

REPORT

on the project

GENDER DIFFERENCES IN SMOKING IN YOUNG PEOPLE

by

the Flemish Institute for Health Promotion, Brussels, Belgium

in collaboration with:

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FOREWORD

Despite interventions and actions, the number of smoking adolescents, especially girls, has continued to rise in many European countries (HBSC-study) during the last decade. In some countries more adolescent girls than boys are smoking. These increasing rates among young

girls will reinforce the already clear trends of higher premature death rates among women, higher risks for coronary heart diseases and lung cancer.

It is well a documented fact that a whole range of factors on different levels, influence the smoking behaviour of a population. Until now there is no single theory that explains smoking behaviour and only a few authors have tried to explain the differential trends in smoking among men and women. The actual smoking prevention interventions and actions do not show an important differentiation for gender, in contrast to the advertisements by the tobacco industry. Maybe the messages of the actual prevention campaigns are not relevant for young girls or maybe the girls are not sensitive to the way the messages are presented. The research literature of the last decades offers little inspiration for new gender specific campaigns or actions. Explanatory models for smoking behaviour concentrate traditionally on either psycho-social determinants as knowledge, beliefs, traits, skills and peer influences or on structural factors such as social deprivation, emancipation etc. Within both research traditions only during the last decades attention has been given to possible gender differences in the variables used. Until now only few gender differences have been found. The question arises: are there indeed no gender differences or could it be that we did not ask the right questions to detect real gender differences?

The few studies focusing explicitly on women and smoking showed that there is a clear class difference among smoking and non-smoking women and revealed that for young women smoking has clear functions such as coping with daily routines. However these studies did not explain why young girls of the age 12-14 years start smoking. Only a few recent studies focus on smoking initiation, smoking maintenance or remaining a non-smoker among young girls.

More research is needed to better understand the smoking behaviour of girls in order to help the development of new preventive initiatives.

This reports is a first step in better understanding this important public health problem. It reviews the relevant literature and uses part of the large European database of the HBSC-study to explore cross national gender differences in smoking among young people. The qualitative study that has been initiated in five European countries is remarkable. To my knowledge not many cross cultural qualitative studies on life styles of young people have been reported.

The report contains important messages and gives clues for future actions for all those involved in working for and with adolescents in Europe.

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With regard to the quantitative study of this project we would like to thank the researchers of the HBSC study. HBSC is a WHO/EURO collaborative study. The International Co-ordinator of the 1997-1998 survey was Candace Currie, University of Edinburgh; Data Bank Manager: Bente Wold and Oddrun Samdal, university of Bergen.

This publication on the 1997-1998 survey reports on data from the following countries: Austria - Wolfgang Dür, Belgium (Flanders) - Lea Maes, Poland - Barbara Woynarowsky, Portugal - Margarida Gaspar De Matos, Scotland – Candace Currie – Sweden – Ulla Marklund.

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EXECUTIVE SUMMARY

Introduction

The project built on data showing an increase in the smoking prevalence among adolescents, especially among girls and revealing gender differences, and on recommendations calling for research into gender differences, explaining the differential trends in smoking.

The major aim of the project was to examine gender differences in smoking in young people. This aim was made specific by the following intermediate objectives:

- To review the literature on gender differences in smoking in young people to determine whether and which gender specific variables had already been found and thus were already known.
- To use the HBSC (Health Behaviour in School-Aged Children)-database for a cross cultural analysis into gender differences in smoking to determine whether and which gender differences could be found between the following countries: Austria, Belgium-Flanders, Portugal, Scotland-UK, Sweden and Poland *.
- To develop and use a protocol to investigate in-depth and gain insight in the meaning and functions of smoking for boys and girls in the five participating countries (Austria, Belgium-Flanders, Portugal, Scotland-UK and Sweden).
- To write a report with conclusions and recommendations for the development and implementation of future gender-specific smoking prevention and smoking cessation programmes and research for young people.

* The project was carried out in five EU countries: Austria, Belgium-Flanders, Portugal, Scotland-UK and Sweden. In the quantitative study Poland (a non-EU country) was included, because it was useful and interesting to complete and compare the dataset of the five EU countries with a country where still more boys than girls were smoking.

Method

To realise the specific objectives and the overall aim three different and complementary studies were undertaken.

- A review of the existing literature on gender differences in smoking.
- An analysis of the existing data of the HBSC-database: a cross-cultural analysis for six countries (Austria, Belgium-Flanders, Portugal, Scotland-UK, Sweden and Poland) into gender differences in smoking.
- Qualitative research in the five countries in addition to the previous research: development and application of a protocol to investigate the problem more in-depth and gain insight in the meaning and functions of smoking for boys and girls by means of the focus group method with adolescents in the five participating countries (Austria, Belgium-Flanders, Portugal, Scotland-UK and Sweden)

The three research parts were presented to and discussed among the project partners during three meetings. The meetings involved all the project partners, especially the national co-ordinators and national researchers and focussed on the presentation and discussion of the methodology and conclusions of the different studies and the formulation of overall conclusions and recommendations. A steering group supervised the project and discussed and decided on the outlines and the progress of the project.

The three research parts and their conclusions are described in this report, together with the overall conclusions and recommendations.

Conclusions

Conclusions with regard to the literature study

The large body of research on the determinants of smoking in women and adolescents reveals that smoking is the result of a complex mix of influences, including factors in the social and physical environment, personality, individual skills, social cognitive and biological factors, which are both directly and indirectly tied to tobacco use.

Looking at these factors from the point of view of gender differences, the review indicates that for the majority of them the research evidence remains unclear or shows a considerable degree of inconsistency. This is the case for factors in the broader social and physical environment, such as socio-economic status, accessibility of tobacco products and advertising; for aspects of the immediate environment, including parental supervision, parental smoking, sibling smoking, peer smoking and peer pressure or combinations of these factors; and personality traits including neuroticism, self control, risk taking, religiousness, depression and anxiety; refusal and coping skills; and behaviours such as previous experimentation with tobacco, school commitment and physical activity. It also applies to a variety of perceived benefits of smoking, including beliefs about mood control and positive image of smoking, perceived norms and perceived control, and to the biological factors of nicotine metabolism and hormone levels. For all these factors, the empirical evidence is insufficiently strong or consistent to conclude that there is a proven differential effect for young men and women on smoking or smoking initiation.

For a number of factors, which are related to smoking, however, gender differences are sufficiently and consistently supported by the research evidence. With regard to the broader social and physical environment, the pricing of tobacco products as well as clear indoor laws appear to affect men more strongly than women. On the micro level environment, peer support and approval increases the likelihood of smoking in girls more than in boys. In terms of personality, rebelliousness, sociability

and self esteem are more related to smoking in girls than in boys. With regard to perceived benefits of smoking, the literature suggests that beliefs about health effects and about effects on body weight have more impact on girls' smoking, whereas beliefs about enhancing social contacts is more prominent as a determinant of smoking in boys.

Finally, for a number of factors that have been identified as determinants of smoking in general, gender differences are clearly not supported by the literature. This is the case for parental hostility, family conflict and parental attachment as factors in the family environment, as well as for a number of personality traits, notably external locus of control, intelligence, coping style, and susceptibility to smoking.

Conclusions with regard to the analysis of the HBSC database

Smoking among adolescents is increasing in all countries despite growing knowledge about its adverse effects and various health campaigns. Female smoking rates in particular are increasing, although the number of boy smokers is stagnating (except in Poland). On the other hand different cigarette consumption patterns were observed for girls and boys in the countries included in this study. The study aimed to further explore gender differences in smoking.

The analyses showed various independent relationships with smoking for both genders on a cross-national basis. The amount of pocket money, truancy, drunkenness and the number of evenings spent with friends were related to smoking for both boys and girls. It seems that tobacco use in adolescents is related to other risk behaviour and alienation from school. Strong bonding with friends also seems to be important.

For boys only, being tired in the morning was independently related to smoking in all countries. This may be related to the number of evenings boy smokers are spending with friends, which is higher for them than for non-smokers.

For girls only, two variables were in most countries independently related to smoking, namely academic achievement and feeling unhealthy. For girls, being a low academic achiever seems to be an extra risk factor. Maybe girls use smoking to handle the stress and tension they experience at school. Girl smokers feel less healthy than non-smoking girls.

Country-specific aspects seem to influence the effect of the other variables, for example the relation between smoking and the reported feelings of the adolescent. In Flanders, Scotland and Sweden, no relation was found between how the adolescent feels and smoking. In Austria, smokers have more positive feelings than non-smokers. On the other hand, Polish and Portuguese adolescent smokers have more negative feelings than non-smokers.

In all countries, adolescent smokers are less integrated in the family than adolescent non-smokers, but in some countries this result was found for only one gender.

Some concepts were not related to smoking in this study, such as the material wealth of the family.

In addition, dieting was only related to smoking for girls in Flanders and Sweden. In the other countries, no relation between smoking and dieting was found.

Although it seems that smokers have more contact with friends, no difference is found in the number of close friends between smokers and non-smokers.

Conclusions with regard to the qualitative research

The qualitative study clearly revealed that smoking is part of the social worlds of boys and girls, and that these worlds – and therefore also the role of smoking – differ for both sexes. Although the boys and girls who participated in this study, when asked to discuss the role of smoking in their daily lives, did not talk about *all* of the factors that are mentioned in the literature or in the quantitative study, a number of these factors did emerge from the focus group discussions and were talked about in detail, giving us an in-depth insight in the different mechanisms and functions of smoking for boys and girls. Moreover, in addition to the gender differences that were the focus of the study, several relevant issues

about adolescents and smoking were mentioned that were not related to gender. These similarities are also described briefly.

When compared across the countries, the focus group discussions revealed six major gender specific differences with regard to the role of smoking in adolescence. In some cases these gender differences were similar in appearance in the different countries, but in most cases the way in which they emerged was different for some countries.

- *Instrumental use of smoking in coping with negative emotions.*

As appears from the qualitative study, boys and girls both use cigarettes to cope with negative emotions. However, the type of emotions they try to cope with through smoking is different for both sexes. For girls, negative emotions generally mean distress and boredom, whereas for boys they refer to stress and anger. Moreover, smoking to cope with negative emotions appears to be more typical for girls than for boys.

- *Sharing cigarettes to enhance friendship.*

In all of the participating countries, sharing of cigarettes was considered by the female participants of the focus groups as a way to reinforce female friendship groups and to increase the feeling of belonging to a group.

- *Stigmatisation of smokers.*

In general, girls in the focus groups more often saw a relationship between smoking and stigmatisation for girls. However, also in this regard some country specific differences emerged

- *Impact of smoking on physical condition.*

An important factor related to smoking among boys found in most countries was the perceived impact of smoking on practising sports, fitness and physical condition.

- *Acceptance of policies and rules.*

In general, girls seem to be more likely than boys to accept smoking policies at school and at home. However, this difference was not equally strong in all countries.

- *Smoking and other substances.*

As appears from the focus groups, smoking is often related to the use of other substances such as alcohol, cannabis or snuff tobacco. Again, there is a gender difference regarding this relationship, yet the actual nature of this difference varies across countries.

In addition to the gender differences reported above, the focus group discussions also revealed a number of similarities for girls and boys with regard to the role of smoking.

- *Instrumental role of smoking in relations with the opposite sex.*

Both boys and girls use smoking as a means to facilitate contacts with members of the opposite sex.

- *Parents, siblings and friends as role models.*

Parents, siblings and friends appear to be important role models with regard to smoking for adolescent boys and girls, in that their smoking related behaviour and attitudes serve as examples.

- *The process of smoking*

As reported by the participants in the focus groups, the process of becoming a smoker and the different stages one goes through from starting to smoke to becoming a regular smoker is fairly similar for both sexes.

- *Relationship between smoking and alcohol.*

As reported above, a relationship between smoking and the use of alcohol among young people was found in all five the participating countries.

- *Lack of enforcement of school policies.*

The adolescents in the different countries mentioned that they did not perceive much enforcement of the smoking policies in schools.

- *Availability of cigarettes.*

Regardless of whether or not there was legislation with regard to selling tobacco to minors, participants in the focus groups generally found it easy to obtain cigarettes and they always found ways to buy them.

- *Perception and understanding of the smoking prevalence.*

In the different countries the young people had a clear perception and understanding of the smoking prevalence by gender among adolescents in their country.

The method of this study was evaluated and the research teams in the five countries concluded that the cross national dimension of the study was quite innovative and added much value to the study both in terms of the process and in terms of the results, producing a rich and elaborated view on the subject of gender differences in smoking among adolescents.

Overall conclusions and recommendations

The aim of this study was to systematically explore gender differences in smoking in young people, as a basis for the development of future gender specific tobacco prevention and/or cessation programmes. To that effect, a combination was used of a literature review, a quantitative and a qualitative study of gender specific determinants of smoking behaviour and smoking initiation in young people. These approaches enable us to draw the following conclusions and recommendations.

- The summary of the literature on young people, gender and smoking indicates that for the majority of factors related to smoking, the research evidence remains unclear or shows a considerable degree of inconsistency. This is the case for certain factors in the broader social and physical environment (viz. socio-economic status, accessibility of tobacco products and advertising) and in the immediate environment (viz. parental supervision, parental smoking, sibling smoking, peer smoking, peer pressure or combinations of these factors), as well as for specific personality traits (viz. neuroticism, self control, risk taking, religiousness, depression and anxiety), refusal and coping skills, behaviours (viz. previous experimentation with tobacco, school commitment and physical activity), perceived benefits of smoking (viz. beliefs about mood control and positive image of smoking, perceived norms, and perceived control), and for the biological factors of nicotine metabolism and hormone levels.

For a number of factors related to smoking, however, gender differences are sufficiently and consistently supported by the research evidence. With regard to the broader social and physical environment, the pricing of tobacco products as well as clear indoor laws appear to affect men more strongly than women. On the micro level environment, peer support and approval increases the likelihood of smoking in girls more than in boys. In terms of personality, rebelliousness, sociability and self esteem are more related to smoking in girls than in boys. With regard to perceived benefits of smoking, the literature suggests that beliefs about health effects and about effects on body weight have more impact on smoking among girls, whereas beliefs about enhancing social contacts is more prominent as a determinant of smoking in boys.

Finally, for a number of factors that have been identified as determinants of smoking in general, gender differences are clearly not supported by the literature. This is the case for parental hostility, family conflict and parental attachment as factors in the family environment, as well as for a number of personality traits, notably external locus of control, intelligence, coping style, and susceptibility to smoking.

- The analysis of the data base of the Health Behaviour of School Aged Children (HBSC) study provided gender specific information with regard to the smoking prevalence and trends from 1994 to 1998 for school-aged children in Austria, Belgium (Flanders), Poland, UK (Scotland) and Sweden. The results showed that smoking among 14 to 16-year-old adolescents is increasing in all these countries. More specifically, female smoking rates are increasing, while the number of male smokers is stabilising in all countries except Poland. The latter is the only country in which smoking prevalence among boys is still higher than in girls.
- Further analysis of the HBSC data revealed several factors that were related to smoking across countries. Four of these were found for both sexes: the amount of pocket money, truancy, drunkenness, and evenings spent with friends. In addition, risk behaviour, alienation from school

and strong bonding with friends were also important factors related to smoking among adolescents. In terms of risk factors, being tired was the only factor that was independently related to smoking in boys, whereas academic achievement and feeling unhealthy were the only two factors that were independently related to smoking in girls in most countries. Some country specific aspects seemed to mediate the gender specific effect of the other variables. Finally, for some concepts that are mentioned in the literature as being related to smoking, no such relationship was found in the HBSC study. This was the case for material wealth and dieting in some countries, and for the number of close friends in all countries.

- To supplement the findings from the literature review and the quantitative study, the qualitative study shed light on the role of smoking in the social world of young people as perceived by these youngsters themselves, thus increasing our understanding of gender specific differences in relation to smoking. Some of the gender differences found in the literature study and the quantitative study were discussed in the focus group discussions and thus placed in their context, whereas others did not emerge from the discussions and could not be further explored.
- The study showed that there are gender differences, irrespective of the smoking prevalence and the difference in prevalence between boys and girls, and irrespective of the stage of the epidemic in the different countries. Themes for which gender differences were noticed are: (1) the instrumental use of smoking in coping with negative emotions: the emotions that trigger smoking are different for boys and girls; (2) sharing as an instrument for social contacts, which is typical for girls; (3) stigmatisation of smoking, which is perceived as a disadvantage for girls; (4) the impact of smoking on physical condition, fitness and practising sports, which is more considered as a disadvantage for boys; (5) the acceptance of policies at school and at home, where girls are more likely to accept policies and rules; and (6) the relationship between smoking and the use of other substances, such as alcohol, cannabis and snuff tobacco.
- In addition to the above issues, the qualitative study also indicated that smoking cessation and willingness to quit smoking is an important issue for many young people
- The use of smoking as a means to control weight is an issue that produced mixed findings. While this topic has consistently been found as being related to smoking in the research literature, it was not often mentioned in the focus group discussions. However, while girls tended not to address this topic, boys talked about it as being an issue for girls. As such, it may be that this issue is too personal, intimate or threatening to be discussed by girls in a group setting.
- The above gender differences may be explained by the different social worlds in which boys and girls (and men and women) live, and by the different roles of boys and girls (and men and women) in society. This, smoking plays an important role in the social lives of adolescent girls and boys alike, but the functions and meanings of smoking differ for both sexes.
- Although the three research methods that were used in this study varied substantially in terms of their philosophy and purpose, and the conclusions that were reached differed, no inconsistencies were found between the findings deriving from the three types of research.
- Primary tobacco prevention programmes must be sensitive to the role of smoking in the social lives of young people in general, and also take the gender specific differences into account.
- Since cessation is an important issue for young people, there is a need for effective smoking cessation programmes, which acknowledge gender specific differences and take the different stages of becoming a smoker into account.
- The study emphasises the importance of the enforcement of policies and legislation in institutions (schools, at home) and public places to support young people, taking into account the process of

implementation and not only the rules and regulations. In this regard, the concepts of health promoting schools and smoke-free schools could be a source of inspiration.

- Cross-national prevention programmes or campaigns should only focus on similarities between countries (e.g., to attract the attention of adolescents through a media campaign), but should avoid addressing issues where there are country specific differences. These differences can only be addressed on a national level.
- Further research is necessary to clarify the relationship between smoking and weight control, and its relation with hunger control, quitting and weight gain.
- Further research is also recommended to further explore the role of smoking in the social worlds of young people, using focus groups that are sampled and recruited on the basis of other criteria (e.g., other age groups, non-smokers), employing other qualitative methods (e.g., single person interviews to explore the issue of weight control), and exploring factors that were not discussed in the focus groups.

BACKGROUND AND INTRODUCTION

Background

During the last ten years there has been an increase in the number of young people smoking in the European Union and in Europe and gender differences can be found. There are gender differences in the smoking prevalence among the different countries in the EU, in the smoking pattern and in the variables related to smoking (Joossens & Sasco, 1999, WHO Regional Office For Europe, 2000).

The statement of the first conference on "Tobacco and Women: Understanding the past, changing the future", held in Paris in 1998, concluded that tobacco use by women is one of the most serious issues for Europe as well as for the rest of the world. To tackle the tobacco epidemic, the conference called on the need to recognise tobacco as the major threat and to take the following action: Implement gender-specific evidence-based strategies from research to prevention and cessation programs. This would involve increasing understanding of the social conditions of tobacco use, which are specific to women.

Introduction

Aim and objectives

Building on the findings that are described in the background the project was carried out on the basis of the following aim, objectives and methods.

The overall aim of the project was to examine gender differences in smoking in young people. The intermediate project objectives to reach this aim were:

1. To review the literature on gender differences in smoking in young people to determine whether and which gender specific variables have already been found and thus are already known.

2. To use the HBSC-database (Health Behaviour in School-aged Children) for a cross cultural analysis into gender differences in smoking to determine whether and which gender differences can be found between the following countries: Austria, Belgium-Flanders, Scotland-UK, Portugal, Sweden and Poland *.
3. To develop and use a protocol to investigate in-depth and gain insight in the meaning and functions of smoking for boys and girls in five countries (Austria, Belgium-Flanders, Portugal, Scotland-UK and Sweden) *.
4. To write a report with conclusions and recommendations for the development and implementation of future gender specific smoking prevention and smoking cessation programmes and research for young people.

* The project was carried out in five EU countries: Austria, Belgium-Flanders, Portugal, Scotland-UK and Sweden. In the quantitative study Poland (a non-EU country) was included, because it was useful and interesting to complete and compare the dataset of the five EU countries with a country where still more boys than girls were smoking.

Methods

To realise the specific objectives three different and complementary studies were undertaken:

1. A review of the existing literature on gender differences in smoking.
2. An analysis of the existing data of the HBSC-database for a cross-cultural analysis for six countries (Austria, Belgium-Flanders, Scotland-UK, Portugal, Sweden and Poland) into gender differences in smoking. The questionnaire was designed by the international HBSC-members. Smoking behaviour is one of the topics.
3. A qualitative study in addition to the previous research: the development and application of a protocol to investigate the problem more in-depth and gain insights into the meaning and functions of smoking for boys and girls by means of focus groups with adolescents in the five participating countries (Austria, Belgium-Flanders, Portugal, Scotland-UK and Sweden).

The three research parts were presented to and discussed among the project partners during three meetings. The meetings involved all the project partners, including the national co-ordinators and national researchers and focused on the presentation and discussion of the methods and conclusions of the different studies and the formulation of overall conclusions and recommendations. A steering group supervised the project and discussed and decided on the outlines and the progress of the project.

The three research parts and their conclusions are described in this report, together with the overall conclusions and recommendations.

The project was one of five European projects administered by the European Network on Young People and Tobacco, ENYPAT, within the ENYPAT-framework project 2001-2002.

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PART 1: SUMMARY OF THE LITERATURE ON YOUNG PEOPLE, GENDER AND SMOKING

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Objectives

As outlined in the introduction of this report, the aim of our study is to systematically explore gender differences in smoking in young people, as a basis for the development of gender specific tobacco prevention and/or cessation programmes. A first step to reach this objective was to review the existing literature, looking for gender specific determinants of smoking behaviour and smoking initiation in young people. Although the range of factors, which precipitate or enhance smoking has been very well documented in the literature, surprisingly little information is available on gender differences with regard to these factors, particularly among young people. Moreover, studies that have focused on this subject have not always produced consistent results. A summary of the research findings that have been published in the research literature about this subject therefore provides a good starting point for more focused research.

Method

The methodology we used for that purpose was a review of reviews. More specifically, we drew on three influential publications reviewing the literature on smoking and gender and one on adolescent smoking, and systematically screened them for research findings with regard to gender differences in factors influencing smoking and smoking initiation in young people.

The first publication used for this study is the "Surgeon General's Report on Women and Smoking" (US Department of Health and Human Services, 2001). This report reviewed more than 100 studies in which tobacco use was an outcome variable, identifying factors that influenced the initiation of smoking in women. For the purpose of the present study, we selected findings from this report deriving from studies that examined gender specific aspects of smoking among adolescents. Apart from several longitudinal studies related to smoking initiation in young people, this also included a limited number of studies addressing gender differences in becoming a regular smoker. In addition, a number of cross-sectional studies were included that had taken a gender perspective in comparing students who had tried smoking with those who had never tried smoking.

While providing a good basis for an overview of the literature regarding gender differences in smoking in young people, the Surgeon General's Report predominantly relies on studies carried out in the USA. In order to secure a more international perspective, the findings from this report were supplemented by those of two other reviews. The first one is a publication on "Women and Tobacco" written on behalf of the World Health Organisation (Chollat-Traquet (1992), containing information collected from a variety of countries and reviewed by a group of experts. The second report is also a WHO publication, and is entitled "Women and the Tobacco Epidemic, Challenges for the 21st Century" (Samet & Yoon,

2001). It is a collection of papers compiled in preparation of an international meeting on women and tobacco held in Japan in 1999, and outlines the problem of tobacco use among women while also offering solutions to this problem. As such, it updates the results of the 1992 publication. As with the US Surgeon General's report, both reviews were screened for findings deriving from studies focusing on young smokers.

The latter was the explicit focus of a fourth publication added to our review. Whereas the three previous reports explicitly dealt with gender differences in smoking, yet not only in young people, the review of "Smoking in adolescence, Images and Identities" by Lloyd and Lucas (1998) provided a concise overview of studies that specifically focused on factors related to smoking in young people, complemented by two studies on smoking prevalence and protective factors in adolescent smoking carried out in the UK. By looking at gender specific differences in the studies reviewed in this report, we could complement the findings deriving from the existing reviews on gender differences in smoking by findings arrived at from a different angle.

While providing a concise summary of the existing literature on the subject to date, one should be aware of the fact that a review based on other review studies has certain methodological limitations. For example, no information can be provided regarding the methodological quality of the studies on which the reported findings are based. Furthermore, it is possible that the variables of interest were not defined similarly across studies, or that variables with the same labels were assessed with different measures. Nevertheless, we think that for the purpose of the present study, a review of existing review studies provided the most cost effective way to summarise the existing research literature and to draw up a "state of the art" of the literature on gender differences in smoking and smoking initiation in young people.

Overview of gender specific factors related to smoking in young people

In this paragraph, we provide an overview of factors, which according to the research literature influence smoking and smoking initiation to a different extent or in a different way for boys and girls, respectively. In this overview, we differentiate between four different types of factors that may influence smoking: (i) factors in the social and physical environment; (ii) personal characteristics, including personality traits and skills; (iii) social cognitive factors, including perceived benefits and perceived images of smoking; and (iv) biological factors. For each of these types, we will list the factors that have been mentioned in the literature, and group them according to whether or not a differential gender effect for the factor concerned is supported by empirical research.

I. Factors in the social and physical environment

Social and environmental factors can be further divided in two subtypes. *Macro level factors* refer to aspects of the broad social-ecological environment that may operate as distal determinants of smoking, such as advertising, availability, and pricing of tobacco products. These factors are generally not under individual control and can only be influenced by policy measures. *Micro level factors*, on the other hand, refer to aspects of the immediate social environment, such as the family environment and peer group influences, that may operate as proximal determinants of smoking. They are more easily influenced by educational interventions.

1.1. Macro level factors

1.1.1. Factors for which gender differences are supported by research evidence

Pricing of tobacco products. The price with which tobacco products are sold is known to have an impact on the sale and consumption of tobacco. Consequently, increasing the price of cigarettes and other tobacco products by raising taxes is generally considered as an effective tobacco prevention strategy. This strategy appears to have a differential impact on male and female smokers. Lewit and

Coate (1982) found that male smokers (aged 20 through 35 years) were more sensitive to price increases, whereas female smokers were essentially unaffected by price setting. Chaloupka (1990, 1991a,b) and Mullahy (1985) also found that women were much less responsive to price increase than men. It should be noticed, however, that adolescents and young adults in general were less responsive to cigarette pricing than older age groups (Chaloupka, 1992).

Clean indoor air laws. To encourage people to refrain from smoking and to protect non-smokers from passive smoking, clean indoor air laws can be a helpful strategy. Chaloupka (1992) demonstrated that there are big differences between women and men in their response to clean indoor air laws: men who lived in states with such laws were found to smoke less than men who lived in states without such laws, whereas the smoking behaviour of women was unaffected by such restrictions. As with pricing, however, adolescents and young adults are generally less responsive to these restrictions than older age groups.

1.1.2. Factors for which the research evidence on gender differences is unclear

Accessibility of tobacco products. A number of self-report surveys conducted since the late 1980' s indicate that adolescent girls are less likely than boys to purchase their own cigarettes (CDC 1996; Kann *et al.*, 1998). As a result, easy accessibility of tobacco products is less likely to have an impact on their smoking behaviour. Moreover, Robinson and Klesges (1997) found that girls are less likely than boys to view cigarettes as affordable and as easy to obtain. To the extent that purchasing cigarettes is already perceived as difficult, making them less accessible will probably not be as effective for girls. On the other hand, compliance check studies revealed that retailers are more likely to sell cigarettes to girls than to boys of the same age (Forster & Wolfson, 1998). This means that cigarettes may be more accessible for girls than they perceive them to be.

Advertising and promotion of tobacco products. Marketing efforts by the tobacco industry, including product design, advertising, and promotional activities, are known to influence susceptibility to and initiation of smoking. In recent decades, women have been increasingly targeted in tobacco marketing, and tobacco companies have produced brands specifically targeted to women. Marketing for women is dominated by other themes than for men, with social desirability and independence as prevailing themes. They are conveyed through ads featuring slim, attractive, athletic models (U.S. Department of Health and Human Services, 2001). Evidence regarding the differential impact of such advertising campaigns for men and women is very scarce and indirect. However, one study showed that ownership of and willingness to use cigarette promotional items were less common among girls than among boys (Gilpin *et al.*, 1997).

Socio-economic status. Low socio-economic status (SES) is a known risk factor for smoking (Conrad *et al.*, 1992; USDHHS, 1994). Two published studies have indicated that low SES places girls at higher risk for smoking than boys (Chassin *et al.*, 1992; Glendinning *et al.*, 1994). This finding was contradicted by Gottlieb and Baker (1986), but their study was conducted among college students, a group in which low SES may have been under-represented. A possible explanation for these contradicting findings is offered by Ferrence (1988), who used Rogers & Shoemaker's (1971) diffusion of innovations' theory, to link gender specific differences in initiation and cessation of smoking to social economic status. According to this theory, persons with more economic resources, better education and more power adopt new ideas and behaviours and accumulate material goods earlier than those with fewer resources. This explains why men historically started smoking before women, and why the first women to smoke were those with better resources. Together with the changing roles of women in society, however, gender specific differences in relation to these resources may be changing over time. In recent decades, smoking prevalence has indeed decreased first among persons with more resources, women and men alike.

1.2. Micro level factors

1.2.1. Factors for which gender differences are supported by research evidence

Peer support and approval. Several studies suggest that strong bonds with peers tend to promote smoking. A study among African Americans showed that the reported number of close friends was a significant predictor of smoking initiation (Brunswick & Messeri, 1983-84). With respect to gender differences, one study indicated that peer support increased the likelihood of smoking among girls more than among boys (Wills, 1986). Best *et al.*, (1995) suggested that smoking in general is more prominent among adolescents for whom peer approval is especially important, which may be more the case for girls than for boys.

1.2.2. Factors for which the research evidence on gender differences is unclear

Parental supervision. According to a number of studies, close parental supervision deters adolescents from smoking (Chassin *et al.* 1986; Mittelmarm *et al.*, 1987; Radziszewska *et al.*, 1996; Jackson *et al.*, 1997). Some studies suggest that such supervision may have a greater effect among girls than among boys (Skinner *et al.*, 1985; Krohn *et al.*, 1986). Other studies, however (e.g., Krohn *et al.*, 1983), do not show a gender difference with regard to this factor.

Parental smoking. Children whose parents smoke are more likely to start smoking themselves. Several studies have reported that girls and boys are equally susceptible to the effects of parental smoking, yet some researchers have arrived at different results. Most of these found that girls are more influenced by parental smoking than boys (Chassin *et al.*, 1986; Charlton & Blair 1989; Swan *et al.*, 1990; van Roosmalen & McDaniel 1992; Flay *et al.*, 1994; Kandel *et al.*, 1994; Hu *et al.*, 1995a; Robinson *et al.*, 1997). At least one study, however, found the opposite (Sussman *et al.*, 1987), suggesting that boys would be more influenced by parental smoking than girls. In addition, whereas the smoking status of the mother has a greater effect on the smoking of their children than that of the father, maternal smoking has different effects among boys and girls. Various studies show that maternal smoking has slightly more effect on the smoking of girls than of boys (Ahlgren *et al.*, 1982; Pulkkinen, 1982; Bauman *et al.*, 1992; Kandel & Wu, 1995). This is corroborated by Stanton and Silva (1992), who found that smoking cessation among mothers helped their daughters but not their sons, to delay or refrain from smoking. Thus, adolescent girls may be more likely than adolescent boys to model their smoking behaviour to their mothers'. Contrary to this finding, however, one study found that maternal smoking predicted smoking among sons but not among daughters (Skinner *et al.*, 1985). Lloyd & Lucas (1998) concluded that the smoking status of the mother has a greater effect on the smoking behaviour of the children of both sexes than the father's smoking, while the latter has some influence on the smoking behaviour of their sons, but not on that of their daughters.

Sibling smoking. A number of studies suggest that the smoking of siblings encourages adolescents to start smoking (Swan *et al.*, 1990; Conrad *et al.*, 1992; Daly *et al.*, 1993). According to one study, this effect is equal among girls and boys (Santi *et al.*, 1990-91), but in other studies a stronger effect was found among girls (Chassin *et al.*, 1984; Mittelmarm *et al.*, 1987; van Roosmalen & McDaniel, 1992; Pierce *et al.*, 1993) or among boys (Brunswick & Messeri, 1983-84; Stanton & Silva, 1991).

Peer smoking. One of the strongest risk factors for smoking in youngsters is exposure to peers who smoke, especially close friends (USDHHS 1994; Meijer *et al.*, 1996; Gritz *et al.*, 1998). Many studies show the effect of peer smoking to be similar for girls and boys (Palmer, 1970; McCaul *et al.*, 1982; Pulkkinen 1982; Chassin *et al.*, 1984, 1986; Gottlieb & Baker, 1986; Krohn *et al.*, 1986; Mittelmarm *et al.*, 1987; Sussman *et al.*, 1987; Santi *et al.*, 1990-91; Stanton & Silva, 1992; Urberg 1992; van Roosmalen & McDaniel, 1992; McGee & Stanton, 1993; Pierce *et al.*, 1993; Glendinning *et al.*, 1994). Other studies, however, found that peer smoking affects girls and boys differently. A few studies report that boys who smoked had more friends who also smoked (Morris *et al.*, 1993) and were more influenced by the smoking behaviours of their peers than girls who smoked (Chassin *et al.*, 1984; Urberg *et al.*, 1991), yet most studies that do find a gender effect report that girls are more influenced by peers' smoking than boys (Semmer *et al.*, 1987; Charlton & Blair, 1989; Pirie *et al.*, 1991; Waldron *et al.*, 1991; Rowe *et al.*, 1992; Sarason *et al.*, 1992; Skinner & Krohn, 1992; Hu *et al.*, 1995a). Looking at these findings from a developmental perspective, Chassin and colleagues (1986) reported

that having friends who smoked was more important for younger girls and for older boys. In addition, Akers and co-workers (1987) found that with regard to smoking, adolescent girls were more influenced by their boyfriends than adolescent boys by their girlfriends. In contrast, Skinner *et al.*, (1985) found that the initiation of smoking among girls tended to coincide with increasing involvement with other girls who smoked, but not with boys who smoked. Finally, Bauman and Ennett (1994) pointed at the importance of the social networks among peers and the homogeneity of adolescent friendship groups or “cliques” with regard to smoking. They noted that most of these groups were entirely composed of non-smokers (Ennett *et al.*, 1994). This suggests that such friendship groups may contribute more to the maintenance of a non-smoking status than to the initiation of smoking. The findings were strongest among all-female and all-white friendship groups.

Peer pressure. Simons-Morton *et al.*, (1999) reported that direct peer pressure was associated with boys’ smoking, but not with girls’ smoking. This finding however is not substantiated by other research.

Interaction of social influences. Flay *et al.*, (1994) tested a model that examined the interaction of different social factors which impact on smoking. With regard to gender specific differences, they found that parental smoking had a stronger effect among girls than among boys, but that the effect was modified by parental approval or disapproval of smoking. Disapproval mediated the influence of parental smoking among girls but not among boys, and approval was a more important predictor for girls to start smoking. Looking at the interaction of parental and peer influences, Hu *et al.* (1995a) found that the pattern of change in parental and peer influences on smoking may differ among girls and boys (Hu *et al.*, 1995a). Whereas in general, the effect of friends who smoke is stronger than that of parents and increases over time, while the effect of parental smoking remains constant, friends’ smoking appears to have a stronger impact on girls than on boys, and increases more noticeably over time in girls.

1.2.3. Factors for which gender differences are not supported by research evidence

Parental hostility and family conflict. According to several studies, a conflict-ridden family environment enhances smoking in children. Most findings, however, indicate that family conflict influences tobacco use only indirectly, and that the mechanisms are similar for girls and boys.

Parental attachment. Mirroring the effects of hostility, high levels of parental attachment have been found to act as a protective factor against smoking initiation in young people. As reported in the literature, however, there are no gender differences between weak attachment to parents and risk for smoking (Ensminger *et al.*, 1982; Krohn *et al.*, 1986; Kumpfer & Turner, 1991).

II. Personal characteristics

Personal characteristics can be further divided in two subtypes. *Personality traits* refer to relatively stable dispositions of an individual. They are grounded in the developmental history of the person, and are not easy to influence or change. *Personal skills*, on the other hand, refer to the behavioural repertoire of an individual. Skills can be acquired through experience or deliberate learning processes, and as such are more open to change. They will be discussed here together with actual behaviours.

2.1. Personality traits

2.1.1. Factors for which gender differences are supported by research evidence

Rebelliousness. Smoking in young people is often considered as a way to rebel against authority (Sussman *et al.*, 1987). This factor appears to be more pronounced among girls than among boys, in the sense that smoking in girls is more strongly correlated with rebelliousness (Pierce *et al.*, 1993), feelings of being bound by laws and parental rules (Skinner *et al.*, 1985), rejection of adult authority (Best *et al.*, 1995) and tolerance of deviant behaviour (Chassin *et al.*, 1984). Stanton *et al.*, (1995)

found that delinquency increased the risk for smoking among girls but not among boys. In a similar vein, Waldron *et al.* (1991) reported that girls are more likely than boys to experiment with smoking when going to bars, taverns or nightclubs, if they had been in trouble with the police, or when they had been involved in fights.

Sociability. Sociability counts as one of the major personality traits. Killen and colleagues (1997) found a relation between sociability and smoking initiation among adolescent girls, but not among boys. Swan *et al.*, (1990) found that unlike boys, girls were significantly more likely to smoke if they were involved in social activities other than sports. The results of a qualitative study by Michell and Amos (1997), suggests that this gender difference may be rooted in the different characteristics of the social status or ‘pecking order’ among adolescent boys and girls. In girls, smoking is part of the social identity of girls with the highest social status, who use smoking to distinguish themselves from the traditional ‘good girl’. High status boys may be protected from this tendency by their interest in sports. The same was suggested by Plumridge *et al.*, (2002), who argue that in this way the social meaning of smoking refusal becomes more problematic for girls than for boys.

Self esteem. A poor self esteem is a contributing factor in smoking. According to a number of studies, this is more so for girls than for boys. Best *et al.* (1995) found that girls who score high on personal dissatisfaction are more likely to smoke than girls who are satisfied with themselves. A similar relationship was not seen among boys. This finding was corroborated by Abernathy *et al.* (1995), who added that self esteem is a contributing factor for girls in grades six through eight, but not among boys in any grade.

2.1.2. Factors for which research evidence on gender differences is unclear

Neuroticism. Neuroticism or negative affect is one of the five basic personality traits (McCrae & Costa, 1990). Studies have shown that adults and adolescents who score high on neuroticism are more likely to smoke (Breslau *et al.*, 1993; Byrne *et al.*, 1995). Lloyd and Lucas (1998) referred to trait neuroticism or negative affect to explain the relationship between smoking and weight control among young girls: analysis of their data revealed that controlling for neuroticism reduced the association between smoking and body image to an almost negligible level (Lloyd & Lucas, 1998). However, a direct study of the differential impact of neuroticism on smoking in boys and girls has not yet been reported.

Self control. Several studies suggest that a lack of self control may play a role in the onset of smoking. Lloyd & Lucas (1998) concluded from their review that girls were more likely to associate smoking with a lack of self control than boys, and saw smoking as an indicator of a poor self control and as a product of unmanageable stress. However, this says more about their subjective appraisal of self control as a determinant of smoking than about its actual importance. Other indirect evidence for a gender difference with regard to self control includes its relation with aggressive behaviour, which may put girls at higher risk than boys for succumbing to peer pressures to smoke (Stanton *et al.*, 1995), and the finding that young women are more likely than young men to initiate smoking if they focus on short term rather than long term goals (Brunswick & Messeri, 1983-84).

Risk taking. A risk taking and sensation seeking disposition appears to be related to smoking among adolescents (Simon *et al.*, 1995; Petridou *et al.*, 1997; Wahlgren *et al.*, 1997; Coogan *et al.*, 1998). US national survey data showed a strong relationship between smoking and use of other substances, including alcohol, whereas more physically active and fit adolescents are less likely to initiate smoking (e.g., Waldron *et al.*, 1991; Aaron *et al.*, 1995). However, findings of studies indicating a gender difference with regard to this factor are inconsistent. Seamark and Gray (1998) found that girls who had had a teenage pregnancy were more likely to smoke than girls who had not been pregnant. Another study showed that at the age of 18, the number of years smoking, excessive alcohol use and poor dietary preferences were clustered among women and men, while physical inactivity was part of the cluster among women only (Burke *et al.*, 1997).

Religiousness. Religious beliefs may be important in the decision of persons to smoke or not to smoke. In general, more women than men report religious commitments, which could be associated with the lower smoking prevalence among women (Reynolds & Nichols 1976; Brook *et al.*, 1987; Grunberg *et al.*, 1991; Waldron 1991). Three studies that examined gender specific differences in religious attitudes among adolescents showed that religion deterred smoking among females more strongly than among males, whereas a lack of religious commitment contributed more to smoking among females than among males (Gottlieb & Green 1984; Krohn *et al.*, 1986; Waldron *et al.*, 1991). In contrast, however, Skinner *et al.*, (1985) found no effect of religiousness on smoking by either gender.

Depression and anxiety. Depression and anxiety can be seen as both a temporary state or a relatively stable personality characteristic (trait). In the latter sense, they have been linked to smoking behaviour in a large-scale study by Patton *et al.* (1996). From this study, depression and anxiety were associated with smoking among teenage girls of all ages, whereas in boys, they were only associated with smoking among younger teenagers. Studies exploring the relationship between smoking and emotional distress as a temporary state, on the other hand, have produced only mixed findings, in the sense that some studies found no association between smoking and emotional distress, whereas others have found links between smoking and certain kinds of distress. With regard to gender specific differences, several studies demonstrated that symptoms of distress are more strongly associated with smoking among females than among males (Brunswick & Messeri 1984; Gottlieb & Green 1984; Knott 1984; Semmer *et al.*, 1987; Lee *et al.*, 1988; Waldron *et al.*, 1991; Pierce *et al.*, 1993). However, other studies could not reproduce this gender difference (Oleckno & Blacconiere 1990; Allen *et al.*, 1994; Frone *et al.*, 1994).

2.1.3. Factors for which gender differences are not supported by research evidence

External locus of control. *In the literature, smoking has been linked to fatalism and external locus of control. However, no gender specific differences were found with regard to these factors as they impact on smoking (Brunswick & Messeri, 1984; Chassin et al., 1984).*

Intelligence. Studies investigating the relationship between smoking and intelligence or academic performance (e.g., Hu *et al.*, 1998; Brunswick & Messeri, 1983-84, 1984) have not revealed any gender specific differences with regard to this factor.

Coping style. Smokers often claim that smoking helps them cope with stress or stressful life events. Lloyd & Lucas (1998) found that girls and boys demonstrate different coping styles in dealing with stress and stressful life events, in the sense that girls more often resort to cathartic coping, whereas boys tend to use focused coping mechanisms. However, no gender specific differences have been reported with regard to the way this difference is linked to smoking.

Susceptibility to smoking. Susceptibility to smoking has been mentioned as a variable that is linked to smoking intention in both females and males (U.S. Department of Health and Human Services, 2001). No differential gender effects have been reported.

2.2. Skills and behaviour

2.2.1. Factors for which gender differences are supported by research evidence

With regard to behaviour and personal skills, no factors were identified for which gender differences are consistently supported by the research literature.

2.2.2. Factors for which research evidence on gender differences is unclear

Refusal skills. Girls have been reported to have more doubts about their capacity to refuse cigarettes when they are offered to them than boys (van Roosmalen & McDaniel 1992), but this reflects their

perceived competence rather than their actual skills. Indeed, attempts to strengthen refusal skills seem to have the same effect in girls and boys. Other studies also indicate that the capacity to refuse cigarettes affects smoking in girls and boys equally (Lawrance & Rubinson 1986; Flay *et al.*, 1994). One study showed that there may be a gender difference in certain ethnic groups only, in that the link between refusal skills with smoking prevalence was found to be higher among Asian boys than among Asian girls (Sussman *et al.*, 1987).

Coping skills. Both adults and adolescents use cigarettes to alter their mood state (Lloyd & Lucas, 1998). Smoking can thus be considered as reflecting a lack of skills to cope with negative emotions and stress. As appears from a qualitative study by Nichter *et al.* (1997), the most frequent reasons for smoking given by girls in grades ten through eleven were stress reduction and relaxation. On the other hand, Lloyd & Lucas (1998) found that boys more often than girls report the stress-reducing effects of handling cigarettes. In the same study, Lloyd and Lucas (1998) concluded that gender differences in smoking can not be directly attributed to differences in coping with stress.

Previous experimentation with tobacco. Youngsters who experiment with cigarettes during adolescence are at risk for progression to becoming regular smokers. Three studies have investigated whether this experimenting behaviour affects girls and boys differently. In two of these studies no gender specific differences were found. The third study, on the other hand, revealed that the amount of cigarettes smoked at ages ten through thirteen was strongly related to the amount smoked at ages fourteen to seventeen, and that this link was stronger among boys than among girls (Skinner & Krohn, 1992).

School commitment. It is often reported that young people who smoke are generally less committed to school. While this is probably true for both sexes, the result of several studies suggest that low commitment to school affects smoking in girls more strongly than in boys (Hibbett & Fogelman, 1990; Waldron *et al.*, 1991; Skinner & Krohn 1992). In a study by Chassin *et al.* (1984), however, a reverse relationship was reported.

Physical activity. Swan *et al.*, (1990) found that girls were less likely to take up smoking if they took part in organised sports. No negative association was found between sporting activity and smoking among boys. Tucker (1985), on the other hand, did find that adolescent boys who did not intend to smoke were more likely to participate in organised sports and were actually more physically fit. They also spent less time watching television and drank less alcohol.

III. Social cognitive factors

According to current socio-cognitive behaviour models, health related behaviours like smoking are to a large extent determined by attitudes, perceived norms and perceived control or self-efficacy. *Attitudes* refer to the judgement whether the behaviour is a good thing to do, based on an evaluation of the likely outcomes of the behaviour and whether these outcomes are rewarding. Whereas attitudes are individual by nature, some attitudes can be shared by groups of people. From this perspective, it is worthwhile to investigate the perceived outcomes of smoking that are typically considered by boys and girls, respectively. *Perceived norms* are the expectations or opinions one assumes other people to have about a certain behaviour. As opposed to explicit norms, which are conveyed through social pressure, perceived norms are often implicit and are construed through observations of others' behaviours in their impact on behaviour. Finally, *perceived control* refers to the expectation a person has about his or her capability to perform a certain behaviour.

3.1. Perceived benefits of smoking

3.1.1. Factors for which gender differences are supported by research evidence

Beliefs about effects on health. There is some evidence that health related expectancies about smoking are especially important among girls. In a study by Waldron *et al.* (1991), for instance, girls were found to be at a higher risk than boys for smoking if they thought the harmful effects of smoking were exaggerated. Another study, which was carried out among 18 to 23 year olds, showed that thoughts about health were an important reason not to smoke for women, but not for men (Brunswick & Messeri 1983-84).

Beliefs about effects on body weight. Many girls believe that smoking helps to reduce or control their body weight by suppressing their appetite (USDHHS 1980; Klesges *et al.*, 1989, 1997). Several studies have indeed found a relationship between concerns about body weight, dieting and smoking among adolescent girls (Charlton 1984; Gritz & Crane 1991; Pirie *et al.*, 1991). The difference between boys and girls in satisfaction with body image may thus exert a differential influence on their uptake of smoking (Rauste van Wright, 1989). This is attested by several studies. Page *et al.* (1993), for example, found that although both girls and boys who smoked were less satisfied with their weight than non-smokers, girls who smoked were more likely to perceive themselves as fat than girls who did not smoke, whereas this difference was not found among boys. Similarly, French *et al.*, (1994) reported that concerns about weight and dieting behaviours in their study were positively related to smoking initiation among girls, but not among boys. At baseline, fear of gaining weight, the desire to be thin and trying to lose weight were also positively related to current smoking among girls. Adding on to these findings, Camp *et al.*, (1993) and Allbutt *et al.*, (1995) demonstrated that girls were more likely to use smoking in an attempt to control weight. Crocker *et al.*, (2001) also found that girls with negative self-perceptions are more likely to smoke and that smoking behaviours and dietary restraint were also linked. According to Gritz (1986), girls in particular are vulnerable to advertising and social pressure to lose weight. In the Sussex study, Lloyd and Lucas (1998) not only found that girls unlike boys were concerned about having a thin body shape and avoiding weight gain, but also that girls who were concerned with being thin more often reported having taken up smoking in the time between the two administrations of the questionnaire. On the other hand, boys who rated themselves low in physical attractiveness and aspired to a heavier and more muscular body shape were slightly more likely to have taken up smoking. So for boys body image was essentially unrelated to their smoking behaviour, while for girls there was a highly significant trend that weight concerns increased with increasing levels of smoking behaviour. It should be noted that the relationship between smoking and weight control is not always easily recognised, especially not by girls. Girls tend to react negatively and with hostility to the suggestion that they may smoke to keep their weight down (Lloyd & Lucas, 1998).

Beliefs about social contacts. Studies have indicated that adolescents often see smoking as a vehicle for entering a desired friendship group (e.g. Aloise-Young *et al.*, 1994). Two studies suggested that this is true for boys only (Gottlieb & Green 1984; Allen *et al.*, 1994). Allen and co-workers (1994) found that boys may use smoking to cope with social insecurity, whereas girls who smoked were more socially competent and self-confident than girls who didn't smoke.

3.1.2. Factors for which research evidence on gender differences is unclear

Beliefs about mood control. The belief that smoking can control negative moods and produce positive moods is widespread. One study showed that there were no gender specific differences with regard to smoking for relaxation or relief from problems or anxieties (McGee & Stanton 1993). However, at least two studies showed that females were more likely than males to say that they smoked to control negative emotions (Semmer *et al.*, 1987; Novacek *et al.*, 1991). In a similar vein, Pirie *et al.* (1991) found that young women who smoked were more likely than young male smokers to say that they would be tense and irritable if they stopped smoking. Similarly, Allbutt *et al.*, (1995) found that relaxation as a reason for smoking was particularly important for girls.

Positive image of smokers. One of the factors which is believed to elicit smoking in youngsters is the image of smokers as mature, confident and self-reliant. While there is evidence of a relationship between this positive image and smoking among both girls and boys (McGee & Stanton 1993),

findings of studies on gender differences in the perceived image of smokers are inconclusive. Firstly, it is not clear if the image of smokers is necessarily positive. In fact, Lloyd and Lucas (1998) found that images of adolescent smokers are often negative: smokers in their study were evaluated less favourably than non-smokers, and girl smokers were rated less favourably than boy smokers. Secondly, boys and girls have a different image of smokers and non-smokers. Boys often seem to associate smoking with being business-like, sociable, fun-loving and happy, whereas girls more often see smokers as sad, unhappy, bored and depressed person. Thirdly, adolescents have a different image of male and female smokers. The image of a boy who smokes is generally described as "tough" and "hard", which corresponds with the idea that boys use cigarettes to affirm their masculinity. In contrast, female smokers are more often described as having a low self-esteem and lacking in confidence, yet also as sophisticated, stylish, classy, elegant and fashionable. Interestingly, the association of smoking with feminine glamour is more often made by girls than by boys, and contrasts with the image of the unsophisticated female smoker, described as "tarty" and "slapperish". So, it seems that for some female adolescents smoking enhances a "feminine" attractiveness among girls, whereas to others it creates a tough image which implies a move away from the traditionally feminine. Finally, there is some evidence that the image of a smoker has a stronger impact on smoking in girls than in boys (Mittelmark *et al.*, 1987; Waldron *et al.*, 1991), although the reverse has also been reported (Dinh *et al.*, 1995).

3.2. Perceived norms and perceived control

3.2.1. Factors for which gender differences are supported by research evidence

With regard to perceived norms and perceived control, no factors were identified for which gender differences are consistently supported by the research literature.

3.2.2. Factors for which research evidence on gender differences is unclear

Perceived norms. Health behaviour specialists point at the role of perceived group norms and the motivation to comply with such norms as a mechanism to explain peer influences on smoking. Two studies mentioned that females significantly more often referred to social norms as a reason for experimenting with smoking than males (Botvin *et al.*, 1992; Sarason *et al.*, 1992). Other studies, however, showed an opposite gender effect, in that boys who smoked admitted to being more influenced by the smoking related attitudes of their peers than girls who smoked (Chassin *et al.*, 1984; Urberg *et al.*, 1991). Finally, there are also studies concluding that perceived peer attitudes to be an equally strong risk factor for smoking among girls and boys (Pierce *et al.*, 1993; Flay *et al.*, 1994).

Perceived control. In a study by van Roosmalen and McDaniel (1992), girls were found to have stronger doubts about their capacity to refuse cigarettes when they are offered to them than boys. Other studies however indicated that doubts about one's capacity to refuse equally affect girls and boys (Lawrance & Rubinson 1986; Flay *et al.*, 1994).

IV. Biological factors

4.1. Factors for which gender differences are supported by research evidence

With regard to biological factors, no factors were identified for which gender differences are consistently supported by the research literature.

4.2. Factors for which research evidence on gender differences is unclear

Differences in nicotine metabolism. Some studies have suggested the existence of gender differences in nicotine metabolism (Grunberg *et al.*, 1991). This may explain why women who try to quit report more withdrawal symptoms than men (Gritz *et al.*, 1996), or recall their withdrawal symptoms as being more severe (Pomerleau *et al.*, 1994). It is unclear, however, whether these reported differences

in withdrawal responses are subjective or physiologic (Niaura *et al.*, 1998; Eissenberg *et al.*, 1999). In general, it appears that differences in metabolism do not exist once the amount of smoking has stabilized.

Hormone levels. According to Bauman and colleagues (1992), testosterone levels in girls increase the receptivity to the influence of maternal smoking. A similar effect was not found among boys. Girls with relatively high testosterone levels may thus be more likely than girls with low testosterone levels to model their mothers' smoking behaviour. In another study (Kandel & Udry, 1999), a positive correlation was found between maternal prenatal testosterone levels and subsequent smoking among female offspring at adolescence. Also, early onset of puberty may prompt girls to smoke (Wilson *et al.*, 1994). However, this may be due to the social pressures associated with early puberty as well as to altered hormonal levels. It seems, then, that further research is needed to determine whether hormones influence smoking initiation.

Conclusions

On the previous pages, we have reviewed the existing literature on smoking initiation and maintenance, in order to identify gender specific determinants of smoking behaviour and smoking initiation in young people. The large body of research on the determinants of smoking in women and adolescents reveals that smoking is the result of a complex mix of influences, including factors in the social and physical environment, personality, individual skills, social cognitive and biological factors, which are both directly and indirectly tied to tobacco use.

Looking at these factors from the point of view of gender differences, the review indicates that for the majority of them the research evidence remains unclear or shows a considerable degree of inconsistency. This is the case for factors in the broader social and physical environment, such as socio-economic status, accessibility of tobacco products and advertising; for aspects of the immediate environment, including parental supervision, parental smoking, sibling smoking, peer smoking and peer pressure or combinations of these factors; and personality traits including neuroticism, self control, risk taking, religiousness, depression and anxiety; refusal and coping skills; and behaviours such as previous experimentation with tobacco, school commitment and physical activity. It also applies to a variety of perceived benefits of smoking, including beliefs about mood control and positive image of smoking, perceived norms and perceived control, and to the biological factors of nicotine metabolism and hormone levels. For all these factors, the empirical evidence is insufficiently strong or consistent to conclude that there is a proven differential effect for young men and women on smoking or smoking initiation.

For a number of factors, which are related to smoking, however, gender differences are sufficiently and consistently supported by the research evidence. With regard to the broader social and physical environment, the pricing of tobacco products as well as clear indoor laws appear to affect men more strongly than women. On the micro level environment, peer support and approval increases the likelihood of smoking in girls more than in boys. In terms of personality, rebelliousness, sociability and self esteem are more related to smoking in girls than in boys. With regard to perceived benefits of smoking, the literature suggests that beliefs about health effects and about effects on body weight have more impact on girls' smoking, whereas beliefs about enhancing social contacts is more prominent as a determinant of smoking in boys.

Finally, for a number of factors that have been identified as determinants of smoking in general, gender differences are clearly not supported by the literature. This is the case for parental hostility, family conflict and parental attachment as factors in the family environment, as well as for a number of personality traits, notably external locus of control, intelligence, coping style, and susceptibility to smoking.

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