosomatic complaints, but without being one of the most important factors. Again, we could see an important effect of socioeconomic variables (home life, social suport and financial resources), home life being the key point of the model. Importantly, the reinforcement of socioeconomic variables could act as mitigating part of the relationship between stressors and psychosomatic complaints, as long as they improve the measures that are negatively affected by undesirable LEs.

Among the determinants of health evaluated, family relations specified as home life had a different role compared with parents' mental health. In previous sections we have provided some evidence about their mediating effect, because of protecting respondents from the presence of other determinants like low levels of parents' mental health and undesirable life events. Our results suggest that the relation with parents is still the most relevant [55] where the influences of other contextual factors included in the model are concentrated and strained relations can work as stressors [55]. We have seen that home life has been strongly influenced by other socioeconomic variables included in the study. Financial support and the support from peers positively affect it. Hence, home life is the path through which other protective factors act. It means that home life also depends on the effect of other environmental variables from outside and inside the family. We have suggested that attention should be devoted to family support in order to prevent health related problems in

adolescents/youths, but we should consider that other social support from community members like peers from school and other social organizations and financial support play an important role in our results. Strong interpersonal relationships and active engagement in school can buffer stressful demands from other aspects of the environment [20]. Their role is crucial to protect early ages from the effect of the stressors the adolescents experience during the developmental period. These findings of family variables protective effects are consistent with some of the literature about child maladjustment problems. In the proposal of F. Elgar et al., the presence of parental depressive symptoms interferes with parental behaviour and is reflected in a lack of nurturance, rejection of the child, and poor monitoring. These behaviours, in turn, contribute to maladjustment and, as a consequence, to low mental health levels of the child [16]. In our results, the presence of home life problems can have the same effect. Ashiabi et al suggested, also using structural equation modelling, that parental depression has an independent effect on health, but that some of its effects pass through its association with parenting behaviours [36], which seems to be in consonance with our results.

Considering the Developmental model presented in the introduction, parental bonding is a specific aspect of the non-shared environment of children. Socioeconomic variables included in our models are part of the environmental opportunities that allow the adolescents to address their needs. Home life seems to be the most important factor, but other social relations play also a role. When these opportunities from the environment reinforce the social capital of the adolescent, he/she can be more protected from a possible decline in interest and self-efficacy. The strong interpersonal relationships help to achieve good results in outcomes despite the excess demands derived from environmental stressors. Our results support the idea that the variation of such a non-shared environment can be the source of possible different outcomes. In addition, the magnitude of the effect of this non-shared environment is even larger than other factors tested in our models. To conclude this epigraph, it is important to mention that results of the theoretical models presented in the thesis reinforce the necessity of measuring several factors together, following the

developmental model presented, and other literature focused on the effect of environmental variables in the developmental period [18, 19, 20]. The use of complex theoretical models has been crucial to provide information about the role of the determinants of health selected in our sample. Without the tests using Structural Equation Modelling [58, 59], the conclusion about the importance of socioeconomic variables in our sample would not have been possible, likewise the paths from some determinants to other determinants. As introduced earlier in the thesis, adolescents' health is determined by social environment, biological aspects, physical environment and behaviour. Despite this model being very complex and our not having measured variables related with the entire developmental context, we have tried to include variables from different environments to try to find a solution for the fragmented body of knowledge presented in the literature. Consequently, we think that the test to assess perceived health needs further improvement. As we mention in the manuscript and in the full thesis, there is a need to include buffering variables [28]. Also, the inclusion of resilience is important in these kinds of tests [63].

7.3 Age and gender effects

We have included a wide age range in our study to permit testing differences between adolescents and youths. From the tests performed, we have found important differences in the test of mental health problems. Consistently with previous reports, age was found to affect home life: as adolescents grow their family relations tend to get worse. As a result, youths in our sample seem to be more vulnerable than adolescents, specially in the case of mental health problems. However, in the other tests no differences have been found between ages. The inclusion of a broad age range (i.e. adolescence and youth) has allowed us to identify vulnerable lifetime periods not previously sufficiently studied. Previous studies have mainly focused on pubertal transition [10, 66], and we have seen that some of the literature on the topic is strongly related with the process

of pubertal development. This period, as we have seen, has been related with more vulnerability due to demands that exceed the resources available during adolescence. However, although we completely agree that adolescence is a developmental period where stressors play an important role [34], our results also suggest post-adolescence is a vulnerable period for mental health problems. This is an important result and we would encourage further investigation of these aspects in future studies, to compare results between adolescents and youths.

Regarding gender differences, we have obtained diverse results. First, gender was associated with the likelihood of suffering from a mental health problem and with psychosomatic complaints, but differences between boys and girls were not important. To be a male was significantly associated with hyperactivity [67, 68], while to be a female was not significantly associated to any of the mental health problems assessed, contrary to our expectations [17, 51, 69]. Secondly, we also expected to find differences in psychosomatic complaints, since girls have been reported to be more affected [55, 70, 71]. Nevertheless, in our sample boys were more affected. The differences were moderate, but significant. In the case of the effect of undesirable events on HRQoL no differences were found. This result was expected, after the assessment of recent literature on the topic.

These results can be explained by the nature of our sample and study design. The fact that we have made the tests with general population using a prospective design may have had an influence on age and gender results, because part of the existing literature reports studies done with clinical samples or with convenience samples. We have seen that including a wide age range in studies gives the opportunity to observe differences between adolescents and youths. The post-pubertal period can be one of greater vulnerability when some topics are studied, as we have observed. After these assessments, we also suggest that in evaluations of the general population, gender differences may be attenuated or no differences found, regarding these topics. Although study design can have an influ-

ence on our results, and the need to test these relations with representative samples is suggested, our results also evidence a tendency of changes in gender differences. On the one hand, recently it has been reported that girls are three times less likely than boys to declare symptoms [52]. It has also been suggested that the burden of demands and limitations on girls has been greater due to their role in society which in turn may have made them more vulnerable when adversities are experienced [72]. This situation may have changed. On the other hand, studies that found smaller gender differences pointed out that girls may have more sources of support [73] and experience social reinforcement by turning to friends when they have a problem. Whereas males may experience criticism for not dealing with problems independently [29]. Our observation of higher scores on the social support and peers dimension, better home life and greater mental health stability among girls supports these hypotheses [52].

This study tries to improve on previous research in adolescents and youths by including analyses made with a general population sample, providing results applicable to Spain. To our knowledge, no previous studies exist in Spain with this kind of data. We contribute to the literature with theoretical models tested with empirical data using Structural Equation Modelling, considering a developmental perspective of adolescents' health, more adaptable to real situations. The results presented are new data to compare environmental effects in early ages samples with environmental effects assessed in other studies based on adult samples. We have seen that environmental conditions have an important effect on health related outcomes, some of them being risk factors, and some of them being protective factors. Our findings suggest a complex interaction between risk and mediating effects of determinants of health that influence health related outcomes. We have also seen that adolescence and youth are periods when life events are common, reinforcing the idea of the constantly changing context in a period of development, which contributes to the stressful demands derived from biology and social context lived in this period. Common undesirable situations are sufficient to provoke a clinically important difference that leads to inclusion in a group more prone

to suffer mental health problems and psychosomatic complaints, and in HRQoL, but with less impact. We also suggest that it is the undesirability of the life events that make them important. In addition, parents' mental health has an important contribution on mental health problems in their offspring and we have seen that an important percentage of the adults of our sample have low mental health levels. We have seen that strong interpersonal relationships inside and outside the family can soften the effect of this stressful context. Additionally, the differences found in the test of the model for mental health between the general model based on parent's appraisal of mental health and self-reports provides information on respondents characteristics and suggests differences in perceptions. This finding should be considered when trying to improve family support and other resources available to families. Finally, we provide some results regarding gender and age differences. We suggest, like recent literature on the topic, that some gender differences tend to diminish, particularly in the effect of LEs on HRQoL. In the other studies, boys seem to be more affected. In the case of age differences, we suggest that youth is a vulnerable period that should be further investigated, because literature on the topic has been focused on adolescence. However, by considering a wide age range we have seen that youths seem to be more vulnerable because relations with family members tend to deteriorate in that period. These last conclusions mark some differences with part of the existing literature on the same topics. The results suggest differences with previous studies that should be tested in the future.

Chapter 8

LIMITATIONS AND STRENGTHS

8.1 Limitations

Our study has several limitations. Firstly, the response rate at follow-up was relatively low (54%), as is usually the case in postal surveys [26, 74]. Despite this fact, sample characteristics were representative of the Spanish population compared to census data in terms of age and gender [75]. In addition, individuals lost in the follow-up sample were shown to be compatible with missing at random. We therefore think our results have sufficient external validity. Secondly, regarding the instruments used, some limitations should be mentioned. First, although the Strengths and Difficulties Questionnaire (SDQ) is a well-established instrument for measuring mental health in adolescents, its sensitivity and positive predictive values may be low for community samples [76] and it has been criticised for its failure to include important disorders like depression. Also, the SDQ was originally developed for adolescents aged 16, while our sample included youths aged 21. However, feasibility of this application was demonstrated in the pilot test, and also with preliminary results of the KIDSCREEN follow-up [75]. In addition, the validity of the instrument has been widely tested and the interrater agreement

has been demonstrated to be substantially better than the average level of agreement reported for other measures [76]. The CLES questionnaire was used to collect LEs which had occurred up to 3 years before the assessment date, and not only 1 year before. We evaluated the feasibility of using it in this way in the pilot test and showed understandability and acceptability [75]. The SF-12 to test parents' mental health has been criticised for not measuring specific disorders. However, there are several studies that compare the instrument with diagnostic measures [77] and we are thus convinced of its validity and the results reported in the present study.

8.2 Strengths

Our study has several strengths. Our results are based on a general population sample, and hence allows more generalizable observations while being less prone to selection bias. Moreover, the longitudinal design of the study is more adequate for identifying a possible causal relation of baseline factors and follow-up outcomes, something not possible in cross-sectional studies [9, 36]. To our knowledge, no similar study has previously been conducted in Spain using a representative sample of adolescents and youths.

In addition, it is worth mentioning that our study gathers information from two members of the same family (father/mother/tutor and the adolescent or youth). Without the information of both respondents, investigating the relationship between variables from parents and variables from adolescents and youths would have not been possible. Also, there has been relatively little research into the effects of different LEs typologies, with most studies focussing on relationships outside of the family [6]. Using the CLES permitted drawing conclusions about the negative role of undesirable LEs compared with desirable, family and extra-family events. Finally, most of the factors previously reported to influence the health related factors investigated have been included in the theoretical models

tested [9, 52]. Even though we did not use a conceptual comorbidity model to assess mental health in adolescents and youths, we constructed the model including three mental health outcomes simultaneously thus taking into account the possibility that the outcomes may co-occur.

Chapter 9

FUTURE RESEARCH

Considering all this new knowledge we would like to remark that future research needs to be focused on theoretical models where several determinants of health are related with health outcomes. We have included only some of them, though several determinants should be included to test their relative contributions. Determinants such as social competence, resilience, children's school satisfaction, personality and coping styles were not included in our study, and could have had an effect on the results [53, 78]. In addition, the inclusion of specific mental health disorders would enrich the results of our study related with mental health and could provide information about differences among disorders. Also, the effect of biological factors was lacking in our study. The inclusion of environmental factors from different scopes in the same modelling would provide a more complete framework. Our results should be taken into consideration in intervention programs to try to reinforce those determinants that have a protective effect, such as the role of family relations. But more research is needed to confirm our results. Other possible protective factors should be included, and it would be useful to test if the protective effects we have reported are reproduced with other health related outcomes. Future research should also include wide age ranges measured in general population samples. We suggest that the post pubertal period is a vulnerable time, even more important than adolescence when mental

health problems are studied. Consequently, more studies with wide age ranges are necessary to further test this result. We also suggest to further investigate gender differences to test the effect of undesirable life events, since we have concluded that girls seem to be more protected than boys. In addition, it would be interesting to reproduce the test of the mental health model using specific parental mental health disorders and testing adolescents psychiatric diagnoses. We suggest that the Coddington life events scale in Spanish should be further tested in larger samples in order to provide more information regarding its psychometric properties. Finally, it's necessary to point out that future follow-up samples should try to have more than two assessments, and include larger samples. Also, the attrition problem using general population samples should be tackled, in order to minimise losses at follow-up.

Chapter 10

CONCLUSIONS

- Undesirable events are risk factors to develop mental health problems and psychosomatic complaints in adolescents and youths. In addition, life events are also risk factors for a diminished HRQoL, but with less impact compared with the other health related outcomes investigated. In the case of mental health and psychosomatic complaints, one common undesirable LE is enough to produce a moderate decrease, whereas two severe undesirable LEs need to be experienced to produce a moderate decrease in HRQoL. In addition, desirable, family and extrafamily events are not significantly associated with the health related outcomes evaluated.

- Parents' mental health is an important risk factor for development of mental health problems in adolescents and youths. The magnitude and direction of the relation of both variables change depending on the source of information of the adolescents/youths mental health. Nevertheless, parents' mental health is a risk factor in both appraisals. Almost 10% of the parents have low levels of mental health, which increases the risk of their offspring of having mental health problems.

- Good relations in home life constitute good protection against the effects of low levels of parents' mental health. This effect is deemed

important when self-report measures of adolescents/youths mental health problems are considered. Home life is also a key variable to protect adolescents and youths from the effects of undesirable life events. In addition, home life is highly influenced by other social and economic resources.

- Socioeconomic variables (home life, social support and peers and financial resources) act as strong protective variables in the models tested on the health related factors evaluated.

- Socioeconomic variables, especially home life, should be improved in order to prevent adolescents and youths mental health problems and psychosomatic complaints. Attention should be devoted to family relations because they seem to be the key to the protective effect of the socioeconomic variables.

- Gender is associated with the likelihood of suffering from mental health problems and with psychosomatic complaints, males being more prone to suffer this than girls. Nevertheless, there are no gender differences in the relation of undesirable events on HRQoL. Results suggest a changing trend in gender differences compared with previous studies.

- Post puberty seems to be a more vulnerable period compared with puberty itself for mental health in youths. One reason is that family relations tend to be worse than during adolescence, which reinforces the vulnerability of this population group.

- Children's, adolescents' and youths' health should be seen as the result of the multiple interactions of several factors that can be risky or protective. For a full understanding of the relation between factors and the outcomes evaluated, the relationships should be tested in more depth.

Chapter 11

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Chapter 12

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Ester Villalonga Olives is a Sociologist and studied her degree at the Universitat de Barcelona (Spain) (98-02) and at the Università degli Studi di Trieste (Italy) (00-01). During these studies she started to work at the Department of Sociology and Analysis of Organizations at the Universitat de Barcelona. She started her PhD related with Health Sciences and, thanks to a scholarship, she went to the London School of Economics (UK) to prepare her All But Dissertation (03), where she worked as visiting researcher in the Health and Social Care Department. During the first years of PhD research, she spent some time in India and Cuba working in hospitals and NGOs (03-04).

She has worked at the Health Services Research Unit, IMIM-Parc de la Salut Mar, during 5 years, in which she is still collaborating. She has worked in depth in social epidemiology studying the PhD program on Biomedical research at the Universitat Pompeu Fabra, doing a Postgraduate course in Statistical Methods and Design at the Universitat Autònoma de Barcelona (05-06) and studying the European Educational Programme in Epidemiology of Florence (Italy) (06). During her work at IMIM-Parc de la Salut Mar she has worked in infant health, health related quality of life, stress measures, structural equation modelling and mental health. She has prepared her dissertation with European Mention due to a stage

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She is currently working at the Fundació Mateu Orfila of the Balearic Islands as well as at the Public Health Agency of Barcelona, where she is working on health inequalities. She is currently involved in preparing the Atlas of Health Inequalities of the Balearic Islands. She is the Vicepresident of the group European Young Epidemiologists, Secretary of the Society of Public Health from Catalonia and Balearic Islands, and a member of the International Epidemiology Association board. She has collaborated with the Universitat de Barcelona doing research lectures and has been a CatSalut consultant.