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IDENTIFYING AND USING INFLUENTIAL YOUNG PEOPLE FOR INFORMAL PEER-LED HEALTH PROMOTION

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This thesis is submitted in candidature for the degree of Doctor of Philosophy

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July 2006

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In the mid-1990's Professor Mick Bloor evaluated a schools-based, peer-led smoking intervention directed at young teenagers. This evaluation demonstrated promising results which prompted a full-scale evaluation (A Stop Smoking in Schools Trial) of this approach which was funded by the Medical Research Council. This trial was conducted between January 2001 and May 2004 by Cardiff University and the University of Bristol in collaboration with researchers at the University of Glamorgan and the Welsh Assembly Government. The Bristol research team was led by Professor Rona Campbell and in Cardiff it was led in the first instance by Professor Mick Bloor, and subsequently by Professor Laurence Moore.

Professor Moore was the trial statistician and conducted the initial power calculations. The trial co-ordinators (Dr Fenella Starkey and Mark Sidaway) were employed in January 2001 to set up the trial (including the pilot study), develop the peer nomination questionnaire, and the outcome evaluation tools. The senior health promotion specialists (Lin Cooper and Kathleen Cordall) were also employed at this stage to develop the intervention. Two further researchers (Dr Suzanne Audrey and myself) were employed in May 2001. We were two of a group of four who had particular responsibility for designing and conducting the process evaluation. We initiated and carried out the collection of all process evaluation data, conducted the majority of transcription and collated responses from questionnaires. We also had substantial involvement in collecting outcome evaluation data in the pilot study and main trial. In addition to these responsibilities, I led development of the social network questionnaire, and co-ordinated and conducted the social network data verification process, data cleaning and data entry. In August 2001, the remainder of the training team (Rob Sage, Lorna Coombes, Heather Anderson-Paine and Nicky Hewer) were employed to implement the intervention. Professors Moore and Campbell analysed the trial outcome data. I analysed all other data used in this thesis unless stated otherwise.

ACKNOWLEDGEMENTS

This study would not have been possible without input and support from a number of people.

Prof. Mick Bloor who gave me the opportunity to alight this rollercoaster.

My supervisors, Prof. Laurence Moore and Dr Simon Murphy for your advice and encouragement.

My colleagues from ASSIST, in particular, Dr Fenella Starkey, Dr Suzanne Audrey, Prof. Rona Campbell and Dr Nina Parry-Langdon for your support and assistance.

The schools, and in particular the young people who took part in ASSIST and provided data for use in this study. ASSIST was made possible by funding from the Medical Research Council: grant number G9900538, Bro Taf, Morgannwg and Gwent Health Authorities.

The people around me on a daily basis for your words of wisdom, and for putting up with my moaning when really I should have been writing (Ingrid, Kirsty Hudson, Kirsty Drew, Sara, Stephen, Becci and Lorna). It has been a long old trip and I thank you for holding my hand along the way. In particular, a huge thank you goes to Sarah Macdonald for being so supportive and helpful. I hope I can repay you now it's your turn.

Sarah Thomas for constantly telling me that if it were meant to be easy, everyone would be doing it. Good luck on your own adventure. Hvala ti!

Matt Wise, Zoë Macdonald and Lorellei Simon for administrative input.

Those who have been on their own journeys alongside me over the past few years, some of whom have reached the end of the tunnel and some of whom are still feeling your way through the dark (Naomi, Penny, Ingrid, Stephen, Matthew and Nick).

Mum, Vanessa and Richard for nagging me to finish, for your help, and for putting up with my elusive and unsociable behaviour over the last year. I'll make it up to you somehow.

Finally, to those not named who have been there for me in one way or another, providing an ear to bend, a much needed distraction or simply by putting up with my petulant and anti-social behaviour. It has meant a lot to me. Thank you.

The ASSIST Team

Principal Investigators:

Laurence Moore, Gareth Williams (Cardiff University), Rona Campbell (University of Bristol), Mick Bloor (Glasgow University), Nina Parry-Langdon (Office for National Statistics)

Cardiff team

Researchers: Jo Holliday, Mark Sidaway

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Clerical support: Zoë Macdonald, Linda Esprit

Bristol team

Researchers: Fenella Starkey, Suzanne Audrey

Trainers: Kathleen Cordall, Nicola Hewer, Heather Anderson-Paine

Clerical support: Valerie Karatzas, Lisa Baker, Jen Jamieson

SUMMARY

This thesis uses the ASSIST intervention (a school-based, peer-led smoking intervention) to explore issues relating to the successful diffusion of a health promotion message through informal contacts.

Social network data and process evaluation data gathered during the evaluation of the intervention are used to examine whether opinion leaders (peer supporters) identified through a 'whole-community' approach to peer nomination were appropriate to disseminate a smoke-free message to their peers and whether this social diffusion approach is acceptable to young people. More specifically, the aims are to i) investigate whether the peer supporters were appropriate in terms of their position in social space, ii) ascertain whether their peers perceived them as suitable to adopt the role, and iii) examine issues relating the the acceptability of the ASSIST approach.

The peer nomination process identified peer supporters who were largely appropriate to undertake the peer supporter role. They were significantly more influential in terms of their social position than other students in their year. They were also contained in a range of social groups and the majority of students knew at least one peer supporter. Peer supporters were representative of the rest of the year group but were more likey to be smokers than other students. Respondents considered the majority suitable to carry out the role although more positive appraisals were received from peer supporters.

The ASSIST approach was in general viewed positively by the students involved. Respondents reported being happier talking with their peers than adults about smoking. Peer supporters had conversations about smoking. However, these conversations tended to be with non-smoking friends and peer supporters. The majority of respondents were positive about peer supporters talking to other Year 8 students about smoking although more encouraging appraisals were received from peer supporters and non-smokers.

The findings will provide valuable learning which may be utilised to maximise the effectiveness of future applications of this novel approach both in the field of smoking prevention and elsewhere.

PUBLICATIONS AND PRESENTATIONS RELATING TO THIS THESIS

PEER-REVIEWED JOURNAL ARTICLES

Starkey, F., Holliday, J., Audrey, S., Moore, L. and Campbell, R. (In preparation), How to identify influential young people to undertake peer education producing health behavior change: the example of A Stop Smoking in Schools Trial (ASSIST).

Campbell, R., Starkey, F., Holliday, J., Audrey, S., Bloor, M., Parry-Langdon, N., Hughes, R., & Moore, L. (Submitted). School's -based smoking prevention in adolescence: findings from a cluster randomised trial of an informal, peer-led intervention (The ASSIST study). *New Engalnd Journal of Medicine.*

Audrey, S., Holliday, J., & Campbell, R. (In Press). Commitment and compatibility: Teacher perspectives on the implementation of a school-based health promotion programme. *Health Education Journal.*

Audrey, S., Holliday, J., & Campbell, R. (2006). It's good to talk: An adolescent perspective of talking to their friends about being smoke-free. Social Science and Medicine. 63, 2, 320-334.

Audrey, S., Holliday, J., Parry-Langdon, N., and Campbell, R., et al. (2006). Challenges of implementing process evaluation within randomised controlled trials: the example of ASSIST. Health Education Research. 21, 3, 366-377.

Starkey, F., Moore, L., Campbell, R., Sidaway, M. and Bloor, M. et al. (2005) Rationale, design and conduct of a school-based peer-led anti-smoking intervention in the UK: the ASSIST cluster randomised trial [ISRCTN55572965]. BMC Public Health, 5, 43.

Moore, L., Campbell, R., Starkey, F., Sidaway, M., Holliday, J., Audrey, S., Parry-Langdon, N. and Bloor, M. (2004) A schools-based, peer-led, anti-smoking intervention that appears to work! MRC ASSIST trial. Journal of Epidemiology & Community Health, 58, supplement 2, A26 - A27.

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Parry-Langdon, N., Bloor, M., Audrey, S. and Holliday, J. (2003) Process evaluation of health promotion interventions. Policy and Politics, 31, 2, 207-16.

SELECTED CONFERENCE PRESENTATIONS

Holliday, J. The ASSIST intervention: Successfully harnessing informal social networks to reduce adolescent smoking. *The British Sociological Association's Social Network Analysis Group Inaugural Meeting,* Manchester, 2006.

Audrey, S., Holliday, J. and Campbell, R. on behalf of ASSIST (A Stop Smoking in Schools Trial). The activities of peer supporters for A Stop Smoking in Schools Trial (ASSIST). *Promoting excellence in public health: improving our public health through evidence-based practice: Ninth South West Public Health Scientific Conference*, Torquay, 2005.

Holliday, J., Moore, L., Campbell, R., Starkey, F., Audrey, S., Parry-Langdon, N. and Bloor, M. The ASSIST intervention: Successfully harnessing informal social networks to reduce adolescent smoking. *International Sunbelt Social Network Conference XXV,* Los Angeles, 2005.

Holliday, J., Moore, L., Campbell, R., Starkey, F., Sidaway, M., Audrey, S. and Bloor, M. Peer nomination as a method of selecting socially influential young people for peer-led health promotion: a social network perspective. *British Sociological Association Medical Sociology Conference.* York, 2004.

Holliday, J., Audrey, S., Parry-Langdon, N. and Campbell, R. Implementing process evaluation within a randomised controlled trial to evaluate a schools-based, peer-led smoking intervention. *British Sociological Association Medical Sociology Conference.* York, 2004.

Holliday, J. and Moore, L. on behalf of ASSIST. An intervention using peer supporters to spread anti-smoking messages through their social networks: rationale, implementation and impact in 30 schools. *International Sunbelt Social Network Conference XXIV.* Slovenia, 2004.

Holliday, J. and Moore, L. Peer nomination as a method of selecting socially influential students for peer-led interventions: a social network perspective. *International Sunbelt Social Network Conference XXIV.* Slovenia, 2004.

POSTER PRESENTATIONS

Holliday, J. on behalf of ASSIST (A Stop Smoking in Schools Trial) Using peer nomination to select socially influential young people for peer-led interventions: a social network perspective. *Applications of Social Network Analysis to the Prevention of Substance Use and Delinquency,* Pennsylvania State University, 2005.

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~ CHAPTER 1 ~

1 INTRODUCTION

1.1 Overview

Smoking causes numerous health problems and results in an estimated 114,000 deaths per annum in the UK alone (Petersen & Peto, 2004). The majority of these deaths are as a result of cancer (including lung, larynx, pharynx, oesophagus, bladder, kidney and pancreas (IARC, 2004; Petersen & Peto, 2004)), chronic obstructive pulmonary disease and coronary heart disease.

Smoking rates among adults have declined significantly over the past 25 years, although since 1990, reductions have been less marked (Goddard & Green, 2005). Amongst young people, rates have fluctuated significantly, seeing a noticeable rise between the mid-1980's and mid-1990's, and a subsequent decrease in the following five years. Since the turn of the century, rates have stabilised (Fuller, 2005; Glickman et al., 2006; National Assembly for Wales, 2002). However, there is a marked difference between smoking rates amongst adolescent boys and girls. The most recent figures show that in 2004, 26 per cent of girls in England smoked compared to 16 per cent of boys (Fuller, 2005). And in Wales in 2003, 28 per cent of 15-16 year old girls smoked compared to 19 per cent of boys (Glickman et al., 2006).

Smoking uptake is highest during the teenage years with 82 per cent of all smokers in the UK starting to smoke during this stage of the lifecourse (Department of Health, 1998b). The earlier in life a person starts to smoke, the less chance they have of giving up (Breslau & Peterson, 1996; Fergusson & Horwood, 1995) and the greater the chance of health problems in the future (Department of Health, 1998b). Therefore, there is a definite need to prevent young people from taking up the habit.

If smoking amongst adolescents is to be prevented it is essential to have a comprehensive understanding of the determinants of smoking uptake. This has been a topic of interest for researchers for several decades and a number of associated factors have been identified. These have been categorised as: sociodemographic factors; behavioural factors; personal factors; societal and cultural factors; and environmental factors. Research has generally demonstrated mixed results regarding the relative importance of these in adolescent smoking behaviour. However, environmental factors, particularly social norms, and the influence of the friends are of particular importance.

In line with developments in the field of health promotion in general, preventive efforts to reduce adolescent smoking have been focused away from the provision of knowledge to approaches that target the social factors associated with behaviour. Many of these interventions are grounded in psychosocial theory. Whilst a number of interventions such as price increases, law enforcement, mass media campaigns and community interventions have been identified as promising, school-based 'social' interventions have been a particular focus of preventive efforts for adolescents. However, evidence of the effectiveness of school-based approaches is mixed and the quality of evaluative studies has been criticised (Stewart-Brown, 2006; Thomas, 2003). The delivery of these interventions by teachers poses a number of problems, and it is proposed that a more appropriate method of delivery is through the use of peers.

In the last two decades peer education has become increasingly popular in the field of adolescent smoking prevention. Whilst peer education can adopt a number of approaches, including the delivery of structured lessons, less formal methods of information provision (such as drama, operating resource centres and outreach) have also been used. Diffusion approaches are the least formal approach and involve the informal dissemination of information through social networks. These interventions have been delivered by a range of peer educators who have been identified using a variety of techniques.

Peer education is consistently cited as an appropriate approach to adolescent health promotion and a number of reasons for this have been identified by Turner and Shepherd (1999). However, 'traditional' formal peer education has been the subject of criticism. While there is some evidence of effectiveness of peer education in general, and more specifically in relation to adolescent smoking prevention, the methodological quality of evaluation of both the process and outcome of peer education has been questioned (Harden et al., 1999). Furthermore, a number of barriers to successful implementation have been identified which largely relate to the reality of young people delivering formal classroom-based peer education. This suggests that more informal approaches (which are grounded largely in diffusion theory) to disseminating health-related messages may be more appropriate and acceptable to young people.

Turner and Shepherd (1999) propose that interventions based on this theory have potential and provide support for several rationales for peer education: peers are credible sources of information; peer educators act as positive role models; peer educators are more successful at imparting information; peer education is a more acceptable method of education than other methods; peer education provides the opportunity for ongoing reinforcement; peer education is more cost-effective than other methods; peer education draws on and utilises existing information sharing networks; and peer education can access hard to reach groups.

Despite the potential for this approach, a number of issues have been identified which affect the diffusion of innovations (in this case a health promotion message) within populations (Rogers, 1995) and which have the potential to affect the effectiveness of these interventions. These issues relate to: change agents and opinion leaders (for example, personal characteristics, behaviour and accessability to the target population); characteristics of adopters in the social system who will implement a new idea (for example, personal characteristics, behaviour and position in social networks); innovation qualities; nature of the social system (for example, characteristics of

community and structure of the social network); and the environmental context. Investigating such issues can increase understanding of the processes involved in peer education and allow researchers to more successfully harness peer education to promote positive health choices.

This thesis uses the ASSIST (A Stop Smoking in Schools Trial) intervention (a schools-based, peer-led smoking prevention intervention for adolescents (Audrey et al., 2004)) to explore a number of issues relevant to the success of informal peer education approaches.

The ASSIST model used a whole-community nomination process which asked Year 8 students to identify any other students in their year who they 'respected', considered 'good leaders' and 'looked up to' to nominate 'influential' peer educators (termed peer supporters). These influential students (who included both non-smokers and smokers) were given the opportunity to attend a two-day training session run by health promotion trainers which aimed to give them the information, skills and confidence to have informal conversations with their peers about being smoke-free. During the ten-week intervention, throughout which the peer supporters had these conversations, they were provided with support and encouragement through four school-based follow-up sessions led by the health promotion trainers.

At one-year follow-up, intervention school students who were in the 'high-risk' group of experimenters and ex-smokers at baseline were less likely to be weekly smokers than equivalent students in control schools. This suggests that the peer supporters did have an effect on the smoking behaviour of their peers.

This study aims to examine whether the peer nomination approach used in the intervention (which identified peer supporters on the basis of influence) was successful in identifying appropriate young people to deliver a smoke-free message to their peers through informal, everyday conversations. It examines whether they were appropriate in terms of both their position in social space, and whether their peers perceived them as suitable. It also explores whether the young people involved considered this novel approach to adolescent smoking prevention acceptable. The findings will provide valuable learning which

may be utilised to maximise the effectiveness of future applications of this approach both in the field of smoking prevention and elsewhere.

1.2 Outline of the thesis

This thesis has nine chapters. The literature review is presented in chapters two to four. Chapter two considers the scale of the problem of smoking by describing the health and financial costs to smokers and non-smokers, and the epidemiology of smoking in England and Wales. It also considers reasons for uptake of smoking in adolescence. Chapter three provides detail of a number of approaches which have been used to discourage adolescents from smoking, outlining the most promising of these. Chapter four considers peer education as one such approach. In particular, it details the advantages of informal peer education approaches grounded in diffusion of innovations theory and identifies factors that affect the success of such interventions.

Chapter five provides the context for the current study, describing the ASSIST intervention; a recent application of the social diffusion model in the field of adolescent smoking prevention. A number of research aims are identified, and the most suitable methods (social network data and process evaluation data) to answer these are presented in chapter six. The seventh chapter details the collection of these data in the context of the ASSIST evaluation, and describes in detail the data collection and analysis methods used to answer the research questions of this study. Chapter eight presents the results of the study. The concluding chapter nine discusses the results of the research. It identifies a number of methodological issues relevant to this study and suggests future useful research. Finally, it provides a number of conclusions and implications for the future implementation of this model.

~ CHAPTER 2 ~

2 SMOKING

This is the first of three literature review chapters. The strategies utilised to gather literature for each chapter of this review are outlined in Appendix 1.

This chapter aims to provide an overview of the health, social and financial implications of smoking tobacco. It describes the epidemiology of smoking amongst adults and young people in England and Wales over recent years, highlighting the scale of the problem and identifies a number of reasons why it is important to target adolescent smoking. Understanding the aetiology of adolescent smoking behaviour is recognised as important for the development of effective interventions. This chapter therefore details a number of factors associated with the uptake and progression of adolescent smoking.

2.1 Smoking and Health

The health effects and costs of smoking to individuals and society in terms of morbidity and mortality are thoroughly documented (for example, British Medical Association, 2004a; British Medical Association, 2004b; Department of Health, 1998a; IARC, 2004; Petersen & Peto, 2004; Royal College of Physicians, 2000; USDHHS, 1994). It has long been acknowledged that smoking is a major public health hazard, contributing to the poor health and death of thousands of Britons a year (a number of the health effects of smoking are included in Appendix 2). Many of the conditions attributed to smoking do not become apparent until many years after exposure, either as a direct result of smoking tobacco, or indirectly through inhalation of other people's tobacco smoke (passive smoking). Consequently, the effects on morbidity and mortality of an increase or decrease in smoking rates

within a population may not been seen for some time (Banoczy & Squier, 2004; Edwards, 2004).

Smokers double their risk of dying before the age of sixty five (Department of Health, 1998b). Half of those who continue to smoke throughout their life are eventually killed by it, with half these deaths occurring before the age of sixty nine (European Commission, 2000). It is estimated that current rates of smoking contribute to the death of around 114,000 people each year in the UK alone (Petersen & Peto, 2004). The majority of these deaths are from lung cancer, chronic obstructive lung disease and coronary heart disease. Numerous other causes of illness and death are also attributable to smoking such as stroke, chronic respiratory disorders and a number of other cancers (Department of Health, 1998a; Department of Health, 2000b; Jabbour et al., 2002; U. S. Department of Health and Human Services Centers for Disease Control and Prevention, 1999). It is estimated that approximately one third of all deaths from cancer are as a result of smoking (Petersen & Peto, 2004) of which lung cancer is the most prevalent, causing an estimated 1.2 million deaths worldwide per year (IARC, 2004), and approximately 30,000 deaths per year in the UK (Department of Health, 1999). In addition to lung cancer, smoking is also a recognised cause of cancers of the larynx, pharynx, oesophagus, bladder, kidney and pancreas and is also associated with cancers of the nasal cavities and nasal sinuses, stomach, liver and cervix, and myeloid leukaemia (British Medical Association, 2004b; IARC, 2004; Petersen & Peto, 2004).

Smokers also face a higher risk of other illnesses that are not fatal but can cause many years of debilitating illness or severe health problems. For example, it is associated with increased risk of osteoporosis (Webster, 1994), reduced bone density (Law & Hackshaw, 1997), premature facial wrinkling (Koh et al., 2002), oral disease (Banoczy & Squier, 2004), poor reproductive health in both men and women (British Medical Association, 2004b), and numerous eye complaints (BBC news, 2004). A number of more minor illnesses have an increased risk amongst smokers. Adult smokers are more likely to

suffer from coughs and colds than non-smokers (Action on Smoking and Health, 1999) and young people who smoke are at immediate risk of incurring smoking-related health problems. They are more likely to have coughs, phlegm, wheeziness, shortness of breath and take time off school (Charlton & Blair, 1989a).

Smoking during pregnancy causes a number of complications such as increased risk of congenital defects, miscarriage, premature birth, having a baby of reduced birth weight, and perinatal death (British Medical Association, 2004b; Poswillo, 1998; Wanless, 2003).

2.2 Passive smoking

Millions of people smoke, causing indoor air pollution and subjecting others to secondhand smoke (sometimes known as environmental tobacco smoke) in social settings, and homes. Secondhand smoke is a mixture of over 4,000 compounds in vapour and particulate phases many of which are toxic and/or carcinogenic. The vapour phase includes chemicals such as carbon monoxide, ammonia, formaldehyde and hydrogen cyanide. The particulate phase includes nicotine, tar, and benzene (Brown, 1992). Secondhand smoke comprises directly exhaled mainstream smoke, and sidestream smoke which comes from the burning cigarette. Both are potentially harmful, but sidestream smoke contains a higher proportion of carcinogens (Samet, 1999).

Passive smoking exposes non-smokers to significantly less smoke than a smoker inhales (Action on Smoking and Health, 1999). However, the health effects of passive smoking show similar patterns to that of smokers (Department of Health and Committee on the Medical effects of Air Pollutants, 1997), and the longer an individual is exposed to secondhand smoke, the more chance they have of disease.

Some of the immediate effects of passive smoking are associated with the irritant nature of secondhand smoke, for example, eye irritation, headaches, cough, sore throat, dizziness and nausea. Longer-term exposure exacerbates the onset of several smoking-

related diseases. Passive smoking causes stress to the respiratory, circulatory and nervous system (Winberry & Murphy, 1993), increasing the risk of heart disease (Kawachi et al., 1997; Law et al., 1997; Wells, 1998; Whincup et al., 2004), the onset and aggravation of asthma, impaired lung function, and increased bronchial responsiveness (Janson, 2004). It also increases the risk of lung cancer (Brennan et al., 2004; Hackshaw et al., 1997; IARC, 2004).

Jamrozik (2005) estimated that exposure to secondhand smoke in UK homes causes around 2,700 deaths in people aged 20-64 and a further 8,000 deaths a year among people aged 65 years or older. Passive smoking in the home is a problem for nearly half of children in the UK (Jarvis et al., 2000). Children living with two smokers are exposed to a similar amount of nicotine as they would be if they smoked 80 cigarettes a year (Jarvis et al., 1985), and have a 72 per cent increased risk of respiratory illness (Strachan & Cook, 1997). Amongst young people, passive exposure increases the risk of cancers, bronchitis, pneumonia, lung disorders, asthma attacks, conditions such as glue ear and sudden infant death syndrome, (Action on Smoking and Health, 2003; Department of Health, 1998a; Health Development Agency, 2001; Janson, 2004; Mannino et al., 2002; Scientific Committee on Tobacco and Health, 2001). Research has shown that simple restrictions of smoking within the home reduces exposure to tobacco smoke and therefore the health risks of living with adult smokers (Biener et al., 1997; Mannino et al., 2002).

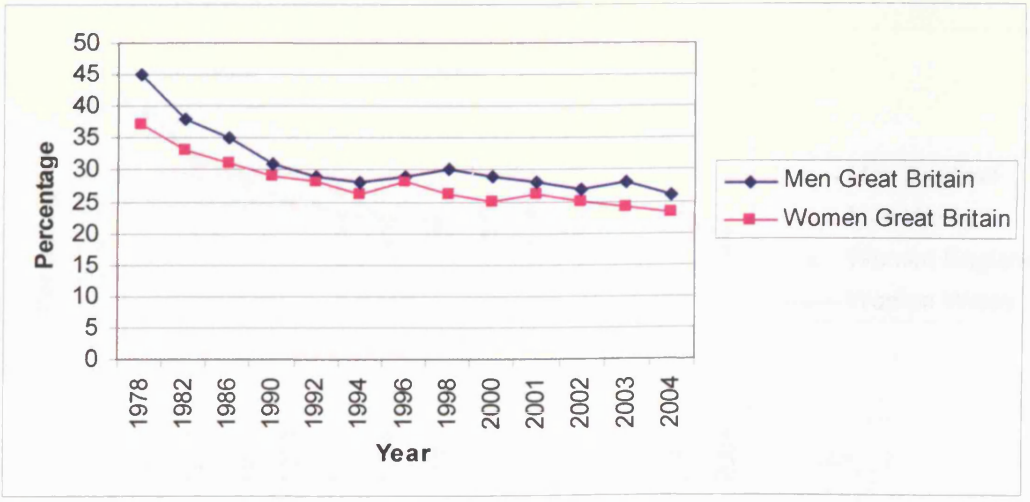
2.3 Epidemiology of smoking in England and Wales

A number of large-scale surveys have been conducted over the years which have gathered data regarding the smoking behaviour of adults and young people in England and Wales. However, there is much variability between these data sources in terms of the data collection methods (face-to-face interviews and surveys), the measures used to assess smoking behaviour and, of particular relevance to young people,

the age ranges reported in results. It is therefore difficult to compare the results of these data sources. Therefore, this review is only able to report data which is available and which may not be directly comparable. Where possible, however, the most comparable sources are presented. The following discussion will concentrate predominantly on data collected through the Office for National Statistics (ONS) General Household Survey for adults, the Health Behaviour in School-aged Children (HBSC) study for young people in Wales, and the Smoking, Drinking and Drug Use among Young People survey for young people in England.

2.3.1 Adults

Figure 1: Prevalence of cigarette smoking by sex: Great Britain, 1978 to 2004



NB. Weighted figures used from 1998 onwards

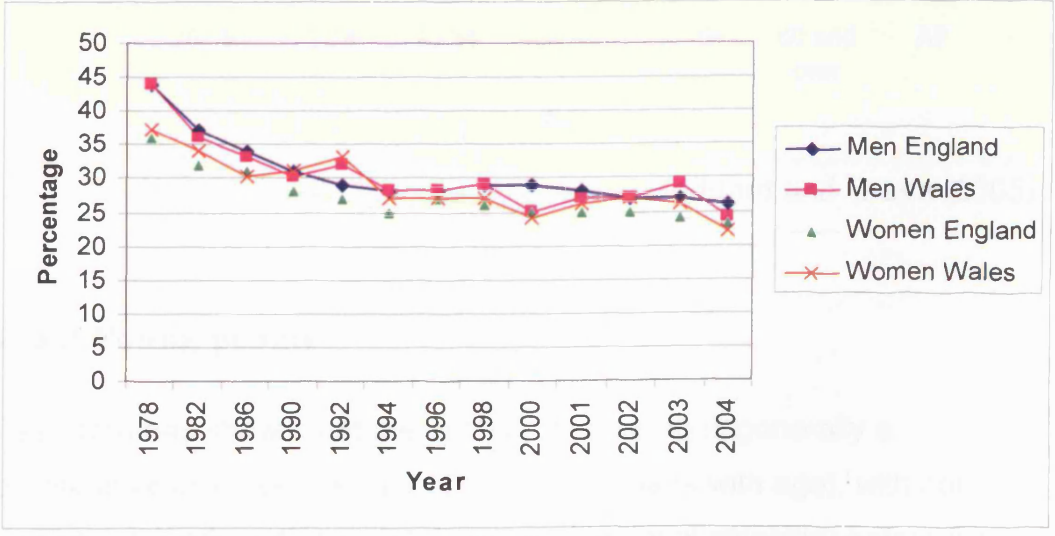
Source: Goddard and Green (2005)

In general, smoking rates in Great Britain have been falling steadily since the 1970's (see Figure 1). Data from the 2004 General Household Survey show that overall prevalence has fallen from 40 per cent in 1978 to 25 per cent in 2004, although a number of fluctuations have been observed. The rapid reduction in prevalence observed in the 1970's and

1980's has since slowed, and overall prevalence has dropped only 5 per cent since 1990. Prevalence has consistently been higher amongst men than women, and although this gap is currently smaller than in recent decades, recent estimates show that 26 per cent of men compared to 23 per cent of women in Great Britain smoke.

When these data are examined for England and Wales, a similar trend is observed in both countries (see Figure 2). As with the data for Great Britain, this decline has not been consistent, and slight fluctuations have been recorded. Furthermore, little reduction has been observed since 1990 in either country. Overall prevalence in Wales has decreased more significantly than in England, falling from 31 per cent in 1990 to 23 per cent in 2004. In England, rates have fallen from 29 per cent in 1990 to 25 per cent in 2004.

Figure 2: Prevalence of cigarette smoking by sex: England and Wales, 1978 to 2004



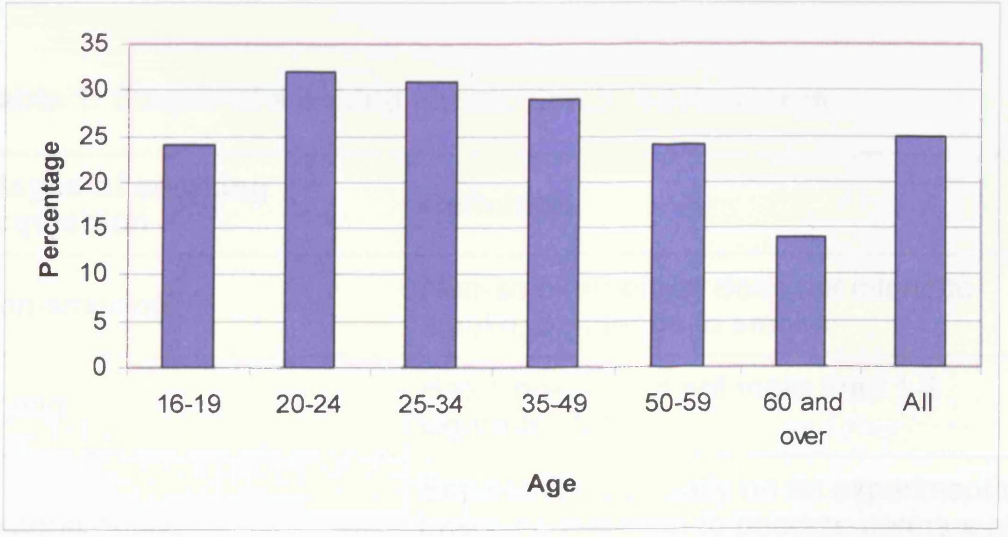
NB. Weighted figures used from 1998 onwards

Source: Goddard and Green (2005)

Since the 1990's smoking prevalence in Great Britain has been highest amongst 20-24 year olds for both men and women, but lowest among people over 60 (Goddard & Green, 2005; Lader & Goddard, 2005). This is probably because the majority of smokers take up the habit in their

teens and early 20's, and are less likely to be giving up the habit than those in older age categories. In 2004, prevalence rates among the 20-24 year olds remained higher than in other groups, at 32 per cent (see Figure 3). An explanation for the decrease in overall prevalence seen since the 1970's therefore seems to be the sizeable reduction in smoking rates for people aged 35 and over (Department of Health, 2000b; Royal College of Physicians, 2000; Wanless, 2003).

Figure 3: Prevalence of cigarette smoking by age, 2004



Source: Goddard and Green (2005)

2.3.2 Young people

Research has shown that the uptake of smoking is generally a progressive process (the rate of which increases with age), with non-smokers experimenting with tobacco (occasional smoking) before they become regular smokers (Fergusson & Horwood, 1995). The linear nature of this progression is frequently cited (Breslau & Peterson, 1996; Fergusson & Horwood, 1995), although some research has demonstrated that the stages of smoking may be cyclical, and not linear (Pallonen et al., 1998).

These stages of smoking are variously defined in the literature. For example, Table 1, obtained from a US study identifies five stages of smoking and defines regular smoking as smoking monthly. On the other hand, many UK studies, particularly large-scale surveys, identify adolescent smokers as belonging to one of four categories (never smokers, ex-smokers, experimenters (smoke less than weekly) and regular smokers), and define regular smoking as smoking weekly i.e. one cigarette or more per week. This lack of consistency is problematic, particularly where the definition of each stage is not reported, as seems to be the case in many studies.

Table 1: Stages of smoking acquisition in adolescents

Stages of smoking acquisition	**Definition**
Non-smoking	Non-smoker; either does not intend to smoke, or intends to smoke
Trying	Has smoked, but not more than 1-2 cigarettes total
Experimenting	Smokes occasionally on an experimental basis; no intention to become permanent smoker
Regular smoking	Smokes at least one day a month, but not as frequently as one cigarette a day
Established or daily smoking	Smokes daily or almost daily, perhaps heavily on occasion; intensity indicative of dependence

Adapted from Mayhew et al (2000)

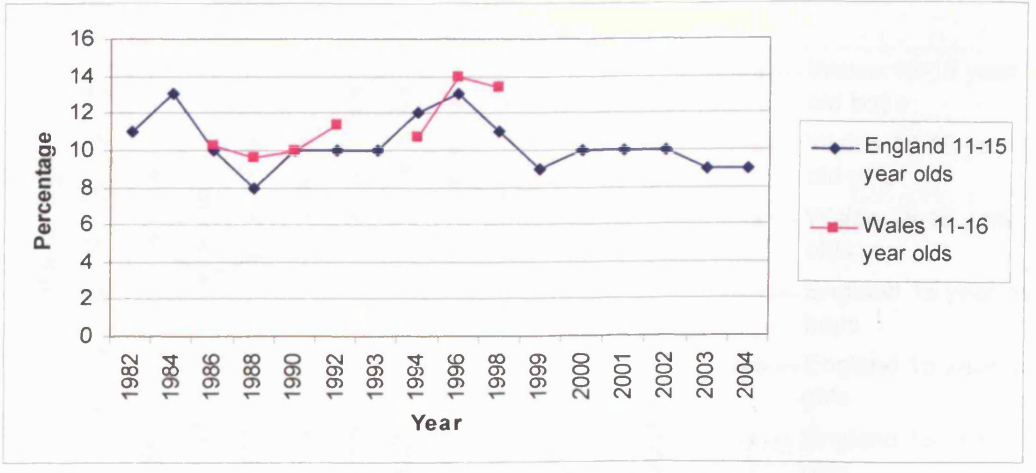
Since there is evidence that those young people who have smoked in the past are more likely to progress to regular smoking than non-smokers, and there is an acknowledged tendency for a transition from occasional smoking to regular smoking, this group can be classified along with those occasional smokers as those at 'high-risk' of becoming

regular smokers. One the other hand, non-smokers, in comparison may be classed as at 'low-risk' for the uptake of regular smoking.

A series of Government surveys conducted biennially from 1982 to 1998 and annually thereafter have shown that prevalence of regular smoking (defined as smoking at least one cigarette per week on average) among 11-15 year olds in England remain high (Department of Health, 2000a; Department of Health, 2001; Department of Health, 2002a; Department of Health, 2002b; Fuller, 2005; National Centre for Social Research, 2004). Rates fluctuated in the late 1980's and early 1990's (see Figure 4). Since 1996, however, rates seem to have stabilised and the current rate is at a low of 9 per cent.

Similarly, in Wales, smoking rates for 11-16 year olds have fluctuated since 1986, reaching a peak of 14 per cent in 1996, but declining to 13.4 per cent in 1998 (National Assembly for Wales, 2002). More recent amalgamated data is not available for 11-16 year olds in Wales.

Figure 4: Proportion of young people smoking at least one cigarette per week in England and Wales



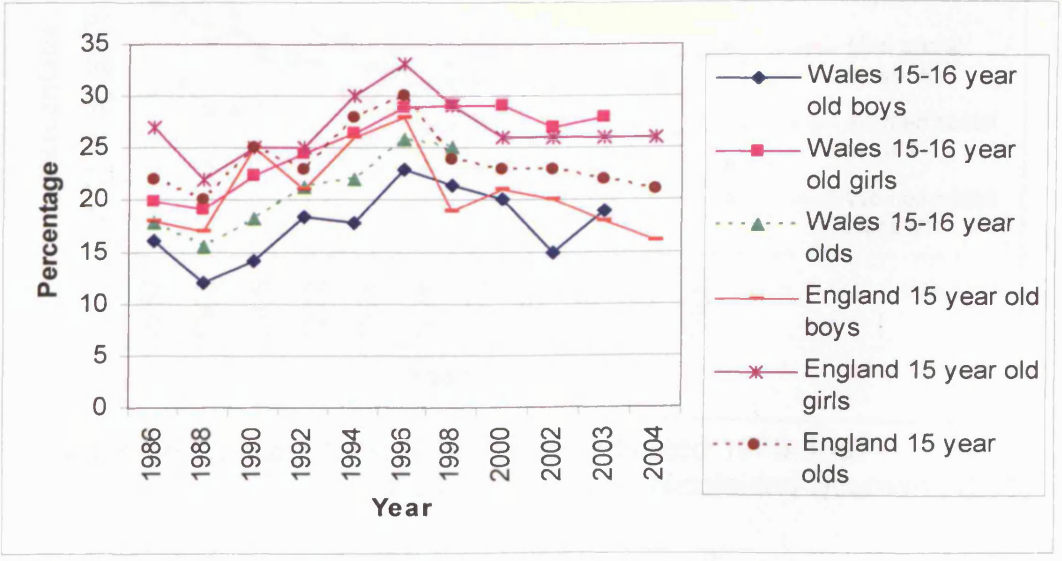
Source: Fuller (2005) and National Assembly for Wales (2002)

Very few young people have started smoking by the time they go to secondary school and so it is not surprising that prevalence amongst 11 and 12 year olds in England and Wales has not exceeded 4 per cent in

the past 20 years (Fuller, 2005; Roberts et al., 2002). Predictably, as age increases, so does prevalence of smoking, and rates amongst 15 and 16 year olds are dramatically higher (see Figure 5). Prevalence among this age group increased significantly in the 1990's, reaching a high of 30 per cent and 26 per cent in 1996 in England and Wales respectively. Since this time, however, rates have fallen again, and in 2004, they had dropped to 21 per cent in England (Fuller, 2005). Data are not available after 1998 in Wales.

As Figure 5 shows, prevalence is also related to gender. Until the mid 1980's, girls and boys were just as likely to smoke. Since then, girls in both England and Wales have been more likely to smoke than boys. This gap has gradually become wider and recent figures show that in 2004, 26 per cent of girls aged 15 in England smoked, compared to only 16 per cent of boys (Fuller, 2005). In Wales in 2003, 28 per cent of 15-16 year old girls smoked compared to 19 per cent of boys of the same age (Glickman et al., 2006).

Figure 5: Prevalence of regular smoking amongst 15-16 year olds by sex: England and Wales, 1986 to 2004



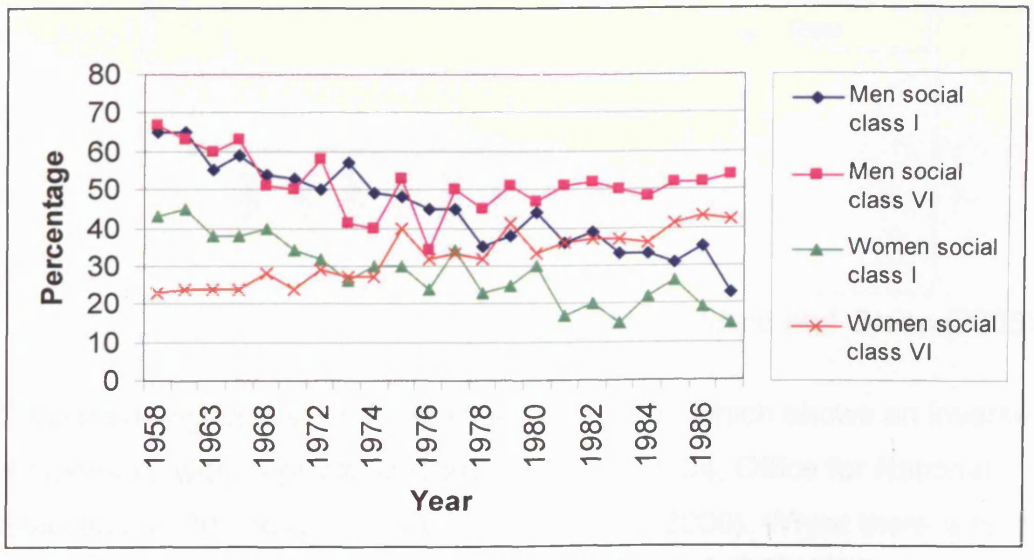
NB. Recent amalgamated Welsh data not available after 1998
Source: Fuller (2005), National Assembly for Wales (2002) and Glickman and colleagues (2006)

2.4 Smoking and health inequalities

Smoking has been identified as a major cause of health inequality (the disproportionately higher levels of poor health amongst those in lower socioeconomic groups than amongst the majority population). Smoking accounts for over half of the difference in risk of premature death between social classes and high levels of smoking in lower socioeconomic groups can be matched with the high rates of cancer (Jarvis & Wardle, 1999) and coronary heart disease.

Smoking rates are disproportionately higher in lower socioeconomic groups and among individuals living in deprived areas than amongst those who are in higher socioeconomic groups or living in more affluent areas (Barbeau et al., 2004; Department of Health, 1998b; Department of Health, 1999; Reijneveld, 1998; Wanless, 2003).

Figure 6: Percentage of men and women who smoke tobacco* by social class: 1958-1987, Great Britain



* except pipe tobacco, for women. Sales adjusted 1969-1987

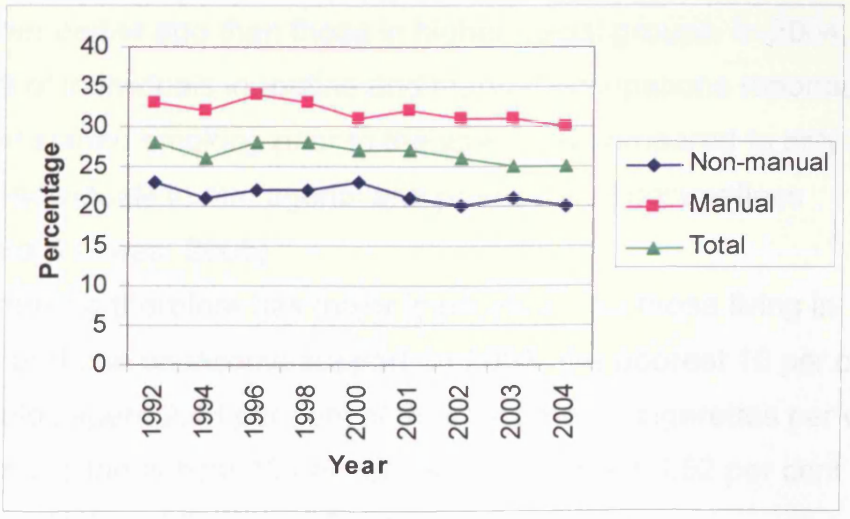
Source Wald and Nicolaides-Bouman (1991)

Figure 6 shows how the difference in smoking rates between the social classes did not become apparent until the 1970's, prior to which women in social class I were more likely to smoke than those from social class

VI and approximately equal percentages of men in these social classes were smokers.

Despite a reduction in overall smoking prevalence in the UK (see section 2.3) in recent years, there has been little change in smoking rates amongst those in lower social classes nor in the difference in rates between social groups (Goddard & Green, 2005; Lader & Goddard, 2005) (see Figure 7). In England in 2004, 31 per cent of people in manual occupations smoked compared to 22 per cent in non-manual groups (Goddard & Green, 2005).

Figure 7: Prevalence of regular smoking by adults aged 16 and over by occupational group of household reference person in England, 1992-2004



Source: Goddard and Green (2005)

Similar findings are seen for smoking cessation which shows an inverse relationship with deprivation (Barbeau et al., 2004; Office for National Statistics, 2000; Royal College of Physicians, 2000). Whilst there is little difference between the proportion of adults who *would like to give up* by socioeconomic status (classified by managerial and professional, intermediate, and routine and manual) (Goddard & Green, 2005) which shows that individuals in different socioeconomic groups are just as motivated to quit smoking, a difference is seen in *attempts* to give up. The 2004 Smoking-related Behaviour and Attitudes survey found that

68 per cent of those who had never worked or who were long-term unemployed had ever tried to give up smoking compared to 74 per cent of those in routine and manual occupations, 77 per cent of those in intermediate occupations and 75 per cent of those in managerial and professional occupations (Lader & Goddard, 2005).

Unsurprisingly, therefore, young people from poorer backgrounds are more likely to be exposed to passive smoking in the home than those from more affluent backgrounds. Furthermore, it is not unexpected that they are more likely to start smoking than those in higher socioeconomic groups (Health Development Agency, 2001). This difference becomes more apparent in adulthood when half of young people from higher socioeconomic groups have quit compared to a quarter in the lower groups (Jarvis & Wardle, 1999).

Adults in lower social groups who have ever smoked regularly start at an earlier age than those in higher social groups. In 2004, 44 per cent of individuals in routine and manual occupations reported that they had started smoking prior to the age of 16 compared to only 29 per cent of individuals in managerial and professional occupations (Goddard & Green, 2005).

Smoking therefore has major implications for those living in poverty or those on income support. In 2003, the poorest 10 per cent of households spent 2.43 per cent of their income on cigarettes per week compared to the richest 10 per cent who only spent 0.52 per cent (Office for National Statistics, 2004).

2.5 Financial cost of smoking

Decreased productivity of the workforce through illness and cigarette breaks is financially unacceptable for employers and can lead to inequalities within the workplace. Each year about 34 million days are lost in England and Wales due to sickness-related absenteeism (Parrott & Godfrey, 2004). A 1999 survey by the Confederation of British Industry estimated that sickness-related absenteeism costs the UK

employer over £12 billion a year (Promoting Health, 2000). The Guardian (2000) estimated that smokers spend an average of thirty-six minutes a day on cigarette breaks so it is no surprise that non-smokers often feel that they are working harder for the same pay as smokers who take time off to smoke. This may in turn affect productivity amongst the non-smoking workforce.

In England in 1997-1998, an estimated 364,000 patients were admitted to hospital with smoking-related illnesses (Royal College of Physicians, 2000). This incurs significant costs and in the UK, it is estimated that the treatment of smoking-related disease costs the NHS £1.4bn-£1.5bn per year which equates to approximately 0.16 per cent of the gross domestic product. £127m of this is spent on the treatment of lung cancer alone (Parrott & Godfrey, 2004). The difference between this expenditure and the health care costs attributed to non-smokers is massive (Buck, 1997). Other costs include payment of benefits to people who are unable to work because of tobacco-related illness and the payment of pensions and benefits to the dependents of people who have died as a result of smoking (Action on Smoking and Health, 2006).

2.6 Smoking cessation

Not only are the health benefits of giving up smoking numerous and immediate (Department of Health, 1998b; Edwards, 2004; USDHHS, 1990) (see Appendix 3) but the personal economic benefits of quitting are substantial (Action on Smoking and Health, 2000).

In 2004, 73 per cent of smokers reported that they intended to give up the habit (Lader & Goddard, 2005). However, many smokers actually continue to smoke, not because they want to but because they are addicted to nicotine. The addictive nature of nicotine is shown by the inconsistency between the number of smokers who say that they want to quit and the number who are successful. Success rates are generally low and it takes on average between four and seven attempts before a smoker is able to give up. Because heavier smokers find it

more difficult to quit the habit, it is estimated that approximately 16 per cent of 'hardcore' (adult) smokers are more resistant to quitting (Jarvis et al., 2003).

Smokers who attempt to quit experience temporary physical and mental withdrawal symptoms including irritability, craving, anxiety, lack of concentration, restlessness, sleep disturbance, reduced heart rate, increased appetite and weight gain (Action on Smoking and Health, 2004b). Smoking cessation aids are designed to help overcome these withdrawal symptoms by providing a low dose of nicotine. Two pharmaceutical aids have been proven to assist smoking cessation; nicotine replacement therapy (Silagy et al., 2004) and bupropion (Britton & Jarvis, 2000).

Young people who smoke are also often keen to quit the habit but face similar issues relating to addiction. Many describe that they are dependent on cigarettes (Johnson et al., 2003). In 2004, 66 per cent of 11-15 year olds reported that they would find it difficult to abstain from smoking for a week while 79 per cent said that they would find it difficult to give up the habit altogether. In England in 2004, 41 per cent of young people who had been smoking for more than a year and 38 per cent of young people who had been smoking for less than a year said that they would like to give up the habit (Fuller, 2005). Of those who reported that they were regular smokers (smoked more than one cigarette a week), 68 per cent reported having tried to give up. As with adults, with increasing frequency and intensity of use, there is an increased likelihood of reporting nicotine withdrawal (Center for Disease Control and Prevention, 1994; Colby et al., 2000).

2.7 The need to reduce smoking amongst young people

There are numerous reasons why it is important to reduce smoking amongst adolescents. First and foremost, the health behaviours young people adopt and choices they make in their teens are likely to affect them throughout their lives. In the case of smoking, 83 per cent of

individuals who have ever smoked regularly start smoking prior to the age of 20. Only 6 per cent start when they are 25 or over (Goddard & Green, 2005). Therefore, if they do not start smoking before the age of 20, they are unlikely to start at all (Mowery et al., 2004). Furthermore, the younger a person starts to smoke, the more likely they are to smoke into their adult years (Royal College of Physicians, 2000). Early uptake is also thought to be related to the number of cigarettes smoked as an adult (Sowden et al., 2005).

Young people may 'unintentionally' become smokers, underestimating the addictive nature of tobacco, making them more likely to experiment with smoking. Indeed, one study found that young people who understand that addiction occurs soon after starting are unlikely to smoke at all (Wang et al., 2004). Young people are highly susceptible to nicotine addiction, becoming dependent shortly after starting smoking (DiFranza et al., 2002) and almost certainly by adulthood (Godeau et al., 2004). Since, as previously discussed smoking is a highly addictive habit, it is a largely one-way process and once young people have started smoking they are unlikely to quit (Breslau & Peterson, 1996; Fergusson & Horwood, 1995).

The ease of addiction and the health issues resulting from starting smoking at an early age suggest the need for intervention before initiation of tobacco use. However, since it is impossible to *prevent* all young people from smoking, it is necessary to assist cessation amongst those who have already started smoking and prevent occasional smokers from becoming regular smokers. Successfully preventing young people from smoking, and encouraging cessation will significantly reduce the number of adult smokers and incidence of tobacco-related conditions in years to come.

However, there are a number of critics of adolescent-focused smoking initiatives. The World Health Organisation Europe's evidence-based recommendations on the treatment of tobacco dependence (Raw et al., 2002) concentrates on inducing an immediate reduction in adult smoking rates. They suggest that preventing young people from smoking or aiding cessation in young people will not achieve this. This

will cause a reduction in adult smoking rates in several decades whereas encouraging cessation in adults will bring about an immediate change which will translate into a more direct health gain. Furthermore, Glantz (1996) suggests that focusing efforts on adolescents will detract from important cessation activities with adults.

2.8 Factors associated with adolescent smoking

Given that the prevalence and incidence of smoking in the UK is cause for concern and there are numerous reasons in support of preventing young people from taking up the habit, it is important to understand the aetiology of adolescent smoking behaviour. Understanding these factors is also important for the design of prevention programmes.

There are numerous factors associated with uptake and maintenance of smoking in adolescence (see, Conrad et al., 1992; Schepis & Rao, 2005; Tyas & Pederson, 1998; USDHHS, 1994). Young people are exposed to these influences in various settings such as the home, school and in social situations. Twenty five psychological factors which have been associated as having at least some association with adolescent smoking have been categorised by Tyas and Pederson (1998) as relating to behaviour, the individual, society and culture, sociodemographic factors and the environment. As Ellickson (2003) describes, some of these factors are selected i.e. who an individual chooses to be friends with, whereas some are imposed, i.e. the smoking prevalence in the school year. In addition to this, genetic factors have also been implicated in adolescent smoking. The following discussion briefly describes a number of these factors, but concentrates on the more frequently cited which are those classified as environmental factors. These are likely to be more amenable to intervention on an individual basis whereas others may only be influenced by large-scale intervention such as legislative change.

2.8.1 Genetic factors

Evidence that tobacco use is inherited has been provided by a number of large-scale twin studies (World Health Organisation, 2004). Genes have been implicated in the initiation of smoking, continuation of smoking and tobacco dependence. A large number of genes are likely to contribute to this, each of which contribute a small amount to the overall risk (Tyndale, 2003; World Health Organisation, 2004). However, the effect of genetic factors is thought to be less significant than social and environmental factors (White et al., 2003). For example, a recent twin study (Vink et al., 2005) ascertained that for smoking initiation, 44 per cent of the variation was explained by genetic factors, 51 per cent by shared environmental factors and 5 per cent by unique environmental factors. In terms of nicotine dependence, the authors reported that 75 per cent of variance was caused by genetic factors while the remaining 25 per cent was due to unique environmental factors.

2.8.2 Behavioural factors

2.8.2.1 School performance

School performance/academic achievement is inversely related to smoking behaviour (Dierker et al., 2004; Hawthorne, 1997; Hover & Gaffney, 1988; Jenkins, 1996; Maes & Lievens, 2003; Miller & Plant, 1996; Wang et al., 1994). Early onset of smoking has also been associated with low levels of education in later life (Paavola et al., 2004). Analysis of the Add Health dataset also found that trouble in school predicted initiation and progression to regular smoking for both boys and girls, and initiation of experimental smoking amongst boys (van den Bree et al., 2004).

2.8.3 Personal factors

2.8.3.1 Self-image

Positive views regarding smoking are important factors which encourage the uptake of smoking, particularly amongst young females. Young people often associate smoking with positive social image, in particular, maturity (Ransom, 1992). They may therefore utilise smoking as a route by which to gain positive social image (Rugkasa et al., 2001; Wearing & Wearing, 2000). Smoking has been identified by young people as a key factor associated with power and status at either end of the social hierarchy (Plumridge et al., 2002). Therefore, being a non-smoker was considered to label one as 'average'. The authors suggested that this could be overcome in boys by being 'sporty'. This is consistent with research discussed later in section 2.8.6.4.4 (Michell, 1997; Michell & Amos, 1997). However, girls had few ways to overcome this and may therefore smoke to achieve higher 'status'. This highlights how the manner in which young people feel they are perceived by others, for example their peers, is important in their decisions to smoke, and demonstrates how the peer group can indirectly influence adolescent smoking behaviour.

Smoking is also viewed as an appealing leisure activity, particularly for young women who often engage in smoking in a social context (Michell & Amos, 1997). Many also perceive smoking as a means of facilitating weight loss (Fulkerson & French, 2003; Lucas & Lloyd, 1999a). These factors may contribute to the disparity in smoking rates between young men and young women in the UK.

2.8.3.2 Self-esteem

Indicators of self-esteem are thought to be associated with adolescent smoking (Conrad et al., 1992; USDHHS, 1994). Whilst it might be expected that individuals with lower self-esteem may be more inclined

to smoke than those with higher self-esteem, the relationship is unlikely to be straightforward and it is probable that there is also a strong association with attachment to the peer group (Glendinning, 2002). Other recent work asked students to report the characteristics of classmates (Engels et al., 2006). A variable-centred approach showed that individuals who drank and smoked were considered more self-confident, sociable, aggressive, and less nervous, emotional, oriented towards achievement and withdrawn than those who did not. A person-centred approach suggested that individuals who were sociable and self-confident or aggressive and emotionally insecure were more likely to be smokers and drinkers. However, others have found that there is no relationship between low self-esteem and smoking (West & Sweeting, 1997).

2.8.3.3 Mood and stress

Adolescence is a time of physical and mental change and involves a number of events and experiences which may be perceived as stressful or create negative mood, such as exams and relationships. A link has been demonstrated between mood and depression, and smoking (Brown et al., 1996; Patton et al., 1996; Royal College of Physicians of London. Working Party on Smoking and the Young, 1992). However, the causal direction of this association is unclear (Brown et al., 1996; Martini et al., 2002). Smoking may be a way of managing mood but mood may also increase the risk of substance use by adolescents in certain social contexts, for example, those with low-quality friendships with substance-using peers. Alternatively, using substances may affect mood. Shared substance use may also help strengthen social ties and positive mood (Hussong & Hicks, 2003).

Stress or anxiety has also been associated with smoking initiation and maintenance (Byrne et al., 1995; Byrne & Mazanov, 2001; Koval et al., 2000; Reppucci et al., 1991; Royal College of Physicians of London. Working Party on Smoking and the Young, 1992; Siqueira et

al., 2000), as has depression and distress (Covey & Tam, 1990; Haarasilta et al., 2004). It has also been linked with decreased quit rates (Sussman et al., 1998) although those who do quit have fewer depressive symptoms than those who have been unsuccessful (Lam et al., 2005). Again the nature of this relationship is unknown (Kassel, 2000; Kassel et al., 2003). Stress experienced at a young age also predicts smoking at a later age (Brook et al., 2004; Koval et al., 2004). As with mood, smoking may also be used as a method of dealing with stress, through the effect of nicotine (Leventhal & Cleary, 1980; Pederson et al., 1997) and has been referred to as a means of dealing with stress among young people (Koval et al., 2004; Mates & Allison, 1992).

2.8.3.4 Anti-smoking attitude

More positive attitudes towards smoking are reportedly related to increased likelihood of smoking (Botvin et al., 1992; Eiser et al., 1991; Zhu et al., 1996). Piko (2001) reported that anti-smoking attitude, and disliking attitudes related to beliefs about the harmful effects and social influences of smoking were related to smoking. Despite this, she also proposed that anti-smoking attitude can be moderated by the effect of friends who smoke, highlighting again the importance of friends in adolescent smoking behaviour. The association with attitude is not as clear-cut as might be expected and a number of studies have found no association (McNeill et al., 1989; Stanton & Silva, 1991) or a relationship only for females (Charlton & Blair, 1989b).

2.8.3.5 Refusal skills

The extent to which young people are able to refuse the offers of cigarettes has been studied. Charlton and colleagues (1999) examined refusal skills amongst 11-15 year olds in two English schools and

reported that girls were more likely than boys to be offered cigarettes and more likely to accept it after two offers. Having a best friend who smoked increased the likelihood of being offered cigarettes demonstrating the importance of friends in the acceptance of cigarettes. Moreover, with age, the likelihood of being offered cigarettes increases, increasing the chance that adolescents will start to smoke. However, young people may play a more active role in the decision to refuse cigarettes than is commonly proposed. For example, it is suggested that accepting cigarettes may be more related to a lack of desire to refuse an offer rather than an inability to refuse (Minagawa et al., 1993).

2.8.4 Societal and cultural factors

2.8.4.1 Advertising and mass media

Another influence often identified as being particularly powerful in relation to adolescent smoking behaviour is the media, which capitalises on the seemingly positive elements of smoking. In particular, tobacco advertising and receptivity to cigarette promotions has been reported to determine smoking initiation (Lam et al., 1998; Lopez et al., 2004; Lovato et al., 2003; Unger & Xinguang, 1999). Owning a tobacco-branded product has been shown to increase the likelihood of smoking (Biener & Siegel, 2000; Sargent et al., 2000). Evidence has also been provided for a positive correlation between viewing smoking in films and smoking initiation among adolescents (Dalton et al., 2003; Sargent et al., 2005). On the other hand, a longitudinal study conducted with 803 Chinese American young people concluded that exposure to pro-tobacco media is not significantly associated with smoking (Chen et al., 2006). Not only is the influence of advertising and media important in this way but how these messages are interpreted and disseminated within the social context should be acknowledged.

2.8.5 Sociodemographic factors

2.8.5.1 Socioeconomic status

While prevalence rates such as those discussed in section 2.3 consistently show that smoking prevalence is higher amongst individuals from lower social classes, the effect of socioeconomic status on adolescent smoking behaviour is not straightforward. Low socioeconomic status has been associated with adolescent smoking (Conrad et al., 1992; Zhu et al., 1996). However, the influence of socioeconomic status may be indirect, mediated by it's effect on peer and parental smoking (Madarasova Geckova et al., 2005). As previously identified, since parents in lower socioeconomic groups are more likely to smoke themselves, they are more likely to exert influence through modelling than those in higher socioeconomic groups. Parents also have a more indirect effect by controlling where young people grow up and in this way, to an extent, who they associate with. Peers who live in the same neighbourhoods and go to the same schools are most likely to be of similar socioeconomic status and therefore may be more likely to smoke inducing influence as described in section 2.8.6.4. There is however some disagreement as to which measure of socioeconomic status should be used when assessing adolescent smoking behaviour (Sweeting & West, 2001) and some researchers propose the use of own social position is a better predictor of smoking than labour market position (Glendinning et al., 1994) or adult social class (Paavola et al., 2004).

2.8.5.2 Family structure

Family structure had been explored by a number of researchers. In general, intact, two-parent families are protective against smoking. However, whilst less frequent drug use (including smoking) amongst adolescents from intact families has been reported (Ausems et al.,

2003; Ely et al., 2000; Jenkins & Zunguze, 1998; Kirby, 2002; Miller, 1997; Sweeting et al., 1998), negative correlations of living with both parents have also been reported, except for boys (Hundleby & Mercer, 1987).

2.8.6 Environmental factors

Common to a number of the factors mentioned above in sections 2.8.1 to 2.8.5 (for example, self-image, refusal skills, socioeconomic status and family structure) is the indirect influence of the social environment, and in particular parents and peers. The direct and indirect influence of others is probably the most thoroughly researched predictor of adolescent smoking initiation and maintenance, and will be considered in this section. Factors considered here include accessibility and availability of tobacco products and the influence of family, school and peers.

2.8.6.1 Accessibility and availability

The sale of tobacco products to young people under the age of sixteen is illegal in the UK. The Children and Young Persons (Protection from Tobacco) Act 1991 (HMSO, 1991) provides guidelines for Local Authorities on penalties and enforcement action against retailers selling these products to under-age youth. Despite this, young people consistently report being able to obtain cigarettes either through direct purchase (Bagott et al., 1998; DiFranza et al., 1996), from friends (Harrison et al., 2000), or in the home.

Fuller (2005) reported that in 2004, 66 per cent of current smokers were most likely to obtain cigarettes from shops (see Table 2). Sixty three per cent reported being given cigarettes (58 per cent from friends and 13 per cent from siblings). Thirty seven per cent bought

cigarettes from other people (27 per cent from friends). Others bought cigarettes from vending machines (19 per cent).

Table 2: Shops young people obtain cigarettes from

Type of shop	Percentage
Newsagent, tobacconist or sweet shop	58
Garage shop	29
Supermarket	21

Young people feel more able to access cigarettes when parents smoke (Jackson & Henrikson, 1997), increasing the likelihood that they will intend to smoke. Furthermore, Fuller (2005) also reported that 10 per cent of regular smokers obtain cigarettes from parents. Therefore, the more friends and members of the family that are smokers, and the easier it is for young people to obtain cigarettes, the more likely they will smoke.

2.8.6.2 Familial influence

2.8.6.2.1 Familial smoking

It is frequently cited that as age increases, the influence of parents on adolescent behaviour diminishes in favour of peer influence (particularly amongst girls) (Harton & Latane, 1997; Quine & Stephenson, 1990; Vitaro et al., 2004). This would seem a logical assertion considering that in adolescence, the time spent with friends increases and the time spent with parents decreases. However, this theory has been found to be invalid by others (Bauman et al., 2001a; Wang et al., 1995).

Although there is evidence of a positive association between parental smoking behaviour and adolescent smoking behaviour (Biglan et al., 1995; Brook et al., 1997; Conwell, 2003; De Vries, 1995; Flay et

al., 1998; Flay et al., 1994; Middlecamp & Mermelstein, 2004; Sasco & Kleihues, 1999; Scragg et al., 2003; Stanton & Silva, 1992), it has also been found to be small or negligible in many cases (De Vries et al., 2003a; Denscombe, 2001; Engels et al., 1999; Jackson, 1997; Wang et al., 1995; West et al., 1999). An association has also been found between having parents who smoke and the likelihood that non-smoking young people will consider smoking when older (Quine & Stephenson, 1990), especially if both parents smoke (Bricker et al., 2006).

The role of parents in the progression from experimenter to regular smoker is unclear as evidence is frequently conflicting. Bricker and colleagues (2006) reported that parents' behaviour is more likely than friends' behaviour to predict progression to more regular smoking, whereas Chassin and colleagues (1986) found that while both friend and parent smoking influenced uptake of smoking, only friend smoking led to increased use amongst experimenters. Barman and colleagues (2004) demonstrated that parental smoking significantly predicted both experimentation and current smoking whereas another study found that father's smoking was associated with experimentation by boys but mother's smoking was related to both experimentation and regular smoking amongst girls (Smith et al., 1995). Mixed results have also been found as to whether parents becoming ex-smokers encourage young people to also quit (Chassin et al., 2002; Farkas et al., 1999; Stanton & Silva, 1992).

Whilst it has been suggested that adolescent smoking behaviour would tend to follow that of the same sex parent, limited support has been provided for this hypothesis (Hundleby & Mercer, 1987). A recent cross-sectional study conducted in the USA found that both males and females were more likely to smoke if their mother smoked but that females were more likely to smoke if their father smoked (Taylor et al., 2004). In fact, it is possible that mother's smoking habits are generally more likely to influence adolescent smoking behaviour (Sasco & Kleihues, 1999).

Other family influences have been explored such as the effect of siblings, and have demonstrated mixed results. The odds of being a smoker if a sibling smokes may be greater than if a parent smokes (Botvin et al., 1992; Hu et al., 1990) but it is argued that where this is the case, same sex modelling is likely (Sasco & Kleihues, 1999). Although the smoking habits of siblings has been reported to have some, but not an important influence on adolescent smoking behaviour (Denscombe, 2001; West et al., 1999), a more positive association was shown in a cross-sectional study of 441 adolescents in Sweden (von Bothmer et al., 2002), and using data collected from 2,533 sixth, seventh and eighth grade students in ten schools in the USA (McAlister et al., 1984).

Perception of other people's behaviour in the home is also associated with smoking (De Vries et al., 1995). One study found that whilst maternal reported smoking had no influence on the smoking status of young women, their perception of their mother's smoking behaviour was associated with their own smoking experimentation and their future smoking intentions (Nichols et al., 2004).

Thus there is evidence of an influence of parental and sibling smoking, although parental smoking is likely to be of more importance. However, the process by which this influence occurs is unclear.

2.8.6.2.2 Parental attitude to smoking

Perceived parental attitude has also been identified as associated with adolescent smoking (Botvin et al., 1992), and is related to current and experimental smoking (Dusenbury et al., 1992), and weekly or daily smoking (Wang et al., 1994). Children with parents who are against smoking (students were asked to categorise parental attitude towards smoking on a four point scale of 'strongly against', 'against', 'not against' and 'don't know') have been found to be less likely to smoke (Wang et al., 1994), whereas parental indifference to their child's smoking behaviour has been shown to increase the likelihood of

smoking in teenagers (Newman & Ward, 1989). In this study, almost half (49.8 per cent) of students reported that neither parent smoked, while 15.4 per cent reported that both parents smoked. When only one parent smoked, it was more likely to be the father (21.2 per cent) than the mother (13.5 per cent). Almost two-thirds of students (65.8 per cent) reported that both parents would be upset and would disapprove if they smoked. Two-thirds (67.9 per cent) of non-smokers and 55.6 per cent of smokers reported their parents were or would be upset with their smoking. When parents were non-smokers, and indifferent toward *their* adolescent smoking, 17.8 per cent of their adolescents smoked but when both parents were smokers, the number of adolescents smoking increased to 32.5 per cent. Another study showed that mother's approval, but not father's approval was linked to smoking amongst 13-15 year olds and older girls, but not older boys (Piko, 2001). However, others have reported that perceived parental disapproval was not associated with smoking (Tilson et al., 2004).

In general, parents with a history of smoking and who hold weaker anti-smoking views are less likely to have rules about smoking (Kodl & Mermelstein, 2004). The degree to which smoking rules are enforced in the home has been found to be inversely related to smoking behaviour (Kodl & Mermelstein, 2004; Wakefield et al., 2000).

Therefore, in general, positive parental attitude towards smoking, including a tendency to allow smoking in the home is generally associated with increased adolescent smoking rates. There is evidence to suggest that positive parental attitude towards smoking may be related to their own smoking behaviour.

2.8.6.2.3 Parenting behaviour

Issues relating to parental supervision such as lack of knowledge about friends (Krohn et al., 1988), and the degree of parental monitoring (Biglan et al., 1995; Fararo & Skvoretz, 1987) has been reported as inversely related to adolescent smoking. However, one study found this

to be more relevant for initiation rather than experimentation (Jackson, 1997), and several researchers (for example, Cohen et al., 1994) have not observed any relationship. The study by Jackson suggested that parental monitoring was more important for adolescent smoking than parental modelling. In general, teens with parents who are involved, have high behavioural expectations and who hold them in high regard are less likely to use substances (Simons-Morton et al., 2001).

Parental attachment and support has also been found to affect adolescent smoking behaviour. Parental support is reportedly protective against smoking where parental smoking levels are low (Wills & Vaughan, 1989). A strong family system characterised by strong parent attachment is also thought to be protective in relation to tobacco-prone behaviour in adolescence (Brook et al., 1997; Tilson et al., 2004; van den Bree et al., 2004). The study by Tilson (2004) reported that young people who reported low levels of parent-child connectedness and whose parents did not smoke were twice as likely to report having ever smoked than those who reported higher parent-child connectedness. Furthermore, Foshee and Bauman (1992) proposed that as attachment to parents increases, adolescents are more likely to model their parents' behaviour.

Finally, a number of studies, including one conducted by Melby and colleagues (1993) with young males have reported that an authoritative parenting style is associated with lower levels of adolescent smoking. An association with perceived authoritarian and neglectful parents has also been observed (Foxcroft & Lowe, 1995). Other more recent research found that parental expectations of behaviour and drug avoidance is protective against smoking (Simons-Morton, 2004).

This discussion highlights the need for a positive and supportive ethos in the home. It shows that in broad terms, increased parental involvement, attachment and discipline decreases the risk of smoking in adolescence.

2.8.6.3 School influence

Schools have also been identified as an arena where the smoking behaviour of young people can be influenced by both their peers and adult figures such as teachers.

It has been proposed that allowing teachers to smoke on the school premises may encourage adolescent smoking by suggesting that smoking is a legitimate practice (Health Education Authority, 1993). This is supported by a study which reported that lower rates of adolescent smoking were observed where policies which restricted smoking to the staff room were in place (Cooreman & Perdrizet, 1980). Furthermore, Poulsen and colleagues (2002) found an association between adolescent smoking rates and perceived exposure to teachers' smoking during school hours. Whilst some research has shown that there is little association between teachers' actual smoking prevalence and student smoking prevalence (Clarke et al., 1994; De Moor et al., 1992; Johnson et al., 1985), others have found a positive association between the number of smoking teachers in the school and adolescent smoking rates (Murray et al., 1984).

Perceived prevalence of smoking in school is also associated with increased risk of smoking (Ellickson et al., 2003). However, the tendency for young people to overestimate the smoking prevalence of their peers suggests that associations made between perceived prevalence and smoking behaviour should be treated carefully as they may be biased.

A more reliable measure is to use actual prevalence. The importance of school norms on the development of smoking behaviour has been identified in studies which have found that students in schools with higher than average reported peer tobacco use were more likely to be current smokers than students in schools where average tobacco use was lower (Alexander et al., 2001; Pokorny et al., 2004). In the UK, school tutor group prevalence was used to estimate the effect of peer smoking on uptake of smoking amongst 13-15 year olds (Molyneuex et al., 2004). The authors reported that smoking increased amongst

individuals who not only had a best friend who smoked, but also those exposed to other students who smoke, providing support for the direct influence of peers. Not all research has found such positive associations. When adjustments were made for school-level prevalence, gender, ethnicity and socioeconomic status, Ellickson and colleagues (2003) found that students enrolled in schools with higher levels of smoking were more likely to be current smokers one year later compared to students in schools where smoking rates were lower. However, when further adjustment was made for baseline smoking behaviour, there was no effect of school-level prevalence. Another longitudinal study found that when individual smoking behaviour was accounted for, no association was found between school prevalence and adolescent smoking behaviour (Patton et al., 1998). Further to the effect to of the behaviour of the peer group, researchers in Scotland (Turner et al., 2006) reporter that differences in the sociometirc structure of peer groups in schools may affect smoking rates in schools. OF the teo schools included in their study, the school with a higher rate of smoking had a more cohesive social structure (more groups).

Setting aside the issues relating to school smoking norms, the school environment is likely to impact on behaviour. The influence of school culture on smoking amongst students was explored in 166 schools in the UK (Aveyard et al., 2004b). Students who attended schools classed as authoritative were less likely to smoke than those who attended schools classed as laissez-faire. A review of how school characteristics influence student smoking (Aveyard et al., 2004a) aimed to ascertain why schools with equivalent students have different smoking rates. The authors concluded that the strength of association between school factors and smoking amongst students is weak and is an insufficient explanation for variable inter-school smoking prevalence. The hypothesis that influence was likely to be independent of student-level composition was supported by empirical work conducted by the authors who suggested that variation was due to unmeasured school factors (Aveyard et al., 2005). West and colleagues (2004) also found that there were higher smoking levels in larger schools, had been

independently rated as having a poorer ethos, and where there were more students who were disengaged from education, and who knew fewer teachers. Lower smoking prevalence has also been associated with schools with the average level of pupil attachment to school (Ennett & Bauman, 1994) and schools with a higher sense of community (Battistich & Hom, 1997).

Research has generally shown that the introduction and enforcement of school smoking policies reduces the amount of smoking by adolescents (Charlton & While, 1994; Maes & Lievens, 2003; Moore et al., 2001; Pentz et al., 1989), particularly when strongly enforced (Maes & Lievens, 1999; Wakefield et al., 2000). However, another study (Clarke et al., 1994) showed that school-based structural and smoking policy variables have little association with students' self-reported smoking behaviour.

This discussion suggests that a positive school environment contributes to reduced adolescent smoking rates. This includes the introduction and enforcement of smoking policies to restrict smoking by staff and students. Some positive effects of moderating the visibility of teacher smoking has been achieved but results are mixed. And whilst high levels of perceived smoking prevalence have been associated with increased tobacco use, the results should be treated with caution. Instead, actual prevalence, which has also been associated with increased tobacco use is considered a more reliable predictor, although an association is not always observed.

2.8.6.4 Peers

The influence of friends is thought to predict smoking initiation and escalation of smoking amongst young people (Bricker et al., 2006). It has been a topic of interest for many years (Leventhal & Cleary, 1980) and numerous commentators have reported a correlation between smoking behaviour of adolescents and the smoking behaviour of their peer group. However, the nature of the association is an issue of

dispute and several explanations have been suggested which provide evidence for behaviours being learned in peer groups, and evidence that individuals who assume certain roles within peer groups are more likely to adopt behaviours. For example, it has been suggested that smoking is associated with: smoking by peer group members, including best friend (Alexander et al., 2001; Botvin et al., 1993; De Vries et al., 2003a; Ennett et al., 1994; Flay et al., 1994; Hussong & Hicks, 2003; Jackson, 1997; Sasco & Kleihues, 1999; Urberg et al., 1997; Wang et al., 1995; West et al., 1999); social position, for example, as a clique member, liaison or isolate within the peer network (Aloise-Young et al., 1994; Ennett & Bauman, 1993; Ennett et al., 1994; Pearson & Michell, 2000; Pearson & West, 2003); and network position of young people within their egocentric networks (such as popularity) (Alexander et al., 2001; Ennett & Bauman, 1993; Valente et al., 2005).

Perceived tobacco use amongst peers has also been associated with initiation and experimentation of tobacco use (Iannotti & Bush, 1992; Jackson, 1997; Simons-Morton, 2002; Unger & Rohrbach, 2002). In one study, this was reported to be a greater predictor than actual tobacco use by friends (Iannotti & Bush, 1992).

A number of researchers have also argued that non-smoking friends can be protective against substance use (Hussong, 2002; Kobus, 2003; Maxwell, 2002). For example, cliques are comprised largely of non-smokers suggesting that peer groups contribute more to non-smoking behaviour than smoking behaviour (Ennett et al., 1994). Another argument is that non-smoking peer groups place pressure on new smokers not to smoke, or eventually exclude the new smoker from the group (Lucas & Lloyd, 1999b). Others have proposed that involvement with a well-defined and successful peer group may also be protective against smoking (Mosbach & Leventhal, 1988).

2.8.6.4.1 Homophily

The discussion about the effect of smoking by peer group members should be considered with caution (Petraitis et al., 1995). And whilst Eiser and colleagues (1991) suggest that young people choose friends on the basis of a variety of attitudinal, behavioural and background characteristics, they also propose that the influence of peers is not as straightforward as sometimes described.

The association with other smokers is often thought to be due to peer influence (the direct effect of group members on the behaviour or opinions of another group member) (Engels et al., 1997), while another possible mechanism is the indirect effect of peer selection (when friendships are formed as a result of a particular behaviour) (Bauman & Ennett, 1996). Therefore, it is possible that the peer group has been selected on the basis of a shared behaviour rather than the behaviour has been changed in order to conform to the peer group's established behaviour. It has also been argued that the apparent association between friends' smoking behaviour is in part due to projection, in which the reporting of smoking is related to smoking behaviour (Bauman & Ennett, 1996). Thus, a smoker is more likely to report that their friend's smoke, and self-reports of smoking behaviour may be biased by friends' smoking. Another possibility is that young people genuinely do not know what the smoking status of their friend is due to recent quit attempts or the experimental nature of smoking during the early teenage years where self-reported behaviour and friends' perceptions of smoking behaviour may be conflicting. This was investigated in a study conducted by Urberg and others (1991) who compared two measures of peer influence and suggested that the difference between respondent and best friend's smoking status is a more appropriate measure of peer influence than the proportion of friends who smoke.

A number of longitudinal studies have supported the hypothesis that peer influence contributes to adolescent smoking. However, in considering the results of these studies it should be acknowledged that peer influence to smoke may differentially affect particular groups of

individuals, such as those who do not value school achievement or spending time with parents (Urberg et al., 2003). Botvin and colleagues' (1993) study on smoking amongst black youth demonstrated that the smoking behaviour of friends was the most significant predictor of smoking at time one, but that other factors exerted an influence on maintenance of smoking when they were older at time two. Another study which used latent growth analysis reported that peer use was positively related to rate of change in use (Wills & Cleary, 1999).

Other longitudinal studies (including, Fisher & Bauman, 1988; Wang et al., 2000) have suggested that the impact of peer influence is overestimated and that peer selection may have a more prominent role to play in peer group homogeneity. Engels and colleagues' two studies (1999; 1997) of 1,063 adolescents demonstrated that the smoking behaviour of friends did not affect adolescent smoking over time and that there was support for selection effects, but not deselection. Ennett and Bauman (1994) suggested that deselection operates for non-smokers but not for smokers, whilst selection effects were more likely to operate for smokers. The largest study to support the selection model utilised data collected from 15,705 students in six European studies (De Vries et al., 2003a). Cross-sectional regression demonstrated that smoking behaviour was related to friends' smoking and best friends' smoking, but longitudinal regression demonstrated that parental influence on smoking behaviour was as significant as that of peers. More recently, data from a smaller sample of 7,102 students from the same dataset were analysed and supported these findings, demonstrating that adolescents chose friends on the basis of homogeneous behaviour (De Vries et al., 2006).

A number of other studies have found that influence and selection contributed equally to peer group homogeneity (Ennett & Bauman, 1994; Kirke, 2004; West et al., 1999).

The evidence base regarding homophily has limitations. There is a relative paucity of large-scale longitudinal studies. The majority have drawn on data from less than 2,000 young people (for example, Botvin et al., 1993; Engels et al., 1999; Engels et al., 1997; Ennett & Bauman,

1994; Fisher & Bauman, 1988; Urberg et al., 1997) and/or had a follow-up of a year or less (for example, Botvin et al., 1993; De Vries et al., 2003a; Ennett & Bauman, 1994; Fisher & Bauman, 1988; Urberg et al., 1997). A minority of studies have utilised direct methods such as social network analysis to examine influence and selection effects (for example, Ennett & Bauman, 1994; Urberg et al., 1997). Ascertaining the smoking status of friends has also been problematic. Whilst the value of using self-report data of smoking status is recognised (Fisher & Bauman, 1988; Urberg et al., 1997) some studies have, as previously identified, instead relied on respondents' perceptions of friends' smoking status which is often inflated (Bauman & Ennett, 1996; Urberg et al., 1990).

2.8.6.4.2 Peer pressure

Direct peer pressure is often cited by layperson and expert alike as a key factor explaining the uptake of adolescent smoking. Peer pressure is a more direct effect of the peer group/friends than peer influence whereby young people may experience coercion, bullying and teasing which culminates in them engaging in smoking. The importance of peer pressure has, however been increasingly questioned. Researchers in Scotland identified peer pressure as a contributory factor, but not the major influence in adolescent smoking (McIntosh et al., 2003), whilst a number of other studies have concluded that direct peer pressure is likely to be of less significance (Coggans & Mckellar, 1994; Denscombe, 2001; Michell & West, 1996; Stewart-Knox et al., 2005; Ungar, 2000). It is argued that this is because peer pressure views those who are affected by it as weak and unable to resist the pressures encountered. Contrary to this, the young people involved in these studies reported that they played an active role in their decision to smoke.

2.8.6.4.3 Network effects

A number of studies have investigated the role of social position (*"a person's place within their network"* (Hoffman et al., 2006, p142)) on smoking behaviour, by identifying individuals who have varying levels of interaction with their peers, for example, as a clique member or isolate. In a cross-sectional study, Ennett and Bauman (1993) used social network methods to study the relationship between peer group structure and cigarette smoking during adolescence. They asked 1,092 ninth grade students to name their three best friends and subsequently identified each individual as a clique member, liaison, or isolate. They demonstrated that the odds of being a current smoker were significantly increased for isolates in four of the five schools studied. Isolates had a higher proportion of smoking friends even though they had fewer friends than group members. Hoffman and others (2006) propose that this was because they had friends outside of the school who were more prone to high-risk behaviours. Ennett and Bauman's (1994) findings that deselection operates for non-smokers but not for smokers, whilst selection effects were more likely to operate for smokers may also provide an explanation why isolates smoke. This was supported by a Scottish study (Pearson & Michell, 2000) in which 150 secondary school students named up to six best friends over two time points. This research found that risk-taking behaviour (smoking and cannabis use) occurred across all social positions at each time point, but that more relative isolates (dyads and isolated tree nodes, isolates attached to tree nodes and isolates) engaged in risk-taking behaviour at time point two. These results demonstrate the importance of risk-taking peer groups as a source of influence and selection of those on the periphery, highlighting the importance of network position in determining risk-taking behaviour. The study by Pearson and West (2003) built on this work, including an analysis of a further sweep of data collected a year later. The results of this research corroborated these earlier findings, concluding that risk-taking behaviour is dependent upon the network position and risk-taking behaviour at the previous time point.

Conversely, others (Haynie, 2001) have found that risk-taking behaviour is associated with membership of cohesive networks.

The results of research exploring the association between egocentric position and adolescent smoking behaviour has identified popularity as a risk factor for smoking uptake (Alexander et al., 2001; Valente et al., 2005), although Alexander suggested this was more important in schools where smoking prevalence was high. Furthermore, Urberg and colleagues (2003) reported that adolescents with more friends and positive relationships with those friends were more likely to be influenced by them to smoke.

Two further studies used social network analysis and reported that the risk-taking behaviour of close friends has a more significant impact on smoking than does the risk-taking behaviour of the whole friendship group (Aloise-Young et al., 1994; Urberg et al., 1997). However, in agreement with the findings of, for example, Ennett and Bauman (1993), Aloise-Young and colleagues found this was the case only for group outsiders and not group members.

2.8.6.4.4 Peer group association

Another issue is the role of peer group association on adolescent smoking behaviour. This body of research has defined friendship groups according to dress, activities, school performance and extracurricular activity. Mosbach and Leventhal's (1988) study which reported that students who identified themselves as 'dirts' and 'hotshots' were more likely to be smokers than those who identified themselves as 'regulars' or 'jocks' was replicated by Sussman and colleagues (1990) who added 'skaters' as an additional group. This later research found smoking to be more prevalent amongst 'dirts', whilst 'hot shots' were least likely to smoke. Later work (Michell, 1997) differentiated young people into other groups ('top girls', 'top boys', 'middle pupils', 'low-status pupils', 'trouble-makers' and 'loners'). 'Top boys' were associated with football and fitness whereas 'top girls', 'low-status pupils' and

'trouble-makers' were associated with smoking. This suggested that smoking was related to 'pecking order' and group membership, and was supported by further work (Michell & Amos, 1997) which reported that girls at the top of the social 'pecking order' (with high self-esteem) were most likely to smoke. This again emphasises the importance of popularity for the uptake and maintenance of smoking.

Thus, there is strong evidence of the influence of peers on adolescent smoking behaviour although the nature of the association is complicated and no clear answers have been provided as to whether peers directly influence their friends to smoke, either through peer pressure or influence, or if young people choose their friends on the basis of behaviour. The possibility that the influence of peers on smoking behaviour may be due to their social position in their social network, or to the subculture in which they are embedded should also be acknowledged.

2.9 Summary

Smoking causes numerous health issues for both smokers and those around them. Furthermore, the financial cost of the habit to both the smoker and society (for example, the taxpayer and the employer) are substantial. These health and wealth impacts affect those who are the poorest in society most as it is these people who are most likely to smoke but least likely to be able to afford it. The addictive nature of the habit means that once someone becomes a smoker it is difficult to stop and it may take a number of quit attempts before they are successful.

While the prevalence of smoking amongst adults in England and Wales has substantially reduced in the past 25 years, in the last 15 years reductions have been less marked, particularly amongst adults in their early 20's. Amongst young people, the story is different. Adolescent smoking rates have fluctuated significantly, seeing a marked rise between the mid-1980's and mid-1990's, and a subsequent decrease in the following five years. Since the turn of the century,

adolescent smoking rates have stabilised. Amongst adolescent boys, the reductions have been substantial but there has been a much less obvious reduction amongst girls of the same age.

Many young smokers know the risks associated with smoking and appreciate the reasons to remain smoke-free. However, many underestimate the addictive nature of nicotine and do not view the health risks of smoking as immediate and of relevance to them. The younger a smoker takes up the habit, the less likely they will be successful in giving up the habit in later life. They also incur health problems, and again, the earlier they start to smoke, the greater the chance of poor health in the future. There is therefore an obvious need to reduce the prevalence of adolescent smoking. In order to achieve this through the implementation of successful preventive interventions, it is essential to understand the aetiology of smoking behaviour.

A number of factors are associated with the uptake and maintenance of smoking in adolescence, including sociodemographic factors such as socioeconomic status and family structure; behavioural factors such as academic achievement; personal factors such as self-image, self-esteem, mood and stress, anti-smoking attitude and refusal skills; societal and cultural factors such as advertising and mass media; and environmental risk factors such as peers, the family, schools, and the availability of cigarettes. The association between the majority of these factors and adolescent smoking is mixed, most studies having demonstrated conflicting results. Two issues that are consistently cited as important are the role of social norms such as prevalence in the home and amongst peers, and the influence of the more immediate friendship group on smoking uptake and maintenance. These factors not only have a direct impact on smoking behaviour, but also an indirect impact, contributing to the influence attributed to other associated factors. These social factors are likely to be easier to target with preventive interventions than factors such as the media and advertising which may involve complex intervention and enforcement, and legislative change.

The following chapter provides detail of some preventive efforts to reduce adolescent smoking, the majority of which have targeted environmental factors. It also outlines the most feasible approaches to achieving a reduction in adolescent smoking rates.

~ CHAPTER 3 ~

3 ADOLESCENT SMOKING PREVENTION

This chapter aims to provide some detail of preventive efforts to reduce adolescent smoking. It briefly considers the development of modern health promotion and summarises some of the theories of adolescent risk behaviour and behaviour change which are used to guide the development of interventions to reduce the prevalence of adolescent smoking. A number of approaches adopted, and specific interventions that have been implemented and evaluated will be reviewed, a number which target environmental factors, and the most feasible approaches for the prevention of adolescent smoking will be identified.

3.1 Health promotion and health education

Health promotion is *"the process of enabling individuals and communities to increase control over the determinants of health and thereby improve their health"* (Nutbeam, 1986, p114). The term health promotion was first used when the Canadian Minister for Health, Marc Lalonde published 'A New Perspective on the Health of Canadians' (Lalonde, 1974). He gave health promotion status in the health field as a method for improving the health of the population. This report suggested that there are four inputs to health: genetic predisposition, health services, behaviour and lifestyle, and the environment. Health promotion is associated with the latter three of these (Tones, 2002).

The term 'health' presents a variety of meanings to individuals from different disciplines, and different sectors of society. However, in general there are two main aspects of health. Negative health refers to the prescence of ill-health, such as disease, injury, illness or disability while positive health refers to the presence of well-being (Downie et al., 1996). The World Health Organisation's broad definition of health

reflects these two facets, *"Health is a state of complete physical, mental and social well-being, and not merely the absence of disease and infirmity"* (World Health Organisation, 1946).

The need for a more holistic approach to health which incorporates elements of social, environmental, individual and economic factors is recognised by others who suggest that a balance of these elements is required to achieve good health (Aggleton, 1990; Ewles & Simnett, 2003). Another more recent definition of health has been provided. *"[Health is] the extent to which an individual or group is able, on the one hand, to realise aspirations and satisfy needs; and, on the other hand, to change or cope with the environment. Health is therefore seen as a resource for everyday life, not an object of living; it is a positive concept emphasising social and personal resources, as well as physical capacities"* (World Health Organisation, 1984). This encompasses both the social and individual elements of health, broadening earlier definitions in order to satisfy a range of interests, not just those from medical disciplines. However, there remains little consensus on a precise definition of health, and given the variety of meanings in different contexts, it is unlikely that a definitive definition will be developed.

Early health promotion activity was grounded largely within preventive medicine and education (Naidoo & Wills, 2000). Health education (which is considered in further detail in section 3.1.1) is therefore often viewed as a precursor to health promotion but is also very much a composite part of health promotion effort.

The World Health Organisation's Alma-Ata declaration of 1978 on primary health care (World Health Organisation, 1978), and the Health For All initiative, which promotes health through intersectoral collaboration (Bunton & Macdonald, 1992) set the scene for the rise of the health promotion movement. The Alma Ata declaration adopted a broad definition of health and primary health care which supported the view that health is more than the absence of disease and infirmity. Health was recognised as a fundamental human right which requires effort by the social and economic sectors as well as the health sector.

Thus, it was suggested that health promotion activity should be more comprehensive than earlier health education approaches.

The Ottawa Charter for Health (World Health Organisation, 1986), published after the first International Conference on Health Promotion in 1986 was a further development, formalising current thinking at an international level. It identified five levels of intervention (health promotion action means) that should be incorporated into health promotion activities. These were: building healthy public policy; creating supportive environments; strengthening community action; developing personal skills; and reorienting health services.

It also proposed three strategies for health promotion which were advocacy, enablement strategies and mediation (see Box 1).

Box 1: Ottawa Charter's strategies for health promotion

Advocacy
Evidence on individual and community health needs should be collected showing the implications for health and social and political issues. People's knowledge and understanding of the factors which affect health should be increased and health promoters should work to empower people so they may argue their own right to health and negotiate changes in their personal environment.

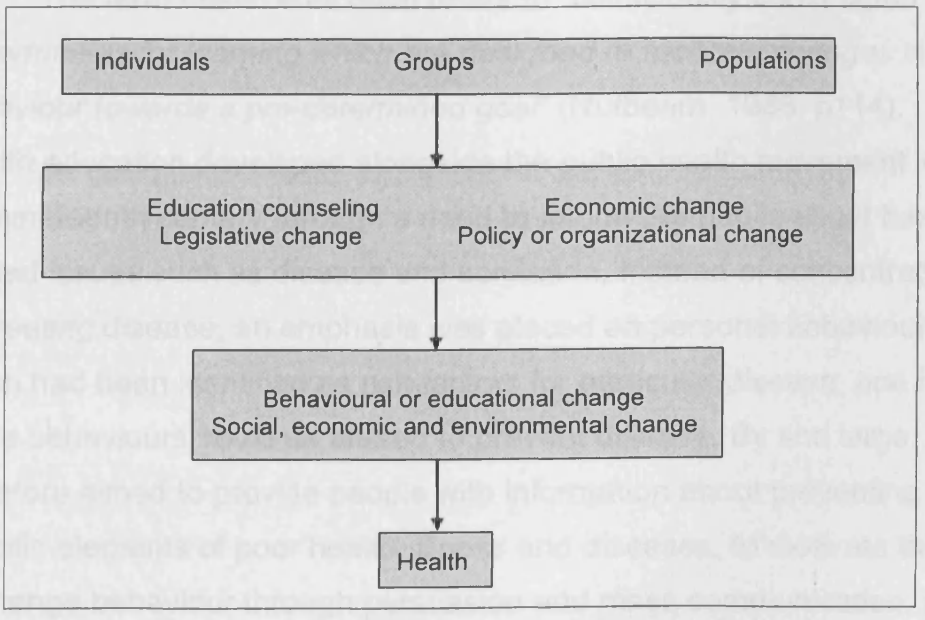
Enablement strategies
Health promotion should aim to reduce differences in current health status and ensure equal opportunities to enable all people to achieve their full health potential. Health promoters should work to increase knowledge and understanding, and individual coping strategies. In an attempt to improve access to health, health promoters should work with individuals and communities to identify needs and help develop support networks in the neighbourhood.

Mediation
Health promotion requires coordination and cooperation by many agencies and sectors. Health promoters have a major role to mediate between different interests by providing evidence and advice to local groups; by influencing local and national policy through lobbying, media campaigns and participation in working groups.

Taken from Naidoo and Wills (2000, p75)

In line with the changing definition of health, this shows the shift in emphasis from preventing disease to an approach which involves environmental and political action, and which utilises both individual and structural strategies to promote health (Bunton & Macdonald, 1992). Figure 8 illustrates how health promotion can utilise a number of strategies to facilitate individual, group and community change. Through the implementation of organised programmes, services and policies, health promotion therefore aims to inform and empower people, enabling them to increase control over and take responsibility for their health, and avoid health risks by facilitating behavioural changes to improve social and environmental living conditions.

Figure 8: The process of health promotion



Adapted from Naidoo and Wills (2000, p80)

The need to adopt an holistic approach to health promotion identifies how problematic the development and implementation of successful health promotion strategies can be. As a result of their complex aims, health promotion activities may therefore be elaborate, attempting not only to achieve individual attitudinal and behaviour change, but also

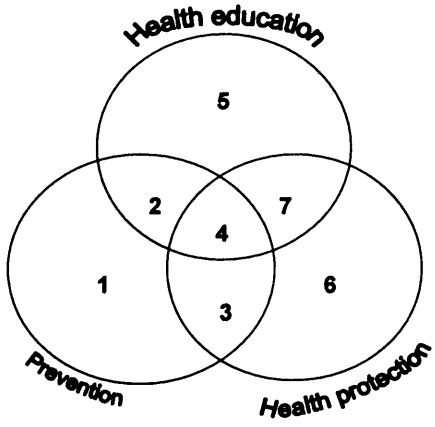
broader environmental change, which in turn may in turn improve health (Bunton & Macdonald, 1992; Tones & Green, 2004; Tones & Tilford, 2001).

3.1.1 Models of health promotion

A number of models of health promotion practice have been developed (see Naidoo & Wills, 2000 for examples) which identify criteria required to inform the design of health promotion strategies. For example, a model of health promotion developed by Tannahill (Downie et al., 1996) identifies three overlapping domains of activity which contribute to health promotion strategies: health education, health protection and prevention (see Figure 9) and distinguishes how these domains might interact.

The term health education refers to *"consciously constructed opportunities for learning which are designed to facilitate changes in behaviour towards a pre-determined goal"* (Nutbeam, 1986, p114). Health education developed alongside the public health movement in the nineteenth century through a need to inform the public about health-related issues such as disease and sanitation. Instead of concentrating on *treating* disease, an emphasis was placed on personal behaviours which had been identified as risk-factors for particular disease, and how these behaviours could be altered to *prevent* disease. By and large, it therefore aimed to provide people with information about preventing specific elements of poor health, illness and diseases, to motivate them to change behaviour through persuasion and mass communication, and supply them, through education, with the skills required to lead a healthy lifestyle (Naidoo & Wills, 2000). In addition to being directed at individuals, health education can also be directed at groups, organisations and communities to raise awareness about the environmental, economic and social causes of health and ill health (Nutbeam, 1986).

Figure 9: Tannahill's model of health promotion



Each numbered domain refers to a particular activity for health promotion.

1. Preventive activities relating to disease, such as cancer screening or the use of nicotine replacement therapy to aid smoking cessation.
2. Preventive health education aimed at facilitating behavioural change to reduce exposure to risk factors (e.g. smoking), which contribute to disease, and increase uptake of preventive services.
3. Preventive health protection measures concerned with health determinants of disease (e.g. overcoming disadvantages of low socioeconomic status) and/or specific risk factors (e.g. smoking policies).
4. Educational measures which allow individuals to achieve relevant preventive health protection measures.
5. Positive health education aimed at influencing behavioural change, and/or developing positive health attributes such as self-esteem.
6. Health protection measures such as regulations and policies restricting smoking in schools.
7. Raising awareness and support for health protection measures. This would involve gaining support from employees and policy makers for the introduction of a smoking policy in schools.

Adapted from Downie et al. (1996, pp59-60)

Health protection is concerned not only with behavioural issues but also with measures concerned with fundamental, socioeconomic and broad environmental circumstances which impact on mental, physical and social health. It therefore involves altering the environment to facilitate decisions to adopt healthy behaviours.

Prevention covers measures not only to prevent the occurrence of ill health, such as risk factor reduction, but also to slow progression of ill health and reduce its consequences once established. Three types of prevention should be acknowledged: primary prevention (aims to prevent the occurrence of ill health); secondary prevention (aims to stop or slow existing ill health by early detection and appropriate treatment); and tertiary prevention (aims to treat and reduce the re-occurrence and establishment of chronic illness).

3.2 Health promotion theory

As discussed, the complex view of health and the numerous factors affecting health requires health promotion practice to be equally complex. Understanding the determinants of health and behaviour change can help those involved in the development and implementation of interventions to generate more effective and appropriate interventions (Tones & Green, 2004). A range of theoretical frameworks exist which help explain how people make decisions relating to health and which can be utilised to devise health promotion strategies. A number of these theories have been adopted in relation to adolescent smoking prevention and will be discussed.

3.2.1 Knowledge-Attitudes-Behaviour/Knowledge-Attitudes-Practice

Early health education practice was based on a basic model which asserted that there was a link between knowledge, attitudes and behaviour (Bennett & Hodgson, 1992; Goodstadt, 1978; Tones & Tilford, 2001). This adopts the idea that the provision of knowledge together with attitude change strategies will lead to behaviour change. This model emphasises the importance of attitude change, and affirms that provision of knowledge will not result in behaviour change without

the intermediary stage of developing attitudes favourable to the adoption of the positive behaviour (Tones, 2002).

Early smoking prevention programmes for adolescents were largely based on information provision, and many adopted this model. These programmes tended to be school-based, didactic teacher-delivered efforts (Chassin et al., 1990). Such early health education programmes, which emphasised the consequences of smoking and attempted to portray negative images of smokers were reviewed by Thompson (1978). Whilst being generally successful at providing information, and changing knowledge and attitudes, these programmes were shown to be ineffective at bringing about behavioural change. This lack of success may be for a number of reasons. Goodstadt (1978) argued that even where positive associations are seen between knowledge, attitudes and behaviour, this is insufficient evidence to conclude that changes in knowledge or attitude will induce behaviour change.

3.2.2 Psychosocial theory and health

As previously discussed in section 2.8, numerous factors affect health, including behavioural, personal, social and environmental factors. One of the main reasons provided for the lack of success of early smoking initiatives which concentrated on the provision of knowledge and attitude change strategies is that this model is too simplistic and overlooks these broader factors which contribute to the uptake of smoking (Goodstadt, 1978; Leventhal & Cleary, 1980; Nutbeam, 1995; Thompson, 1978). In recognition of the limitations of these interventions which relied on the knowledge-attitudes-behaviour process to reduce smoking uptake, more sophisticated intervention strategies were developed. This paralleled the development of psychosocial theories of health behaviour which recognised the importance of these wider determinants of health behaviour, and underpinned the holistic

approach to health promotion advocated in the Ottawa Charter (Bunton & Macdonald, 1992).

The following brief discussion considers several psychosocial theories which have been applied to the uptake and maintenance of smoking in adolescence and have been used to drive the development of interventions to reduce smoking prevalence (for further details, see Bennett & Murphy, 1997; Bunton & Macdonald, 1992; Naidoo & Wills, 2000; Tones & Tilford, 2001). A number of these theories overlap, and several comprise a number of similar elements. Whilst this may be the case, one theory alone may not sufficiently explain behaviour, change in behaviour or induce positive behavioural change. Therefore, these theories should not necessarily be viewed exclusively. Furthermore, the relevance of different theoretical stances may also vary depending on the behaviour of interest.

3.2.2.1 Social Learning Theory and Social Cognitive Theory

Social learning theory (Bandura, 1977), which later became known as social cognitive theory (Bandura, 1986) focuses attention on the causes of beliefs relating to the expression of behaviours. It stresses the importance of social models and places an emphasis on the importance of observing and modelling the actions of others. Mechanisms involved in observing and imitating behaviours, social reinforcement of behaviours, and conformity are considered important. Social cognitive theory explains behaviour in terms of a reciprocal interaction between cognitive behavioural and environmental influences. By observing role models, individuals learn how to perform behaviours. This knowledge can then be translated into action. Two types of modelling can occur. Direct modelling occurs as a result of watching others while indirect modelling occurs as a result of being exposed to other influences such as the media and television. However, individual differences such as age, sex and race may affect the degree to which they are influenced as they determine the behavioural models and norms individuals are

exposed to i.e. who and what influences surround them. Past personal experience may also influence decisions to recommence the behaviour. Individuals are motivated to engage in behaviours if they perceive the outcome to be advantageous (outcome expectancies) and they feel they can successfully engage in that behaviour (efficacy beliefs). In general, more positively portrayed behaviours will be adopted.

When applied to adolescent smoking, these theories argue that smoking is influenced through factors such as the direct influence of peers, parents, siblings and schools, and indirect influences such as the portrayal of smoking on television and in films. Outcome expectancies and efficacy beliefs relevant to smoking are related to the ability to resist these social influences. Interventions based on social learning theory can assume a variety of forms but concentrate on making smoking role models less salient; correcting inaccurate subjective norms, such as the prevalence of tobacco use; addressing the reasons young people smoke and the short-term negative consequences of smoking; capacity-building to resist positive associations linked with smoking; the development of refusal skills and skills to resist social pressures; and increasing self-efficacy (Corbett, 2001; Petraitis et al., 1995). These interventions can target influences in numerous settings such as the home, school and at a wider community level.

3.2.2.2 The Theory of Reasoned Action and Theory of Planned Behaviour

Ajzen's theory of reasoned action (Ajzen & Fishbein, 1980) links attitudes to behaviour and states that behaviours are determined by an individual's intentions to engage in a behaviour. These intentions are predicted by two influences: attitudes towards the behaviour and normative beliefs about it. Attitudes embrace beliefs and a value that is attached to that belief. Any one individual may have a number of congruent or conflicting attitudes which comprise this source of influence. Normative beliefs encompass an individual's perception that

important others want him or her to engage in a behaviour, and the likelihood that they will subsequently respond to these expectations. These two influences explain why some people have particular beliefs but do not necessarily behave in a manner compatible with those beliefs. For example, an individual may have a number of negative attitudes towards smoking but smoke in order to conform to their perceived social norms. One assumption this theory makes is that individuals have the resources and opportunities available to engage in the behaviour (actual behavioural control).

The theory of reasoned action suggests that the beliefs an individual holds about the positive and negative consequences of smoking determines uptake. Smoking is often viewed as having benefits (such as helping them become or remain a member of a social group) which adolescents view as advantageous, thereby encouraging uptake. These benefits often outweigh the negative effects of smoking such as the health effects which young people may not view as being immediate and therefore not as important. In addition, the perceptions that family or friends approve of smoking could be predictors of adolescent smoking. For example, if friends and family are smokers themselves, or if parents do not discourage smoking in the home this is unlikely to dissuade them to smoke.

The theory of planned behaviour (Ajzen, 1991) builds on the theory of reasoned action. It states that in addition to attitudes and normative beliefs, behaviour is also determined by the perceived ability of individuals to conform to desired behaviours (perceived behavioural control). Therefore, if an individual has a high level of perceived behavioural control, they are more likely to successfully engage in a behaviour than an individual with a low level of perceived behavioural control.

When applied to smoking, two forms of self-efficacy are important. These are beliefs in the ability to obtain and successfully smoke cigarettes, and the ability to resist engaging in smoking, and resist social pressures (Petraitis et al., 1995).

Interventions influenced by the theory of reasoned action and theory of planned behaviour therefore include those which aim to promote good communication skills, assertiveness, help resist peer pressure and enhance refusal skills thereby increasing an individual's perceived behavioural control (Boys et al., 1999; McMillan et al., 2005). They may also target attitudes, subjective, moral and descriptive norms, and anticipated regret relating to smoking (McMillan et al., 2005). A variety of approaches have been adopted in intervention studies grounded within this theory including information provision, verbal persuasion techniques, increasing and rehearsal of skills, goal setting, modelling, social encouragement/support and planning/implementation (Hardeman et al., 2002).

3.2.2.3 Health Belief Model

Becker's health belief model (Becker, 1974) highlights the function of beliefs in the health-related decision-making process. It centres on an individual's vulnerability to damage (including susceptibility and anticipated damage), and the actions they may take to avoid damage (including the costs and benefits of taking action to avoid damage). In addition, health-related decision-making is affected by the environment and personal motivation regarding health. For behaviour change to occur, individuals must have *incentive* to change behaviour, feel *threatened* by their current behaviour, feel a change would provide them with *benefits* and feel *able* to change behaviour (Naidoo & Wills, 2000).

According to this model, the decision to smoke would involve consideration of issues relating to the benefits of taking up the habit, and whether these benefits outweigh the advantages of remaining a non-smoker. Individuals would then need to feel that they were likely to induce harm by continuing to be smoke-free, either physically or, for example, socially if they felt that they would damage relationships by continuing to be smoke-free if all of their friends have started smoking.

They would also need to feel that they will benefit from being a smoker, for example, that they would gain friends if they were a smoker, or that being a smoker would enable them to interact with smokers more easily because they would have something in common. The health belief model is one of the most frequently used models to guide smoking cessation interventions. However, it is also used to direct preventive interventions. Interventions grounded in this theory attempt to combat feelings of vulnerability and strengthen anti-smoking attitudes. Providing information and cues such as health warnings on cigarette packs and advertising emphasising the detrimental effects of smoking may help initiate or maintain behaviour change (Bunton & Macdonald, 1992).

3.2.2.4 Social Inoculation Theory

Social inoculation theory (McGuire, 1964) emphasises social pressures to adopt unhealthy behaviours. It is based on the premise that individuals do not want to engage in risk-behaviours but that they lack the skills necessary to resist social pressures. However, as already acknowledged in section 2.8.6.4.2, other research has questioned the extent to which peers exert pressure in this way (Michell & West, 1996). The extent of this influence and the relevance of this theory is therefore unclear.

According to this model, young people encounter pressures to smoke from sources such as peers, the media, and the family, and therefore can be protected from potentially harmful social influences by being educated about and prepared for them in advance. Social inoculation theory has influenced interventions that provide young people with the experience of being exposed to pressures (for example, through role-playing). They also teach young people how to recognise these pressures, and provide them with the opportunities to learn about and practise the skills required to resist the pressures.

3.2.2.5 Diffusion Theory

Diffusion theory (or diffusion of innovations theory) (Rogers, 1995) does not explain changes in individual action. Instead, it explains the process of change at a community-level. It has been used as a key to understanding how 'new' ideas and practices a) begin and b) spread throughout a community. This theory describes how the adoption (or discontinuation) of practices and ideas traditionally follows an 'S'-shaped curve, with slow uptake at the start, followed by a period of rapid uptake, and a decrease in rate at the end of the adoption period. Different groups of the community are involved at different stages of this process. These are: innovators, early adopters, early majority, late majority and laggards, each of which has a specific role to play in the diffusion process. At the heart of the diffusion process is modelling and imitation of innovations already adopted and/or endorsed by influential people. These individuals are termed opinion leaders. Communication channels used in the diffusion process include mass media channels in which one or a small number of individuals can reach many others to create awareness-knowledge, and interpersonal channels which involve face-to-face exchange and entail strategies that are more persuasive.

The diffusion of innovations model has been applied in the public health field (Valente, 2002a) in which opinion leaders can be used to facilitate the spread of positive health-related attitudes and behaviours (Rogers, 2002; Valente & Davis, 1999). Diffusion theory can therefore be applied to adolescent smoking in order to develop interventions to facilitate the spread of smoking-related messages through the use of mass media channels (Haider & Kreps, 2004) and/or face-to-face interaction (Coleman et al., 1957; Kelly et al., 1997) so as to improve health awareness, facilitate decision-making and change practices.

3.3 Adolescent smoking prevention

There is an abundance of initiatives aimed at preventing adolescent smoking. While many interventions are developed and implemented on the basis of felt need, practicalities and political motivations, others are more theoretically driven, embracing psychosocial theories such as those previously discussed. These have adopted a variety of approaches, including school- or community-based interventions, mass media campaigns and law enforcement. Some of these interventions are aimed at individual factors while others target wider social influences. The success of these different approaches has been mixed.

Perhaps the broadest overview of adolescent smoking prevention interventions is provided in the recent Health Development Agency commissioned systematic review of reviews of interventions to increase smoking cessation, reduce smoking initiation and prevent further uptake of smoking (Naidoo et al., 2004). Of the 29 reviews included in this publication, six were focussed on strategies to reduce initiation and/or further uptake of smoking amongst children and adolescents. While this review demonstrated that there is little consensus over the most successful approach to take, it identified a number of promising preventive strategies. These included:

- community-wide interventions based on social learning theory/social influences approaches;
- school-based 'peer' or 'social-type' interventions.

Of lesser importance, but worthy of attention were:

- price increases;
- mass media interventions (when used in combination with other interventions);
- retail interventions (effective at decreasing the number of underage sales but not successful in reducing adolescent smoking prevalence)

These promising approaches will be covered in further detail in this section. A plethora of evaluative studies exploring the efficacy and

effectiveness of preventive initiatives have been conducted over a number of decades. Some evaluations have been cross-sectional while others (particularly more recently) have adopted rigorous evaluative designs such as randomised controlled trials. However, the complexity of many intervention approaches has meant that thorough evaluation has often been problematic and has resulted in limited robust evidence of effectiveness. Several relevant Cochrane systematic reviews have been conducted which provide comprehensive evidence of the quality and effectiveness of a number of approaches to reducing adolescent smoking (Sowden et al., 2005; Sowden & Arblaster, 1998; Stead & Lancaster, 2004; Thomas, 2003).

3.3.1 Community interventions

In recognition that young people make decisions to smoke within the broad social context, there is support for community prevention programmes (VanderWaal et al., 2005). *"The goals of most community interventions are to set in place structures that both support and reinforce efforts to improve health and well-being"* (Sowden et al., 2005, p2). Therefore, community interventions are generally complex and target several systems, institutions or channels using various approaches. They often involve a range of individuals and organisations, such as schools, the media, health agencies, businesses and law enforcement, and aim to induce both environmental and behavioural change, for example, by creating environments conducive to individuals being smoke-free (Lantz et al., 2000).

Despite the potential of these interventions, few have proved effective, and there remains discussion regarding their effectiveness in influencing adolescent smoking behaviour. However, some community-based interventions have had a positive impact on knowledge and attitudes, for example, Smokebusters (Bruce & van Teijlingen, 1999; van Teijlingen & Bruce, 1999). This is a community-based smoking prevention initiative aimed at young people which has been

implemented throughout the UK and Ireland since 1985. A review of this initiative was conducted in 36 clubs. Some evidence of improved knowledge and attitudes was demonstrated, although there were no reports of sustained changes in smoking behaviour. The Texas Tobacco Prevention Pilot Initiative (Meshack et al., 2004) examined how the intensity of anti-smoking media campaigns and differing anti-smoking community-based interventions (none, enhanced school and comprehensive) influenced the smoking behaviour and related psychosocial variables of sixth graders using a quasi-experimental design. The analyses conducted demonstrated an impact on anti-smoking attitudes although the most consistent short-term reductions in adolescents' susceptibility to smoking and pro-smoking attitudes were achieved through a combination of an intensive media campaign and the comprehensive community condition.

Whilst a number of community-based interventions have demonstrated promising outcomes, the long-term effects are generally unclear. Several interventions have, however, provided evidence of a sustained impact. Two of these have been implemented as part of wider cardiovascular disease programmes amongst the whole community. The North Karelia Youth Project evaluated a community-based intervention which involved a school-based social influences element, community-wide cardiovascular disease prevention activities and mass media intervention (Vartiainen et al., 1998; Vartiainen et al., 1986). At both ten- and fifteen-year follow-up this intervention had a positive effect on smoking rates suggesting that a combination of approaches produce successful reductions in smoking. A positive (and long-term) effect was also demonstrated in the Minnesota Smoking Prevention Programme which was evaluated as part of a wider community programme aimed at promoting a healthy lifestyle amongst the whole community (Perry et al., 1992). The school-based intervention (which it was proposed would be more successful when delivered in the context of a more comprehensive programme) addressed social and psychological factors which influence smoking amongst sixth graders. This intervention induced a significant reduction in smoking rates

amongst the intervention group which was sustained through to twelfth grade.

Problems with evaluation have been observed, and in particular establishing appropriate control groups (Sanson-Fisher et al., 1996). Furthermore, interventions are rarely comparable, or reproduced in the same manner in different settings. The latter problem was observed in the European Smoking prevention Framework Approach (ESFA), where the intervention was evaluated in a number of different countries (De Vries et al., 2003b; De Vries et al., 2003c). The ESFA was implemented in six European countries and included activities for adolescents, schools, parents and out-of-school activities. A common element across all countries was the implementation of at least five lessons which focussed on social influences processes and training in refusal skills. However, variable results were obtained across countries which are likely to be as a result of differing approaches to the ESFA between countries, and variable evaluation strategies.

These findings are supported by the Cochrane systematic review of community interventions for smoking prevention conducted by Sowden and colleagues (2005), This reported that there is some limited evidence for the effectiveness of these interventions to prevent smoking amongst young people. The review included 17 (out of 63 identified) randomised and non-randomised trials of multi-component versus no intervention, single-component interventions or school-based interventions. Two of the 13 studies comparing comprehensive and no intervention (discussed above) reported lower smoking rates amongst under 25 year olds. One of the three studies comparing multi-component interventions to school-based interventions reported differences in smoking rates. The authors proposed that when combined with school-based programmes, community interventions are more likely to induce change.

In conclusion, community interventions directed at adolescent smoking prevention are capable of inducing attitudinal change and reductions in adolescent smoking rates, but this impact may be limited.

Furthermore, there is evidence that they are capable of achieving sustained impact when part of community-wide programmes.

As previously mentioned, community interventions can target a number of settings using a variety of approaches. Activities such as legislation, media campaigns, and school-based interventions can be incorporated into community interventions. However, these strategies can also be used as stand-alone interventions. These will briefly be discussed.

3.3.1.1 Policy and legislation

Restrictions on smoking in public places, for example, worksites, restaurants, public transport and other public places are increasing and have been implemented in a number of countries. These bans have been met with mixed feeling from both industry and members of the public but can reduce exposure to secondhand smoke (Brownson et al., 1997). One aim of smoking bans is to reduce the belief that smoking is an acceptable practice. For this reason, bans on smoking in public places have been effective in reducing smoking rates amongst young people (Biener et al., 2000; Farkas et al., 2000; Lantz et al., 2000; Lober Aquilino & Lowe, 2004; Wakefield et al., 2000).

There is evidence that taxation of tobacco products will reduce youth tobacco consumption (Lantz et al., 2000; Lober Aquilino & Lowe, 2004). However, it has been reported that taxation does not necessarily reduce smoking initiation (DeCicca et al., 2001). Chaloupka and Wechsler (1997) reported that price increases can have a statistically significant impact on the smoking behaviour of college students. Since young people spend a much higher proportion of their disposable income on tobacco than adults do, it is likely that taxation and price increases will have a more significant impact upon them than on long-term adult smokers.

Controlling access to cigarettes is an important strategy to help reduce the prevalence of smoking amongst young people. In the UK,

sales of tobacco products to young people under the age of 16 are illegal. Despite this, underage tobacco sales are a problem. A systematic review of 27 interventions to prevent tobacco sales to minors (Stead & Lancaster, 2000), and a more recent Cochrane review covering the same issue in 34 studies (which included studies from the earlier review) (Stead & Lancaster, 2004) identified interventions which broadly included education about legal requirements; notification of the results of compliance checks; warning of enforcement; and implementation of enforcement by Police or health officials. The results of the Cochrane Review will be considered here. Interventions induced large decreases in the number of outlets selling tobacco to youth but compliance was rarely sustained. Eleven of the studies included assessed the effect of the intervention on the smoking behaviour of underage adolescents. Four of the seven controlled trials and two of the uncontrolled trials included found that youth smoking behaviour was affected by the intervention. However, the methodological quality of studies varied greatly. In relation to reducing the prevalence of smoking amongst youth, the authors concluded that there is limited evidence for an effect of interventions on smoking behaviour, which may be explained by the unsustainable reductions in tobacco sales. A concern raised, which is supported elsewhere (Harrison et al., 2000) was the availability of tobacco from other sources, for example, friends and relatives. This has been discussed previously in section 2.8.6.1. Accessibility through vending machines is also a potential problem, and whilst policy action to restrict the location of vending machines could be effective at reducing tobacco sales and help delay smoking initiation, this may be difficult to enforce (Lantz et al., 2000; Lewit et al., 1997; Reid et al., 1995). This was confirmed by a study conducted in Illinois, in the USA (Jason et al., 1999) which found that where legislation relating to sale of tobacco was enforced, adolescent smoking rates were lower than in communities where the legislation was not enforced.

In summary, policy and legislation can contribute to reducing adolescent smoking. Bans on smoking in public places help dispel social fallacies that smoking is the norm and can contribute to

preventive efforts. Price rises in the form of taxation, or otherwise are likely to affect the smoking behaviour of young people more significantly than older smokers. Finally, controlling youth access to tobacco from 'official' sources can reduce tobacco sales but the difficulty of regulating and enforcing legislation suggests that the impact on smoking behaviour is likely to be limited.

3.3.1.2 Mass media

Mass media effort is often incorporated into community interventions. It has the advantage of having the potential to provide access to a large population, and is especially appropriate for reaching young people and hard to reach groups (Lantz et al., 2000). However, this access is neither easily regulated nor easily focussed to target any particular population. Furthermore it's cost-effectiveness has been questioned and concerns have been raised about the ability to successfully evaluate such interventions (Wellings & Macdowall, 2000).

Lantz and colleagues (2000) reported that mass media interventions produce varying results, and concluded that the impact of these campaigns is unknown. However, they acknowledged that combining this approach with school-based interventions increased effectiveness. This was also demonstrated by Flynn and others (Flynn et al., 1992; Flynn et al., 1994) who examined the long-term cigarette smoking prevention effects of an intervention which utilised radio and television slots to target adolescents over a four year period. This was combined with a teacher-led, curriculum-based, school-based intervention which emphasised decision-making, skills to resist peer and advertising pressure, social support for non-smokers, and information about smoking and health. Two communities received both the mass media and school intervention, and two matching communities received only the school intervention. The combined intervention demonstrated a positive effect on weekly smoking compared to the

school only intervention. This effect was maintained two years after completion.

Some mass media interventions have not demonstrated any impact on adolescent smoking rates. One example is an intervention which compared the effect of three different forms of mass media intervention (Bauman et al., 1991). This involved the broadcast of radio messages about the negative consequences of smoking and the promotion of a sweepstake offer which encouraged young people to recruit friends who might then become involved in discussion about smoking. In another study, a blocked randomised design was used to compare no intervention with various combinations of a mass media intervention and a school-based programme (mass media alone, mass-media and school component, school component alone) (Flay et al., 1995). This social influences programme showed no impact on smoking intentions or behaviour, although deficiencies in delivery were acknowledged by the researchers.

The intense marketing strategy of tobacco companies and the theory that increased exposure to tobacco advertising increases the likelihood of smoking initiation (see section 2.8.4.1) suggests that restricting tobacco advertising will subsequently reduce smoking uptake. However, whilst the potential effect of this is unclear (Lovato et al., 2003), the results of a telephone survey of nearly 7,000 12-24 year olds in the USA suggested that media campaigns which adopt a counterindustry approach and aim to change beliefs about industry practice are promising in the effort to reduce smoking amongst this age group (Hersey et al., 2003).

The Cochrane Review of mass media interventions for preventing smoking amongst young people aged 9-18 (Sowden & Arblaster, 1998) supported the findings above that mass media can be effective at preventing smoking uptake amongst adolescents. It identified 63 studies, six of which met the criteria for inclusion (a number of which are considered above). All studies included had a comparison group. Only two of the included studies found a positive association between mass media and adolescent smoking behaviour.

There is limited evidence of the impact of mass media intervention on adolescent smoking behaviour. In combination with other interventions, such as school-based approaches, they appear to be most effective. The few studies considered rigorous enough to be include in the Cochrane Review suggests that evaluation of this approach is likely to be problematic, particularly where impact is difficult to quantify.

3.3.1.3 Home-based approaches

As discussed in section 2.8.6.2, the home environment has the potential to affect the smoking behaviour of young people in a variety of ways. Therefore, making changes in the home, such as by targeting residents' smoking behaviour and encouraging parents to introduce restrictions on smoking in the home may be able to affect behaviour. Parental involvement has also been identified as an important contribution to school-based smoking prevention programmes (Glynn, 1989; Perry et al., 1988).

Home-based approaches have had variable impact on adolescent smoking behaviour. For example, a family-directed programme (Family Matters) for preventing tobacco and alcohol use amongst adolescents aged 12-14 (Bauman et al., 2001b) induced a 16.4 per cent reduction in the number of smoking adolescents in families randomised to receive the intervention compared to control families at one-year follow-up. Aspects of this intervention were grounded in several social and behavioural science theories: value expectancy theory; the health belief model; social learning theory; theories of socialisation, social control, social development and family interaction; social inoculation theory and communication theories. However, another randomised trial of a family-based smoking prevention intervention provided through managed care organisations (Curry et al., 2003) found no positive effect of the intervention on young

adolescents' susceptibility to smoking, experimentation with smoking, and smoking in the past 30 days at 20-month follow-up.

As considered in section 2.8.6.2.2, smoking restrictions in the home can also affect smoking rates. They are reportedly related to a greater likelihood of being in an earlier stage of smoking and a lower 30-day prevalence of smoking (Wakefield et al., 2000). They have also been reported as being associated with a lower likelihood of experimenting with smoking amongst middle and high school students (Proescholdbell et al., 2000). For high school students this was restricted to homes with non-smoking parents.

In summary, parental involvement and the use of home-based intervention strategies can positively contribute to smoking prevention efforts, although the impact on smoking behaviour is equivocal. The most likely impact on adolescent smoking is through imposing smoking restrictions in the home.

3.3.2 School-based approaches

Schools are considered particularly appropriate settings for health promotion interventions with young people (Department of Health, 1999; Gorin, 1998; National Assembly for Wales, 2001; Tones, 1998). Their main advantage is that compulsory school attendance for young people in the Western world means that there is opportunity for sustained contact with all but a minority of young people, providing a captive audience to health promotion initiatives (Denman, 1999; Lynagh et al., 1997; Maes & Lievens, 1999; Moore, 1999; Rudd & Walsh, 1993). Furthermore, since smoking uptake is most prevalent during the teenage years, and adolescent smoking rates have remained stable, while adult smoking rates have gone down there is sufficient evidence to support the use of interventions which target the risk-factors of smoking at an early age. It is not surprising, therefore, that school-based approaches to smoking prevention are frequently adopted.

3.3.2.1 Smoking education in schools

The first tier of preventive efforts in schools is based within the school curriculum, and is likely to adopt the Knowledge-Attitude-Behaviour model discussed in section 3.2.1. Whilst health education is not a separate subject within the National Curriculum in England and Wales, there are several opportunities to cover aspects of health education within subjects such as science, PSHE (Personal, Social and Health Education) in England, PSE (Personal and Social Education) in Wales, and citizenship (see Appendix 4 for examples). Other opportunities within subjects such as English, Mathematics, Information Technology, History, Economics, Geography, Modern Languages and Physical Education (see Department for Education and Skills, 2004; West & Foulds, 1999 for examples) are available but are unlikely to be utilised as frequently. Additional coverage of drug, alcohol and tobacco education outside of the science curriculum is not mandatory so long as it has contributed to the whole-curriculum aims (DfEE, 1995; Qualifications and Curriculum Authority, 2003). Therefore, it is likely that the content of this curriculum will be tailored to the needs and priorities of individual schools, some of which may have more problematic health-related issues such as drug and alcohol use/abuse to deal with.

As discussed in section 3.2.1 there are limitations of approaching adolescent smoking prevention solely through education. The primary criticism is that since smoking behaviour is affected by numerous influences, it is unlikely that just telling young people of the risks of smoking will affect adolescent smoking behaviour (Hawthorne, 1997; Maes & Lievens, 1999). Mixed results have also been reported regarding the association between health benefits and provision of health education, or the employment of health education staff in schools (Clarke et al., 1994; Connell et al., 1985; Maes & Lievens, 1999). Therefore, school-based smoking education is most likely able to delay rather than prevent smoking uptake by adolescents (Reid et al., 1995). These authors recommend the introduction of comprehensive programmes based on the 'health promoting school' concept. This will

be discussed in section 3.3.2.2.2. Moreover, classroom teaching is not well suited to imparting health promotion messages, primarily because of the conflict between pedagogical and health promotion approaches (West & Foulds, 1999). The 'one size fits all' didactic approach adopted within the traditional educational approach is unlikely to adequately engage with, and influence behaviour change amongst different target groups of smokers and non-smokers. Curriculum-based intervention will also fail to access individuals who are disengaged with school. One could also argue that incorporating health education into other core curriculum subjects rather than being a subject in its own right automatically gives it low priority and status with both teachers and students, reducing the motivation to take delivery and receipt seriously.

Reliance on non-specialist teachers to deliver health education packages is demanding and requires valuable time out of the 'core' curriculum which in an educational climate of targets, league tables and increasing pressure on teachers to deliver the 'core' curriculum, few schools are able to provide (Thomas & Keirle, 2001). In reality, the practice of combining the health and education agendas may result in a precarious balancing act between competing priorities both in terms of time and resources (Gordon & Turner, 2003).

This brief discussion draws attention to the deficiencies of school-based health education provision. Given that there is not enough time, few expert personnel, insufficient investment in resources (Denman, 1999) and a demonstrated lack of effectiveness, there is considerable evidence to support the adoption of alternative or additional approaches for school-based smoking prevention.

3.3.2.2 Other school-based interventions

Evidence had been provided for the ineffectiveness of knowledge-based health education approaches for reducing smoking amongst adolescents. Simply delivering the school curriculum and neglecting the developmental and health needs of young people is inadequate to

effect change. However, whilst smoking education has proved relatively unsuccessful in reducing adolescent smoking, we should not rule schools out as a vehicle for preventive interventions. The need to develop social interventions which draw on psychosocial theories and concentrate on redressing social norms and developing the skills required to avoid and resist the pressures to smoke has previously been discussed. This approach can be adopted in schools-based interventions. Many of these interventions target more than just knowledge, looking to make changes in the wider environment and affect social norms within both the school and community. This is conducive with the settings approach to health promotion.

3.3.2.2.1 Settings for smoking prevention

Health promotion strategies are not limited to a specific health problem or set of behaviours. Health promotion activity can be focussed to target different population groups (the population approach, where a population of concern is targeted), risk factors, diseases (the issue approach, where activity concentrates on particular issues that affect an individual or group), and in various settings (the settings approach) (Poland et al., 2000).

The World Health Organisation is an advocate for the settings approach to health promotion. For example, one of the strategies for health promotion action identified in the Ottawa Charter was 'supportive environments'. Furthermore, it stated that *"health is created and lived by people within the settings of their everyday life; where they learn, work, play and love"* (World Health Organisation, 1986, pp3-4). Instead of looking at behaviour change in terms of individuals, the settings approach recognises the importance of context and looks to achieve behaviour change by facilitating modifications to the physical and social aspects of organisations, systems and the environment.

Within the settings approach, health can be promoted by encouraging individuals to access services and resources within or

outside the setting, or by changing the physical environment and organisational policies and structures (World Health Organisation, 1998b), for example, by introducing interventions which will reduce the impact of health-related risk factors.

Therefore, where the school is the setting, multi-facetted approaches to smoking prevention can be adopted which involve the introduction of policies, and interventions which target tobacco use in a holistic manner. This approach is commonly known as the 'whole school approach'.

3.3.2.2.2 The whole school approach to smoking prevention

As previously discussed, the declaration of Alma Atta (World Health Organisation, 1978) and the Ottawa Charter for Health (World Health Organisation, 1986) recognise education as a means of improving health but also look to a more holistic approach to improving health. Such an approach acknowledges that in addition to education, healthy policies and supportive environments are also important to facilitate behaviour change.

In schools this suggests a need to focus on the wider school environment, not just what students are taught through the formal curriculum. This approach is known as the whole-school approach to health promotion and recognises that in addition to providing knowledge, schools have the potential to influence students and staff whose well-being is affected by the environment in which they work and study in other ways (Lister-Sharp et al., 1999; Naidoo & Wills, 2000). Schools can play a role in promoting holistic health through, for example, the school's physical and social environment; the school health services; psychological, counselling and social services; meals at school; employee health policies; programmes and extra-curricular activities such as sports; and developing community links (Dhillon & Philip, 1992; Kolbe, 2005; Lister-Sharp et al., 1999). Such strategies are sometimes termed the 'hidden curriculum' and whilst in this context they

are usually considered as having a positive impact on health and are supportive of the curriculum, they may also challenge the formal curriculum.

This whole school approach is formalised by the health promoting school concept (Denman et al., 2002). The underlying theory assumes that the environment surrounding individuals is important for their ability to learn and develop skills required for their future (Denman, 1999; Thomas & Keirle, 2001). Since the focus is on a whole school approach, health promoting schools are also able to affect the health of those for whom it is a workplace (Rudd & Walsh, 1993).

Within this approach, policies can complement efforts to improve the school environment and ethos. Furthermore, they can help to ensure that work conducted in schools is not undermined by students and teachers smoking on the school premises. Policies affect the whole population, reinforcing prevention and curriculum efforts by encouraging climate change (Hartland & Tudor-Smith, 1997; Pentz et al., 1997).

While it is considered important that policies are in place and are enforced within schools to create healthy environments and prevent students smoking in school time and on schools grounds, evidence shows that written policies may be rare, and introduction and enforcement may be logistically difficult (Hartland & Tudor-Smith, 1997). The adoption of smoking policies in schools is not only important for students but also for the teachers and other staff for whom the school is a workplace. Enforcing a smoke-free policy for teachers can contribute to cessation amongst staff (Health Education Authority, 1993) and may impact on the smoking habits of students as shown in section 2.8.6.3.

Making links with the community is an important facet of the whole school approach and there are many organisations and individuals outside schools who can aid and support anti-smoking activities within schools (Health Education Authority, 1993; West & Foulds, 1999). Linking with these transfers the focus of these activities to a more community-based approach of which the school is a part. Furthermore, it has the potential to facilitate consistency in the

messages portrayed to young people about smoking both inside and outside the school environment (West & Foulds, 1999). One of the obvious useful links is with local shopkeepers, and can encourage the enforcement of laws regarding tobacco sales to young people. Utilising the experience and resources of external experts such as local health promotion departments, and anti-smoking alliances (Hamilton & Saunders, 1997; West & Foulds, 1999) can help overcome the lack of expertise in the area of health education previously discussed. The most positive aspect is that this approach detracts attention from the school curriculum, and from teachers being responsible for health as well as education (Rudd & Walsh, 1993).

3.3.2.2.3 Social interventions for smoking prevention in schools

Interventions which target the social influences of smoking and promote the development of resistance skills form an important part of the whole school approach. However, whilst the following discussion considers these interventions in the context of the whole school approach, it should be recognised that they are generally designed and implemented as stand-alone interventions. They need not be implemented as part of the whole-school approach, and are not necessarily a requirement of the whole-school approach. A large number of school-based smoking-prevention interventions have been evaluated although the evidence of effectiveness is equivocal. Some evaluations have shown no significant effect on smoking behaviour (for example, Aveyard et al., 1999; Nutbeam et al., 1993; Peterson et al., 2000), while others have demonstrated convincing effects (for example, Botvin et al., 1990; Elder et al., 1993; Perry et al., 1992).

The most promising approach in schools appears to be in the form of comprehensive prevention programmes which have shown some success in inducing attitudinal or behavioural change amongst their target groups. This method supports the whole-school approach to

smoking prevention. While a number of interventions to help young people resist social pressures have been successful at reducing smoking prevalence (McAlister et al., 1980; Perry et al., 1980; Telch et al., 1990), the study by Telch and colleagues produced less clear-cut results. In this study, videotape social pressures resistance training, and peer leader involvement demonstrated a more robust effect than was seen amongst those who just received the videotape instruction, providing support for more comprehensive programmes, and those involving peer leaders. Another video-oriented programme (De Vries et al., 1994) involved five 45 minute-long lessons which focused on a peer-led video. This intervention prevented regular smoking amongst vocational students, but not experimental smoking amongst high school students. Again, a more comprehensive version of this programme included boosters (Dijkstra et al., 1999) and added to the effectiveness. The evaluation of Be smokeFREE compared three school-based interventions with a control condition (Jøsendal et al., 1998; Jøsendal et al., 2005). The more comprehensive version of this social influences approach (a classroom programme with parental involvement and teacher components) was more effective than the less intensive interventions (classroom programme with teacher components and classroom programme, with parental involvement).

Bruvold's (1993) meta-analysis, which focussed on the efficacy of school-based programmes supported the comprehensive school-based approach. He compared 94 studies which were classified as: rational, or information-giving; developmental, where the focus was on increasing self-esteem and developing decision-making skills; social-norms; and social reinforcement interventions. Results of 'better quality' studies provided evidence to support the use of school-based interventions which adopt a social reinforcement approach, and to a lesser extent those with a developmental or social norms approach. Another meta-analysis of smoking prevention programmes conducted with 11 to 18 year olds (Rooney & Murray, 1996) included 90 studies which had either a control or comparison group. Studies included were school-based peer-led and social influences programmes which

collected at least one-year follow-up data. The analysis took account of clustering. The authors suggested that the limited effect of social reinforcement programmes could be improved if delivered during early adolescence, if they involve same age peer leaders, are part of a multi-component programme, if they include booster sessions and if peer leaders are not over-trained. These meta-analytic results are supported by a qualitative review of substance use prevention studies conducted in the 1980's (Hansen, 1992) which concluded that comprehensive and social influences programmes were most successful at preventing *onset* of substance use.

The merits of using peers have been mentioned on a number of occasions above and have also been endorsed by two reviews. Black and colleagues (1998) reported that interactive peer interventions were superior to non-interactive, didactic programmes led by adults. In support, a meta-analysis of 207 school-based adolescent drug prevention programmes conducted by Tobler and colleagues (2000) deduced that school-based drug prevention programmes which addressed social influences in small group interactive programmes and those led by peers were more effective than non-interactive large-scale programmes. However, in disagreement with the reviews considered above, programmes which specifically targeted tobacco were more effective than those which included tobacco as a component of a more comprehensive health promotion programme. The use of peers will be covered in further detail in chapter 4.

Despite the support for social influences approaches, the long-term effectiveness of this approach has been questioned (Resnicow & Botvin, 1993). The Oslo Youth Study Smoking Prevention Program (Klepp et al., 1993) is an example of one such intervention. This involved a 10-session smoking prevention programme which was partly led by older students and involved training to resist social pressures to smoke, personalised role models, public commitment to remain a non-smoker, and covered the social, political, and health aspects of smoking. At one- and two-year follow-up it showed a short-term effect

amongst some students, but these effects were not seen at ten-year follow-up.

Some evaluations have shown that boosters can prolong the impact of interventions. This was demonstrated in a long-term peer-led psychosocial intervention which combined refusal skills training, contingency management and telephone and mail boosters (Elder et al., 1993). Other authors have proposed that boosters might sustain a long-term effect. For example, Ausems and colleagues (2004) examined the impact of three lessons plus a computer-based out-of-school programme amongst vocational school students. At 12-month follow-up, the in-school intervention was successful at preventing continuation of smoking. At 18-month follow-up this effect had disappeared and the out-of-school intervention was successful at preventing smoking initiation. These authors acknowledged that implementation could be improved and recommended the use of boosters for long-term success.

The lack of long-term impact was recognised by two research teams who subsequently reviewed the long-term impact of adolescent smoking-prevention programmes (Skara & Sussman, 2003; Wiehe et al., 2005). The review by Wiehe and colleagues included only randomised controlled trials whereas the Skara and Sussman review included those which had at least a quasi-experimental design. All but one of the studies included in the Skara and Sussman review had a schools-based component and the majority (19 of 25) adopted a social influences approach to smoking prevention. Sixteen studies targeted 12-13 year old students, and the remainder younger students. The majority reported positive programme effects for tobacco smoking, some of which were maintained until the end of the study. Whilst some methodological issues were acknowledged, the authors concluded that there is evidence for the effectiveness of such social influences programmes for preventing and reducing substance use when evaluated over a period of up to 24 months. However, the more restrictive review by Wiehe and colleagues was not so positive. This systematic review included only school-based smoking prevention

interventions with young people up to 18 years of age and which had follow-up of greater than one year. Eight (out of 177 identified) studies of varying intervention intensity, follow-up, and attrition met selection criteria. Only one of these showed a significant decreased smoking prevalence in the intervention group five years post-intervention. The authors suggested that school-based smoking interventions are useful when implemented in conjunction with community and media interventions, but could offer no evidence of their long-term effectiveness as stand-alone interventions. Slama (1994) proposes one reason for this limited long-term effect might be that prevention programmes may not have sufficiently intense and sustained contact with young people throughout their school life to have a lasting impact on smoking behaviour and attitudes.

The methodological quality of evaluations of school-based interventions has been criticised by a number of researchers, and the need for further evaluation has been identified (Sussman et al., 1999; Thomas, 2003). The author of the Cochrane systematic review of school-based programmes for reducing smoking was one such critic (Thomas, 2003). This review included 76 randomised controlled trials of interventions which targeted children and young people up to the age of 18. These interventions adopted a variety of approaches including information provision; social competences; social influences; combined social influences/social competences; and multi-modal programmes. Sixteen studies were found to be most valid, of which 15 were of social influences interventions. Of these, eight demonstrated a positive effect on adolescent smoking behaviour. However, Thomas argued that few evaluations had been rigorously conducted. Therefore, whilst some positive outcomes were observed, this review concluded that there is a lack of high quality evidence for the effectiveness of these interventions to reduce adolescent smoking. Furthermore, the most rigorously conducted evaluation, the Hutchinson Smoking Prevention Project (Mann et al., 2000; Peterson et al., 2000) showed no impact of the intervention on adolescent smoking at the immediate or two-year follow-up. This intervention involved twelfth grade students receiving 65

intervention sessions which covered skills to identify marketing and peer influence to smoke; skills to resist social influences; information provision; motivation to be smoke-free; the promotion of self-confidence in the ability to refuse influences and pressures to smoke; and enlisting positive family influences. Another study not included in this review provides further evidence for the methodological limitations of previous evaluations. The Healthy School and Drugs Project (Cuijpers et al., 2002) was a programme based on the theory of planned behaviour. Whilst the intervention demonstrated some impact on tobacco use, the authors recognised that there were methodological limitations including randomisation, fidelity and self-reported outcomes, and suggested that the results should be treated with caution.

The above discussion shows that there is some evidence for the effectiveness of school-based interventions. Despite this, interventions that have demonstrated effectiveness have shown little impact beyond the short-term. However, when incorporated with standard education, or as part of more comprehensive preventive programmes, interventions which target social norms relating to smoking, and which are based on the social influences resistance model where the social environment is emphasised as being an important factor in tobacco use are considered the most successful approach (Botvin et al., 1998; Corbett, 2001; Hansen, 1992; Lantz et al., 2000; Lister-Sharp et al., 1999; USDHHS, 1994). This also provides some support for their implementation as part of a whole-school approach. In addition, interventions which are interactive peer interventions also seem to be superior to non-interactive, didactic programmes.

3.3.2.2.4 Criticism of the school-based approach

The demonstrated short-term effectiveness and *convenience* (relative to other approaches) of school-based approaches has resulted in the attention of adolescent smoking prevention being focussed largely on these interventions. However, despite this support (Lynagh et al., 1997;

Tones & Tilford, 2001), there are several limitations and criticisms, a number of which are associated with the reality of teachers implementing these programmes in addition to undertaking their primary role of teaching.

Reid (1999) criticises school-based interventions because they place additional pressures on teaching staff and curriculum time. Moreover, he suggests that the failure of the schools-based, computer-aided intervention conducted by Aveyard and colleagues (1999) reinforced the idea that schools cannot deal with such complex interventions and emphasises the benefits of interventions which target the social influences of smoking.

Furthermore, Reniscow and Botvin (1993) and Reid (1995) suggest that the 'real world' conditions under which interventions tested under experimental conditions will be conducted in practice will rarely meet those required to achieve optimum intervention effects. An example of a school-based smoking intervention with young people where this was observed was conducted by Nutbeam and colleagues (1993). This intervention was effective under trial conditions, but when implemented under normal classroom conditions, it had no significant impact on adolescent smoking behaviour. Insufficient dose and the need for additional booster sessions following programme implementation are some suggested reasons, another being that inadequate or inappropriate programme implementation may result in a negative or smaller intervention effect (Dusenbury et al., 2003; McGrew et al., 1994; Rohrbach et al., 1996; Tobler & Stratton, 1997).

Research suggests that whilst effective research-based programmes may be adopted in schools, it is unlikely that teachers will implement them with fidelity (Hallfors & Godette, 2002). A number of studies have been conducted which illustrate this. Teachers often do not deliver the whole programme (Botvin et al., 1990; Buston et al., 2002; Mihalic et al., 2004) or do not achieve the intended dose of the programme, (Elliott & Mihalic, 2004). The quality of delivery is also variable, and adaptation is common-place (Buston et al., 2002;

Dusenbury et al., 2005). This clearly raises concerns regarding the quality of interventions implemented by teachers.

In schools, a number of reasons for not implementing with fidelity have been identified. These include: lack of teacher training and support; lack of requisite materials; insufficient or inappropriate classroom space; disciplinary issues; low teacher morale; competing demands for teacher time and timetable space; use of some but not all required lessons and teaching strategies; failing to deliver to appropriate age groups; unplanned adaptation (maybe due to personal preference i.e. style, or beliefs about what most suitable for audience); and the manner in which the programme integrates with existing activities and programmes (Botvin, 2004; Buston et al., 2002; Greenberg, 2004; Pentz, 2004; Smith et al., 1993; Wagner et al., 2004). These explanations provide further evidence that whilst schools may be appropriate settings for health promotion efforts with adolescents, even the most well conceived teacher-delivered curriculum-based intervention is unlikely to achieve maximal impact.

Another criticism is that 'authority figures' do not always act as the most credible source of information, and that information may be best provided by less traditionally oriented approaches. It is suggested that people of similar ages and backgrounds may be better placed to convey health-related information (Shiner & Newburn, 1996). The need to avoid authority figures who assert power, control, authority and morality was also identified in a community-based intervention which tested the feasibility of using peer leaders among adult amphetamine users (Klee & Reid, 1995). The use of peer leaders in this intervention is an example of a promising approach which achieves this and which has been mentioned on a number of occasions in this chapter in relation to smoking prevention.

In conclusion, whilst school-based approaches may seem appealing, they have their limitations. Structural restrictions and the pressurised school environment limit the impact any school-based intervention can have. This may also reduce the ability to effectively transfer successful evidence-based interventions into real-world

settings with equivalent outcomes. Finally, implementation of interventions by school staff poses a number of problems. The first is that they are unlikely to implement with the fidelity required to achieve maximal success. Furthermore, delivery by such authority figures is perhaps not the most appropriate way of inducing health-related behavioural change, suggesting the need to employ peer-led approaches.

3.3.3 Comprehensive approaches

It should be recognised that the most effective reduction in adolescent smoking may not be achieved by being exclusive about the use of one approach (Arciti et al., 1994). The optimum requirements for reduction in tobacco use will also be determined by the population in question and no single intervention will ever be effective with everyone. As mentioned on a number of occasions in this chapter, there is substantial support for the idea that only a comprehensive approach will be successful at reducing smoking amongst young people.

Examples of comprehensive approaches include the US-led ASSIST (Manley et al., 1997a; Manley et al., 1997b) and COMMIT (The COMMIT Research Group, 1995) which was also conducted in the USA. However, COMMIT, which was adult-focused, showed little evidence of an impact on adolescent smoking rates (Bowen et al., 2005). Wakefield and Chaloupka (2000) concluded that there is evidence to suggest that comprehensive programmes can influence teenage smoking rates and affirmed that individual strategies (such as those mentioned above) can reinforce each other rather than being viewed exclusively. However, they proposed that programmes that are more successful may be dependent on the level of funding and the level of implementation and suggested the need for further research to establish the effectiveness, and advantages of such approaches compared to other effective approaches.

These findings have been confirmed by a number of reviews and meta-analyses which have concentrated largely on studies from the USA. Hwang and colleagues' (2004) meta-analysis of 65 smoking prevention programmes conducted with sixth to twelfth graders included school- or school-community-based social influence, cognitive behavioural and life skills approaches. Programmes adopting cognitive-behavioural and life skills approaches, and those that were comprehensive school-community settings produced the most significant long-tem effects. Backinger and colleagues (2003) provided evidence to support earlier findings regarding the limited success of more traditional knowledge-based interventions. They reported that mass media and smoking bans, when used in conjunction with school-based interventions can prevent smoking amongst adolescents and suggested that multi-faceted approaches and those which address tobacco use within the youth social context merit further study. A review of tobacco advertising, restrictions on sales to young people, product regulation, price increases and educational strategies (Willemsen & De Zwart, 1999) concluded that the greatest effect is likely from a combination of a complete ban on advertising, price increases, reducing sales, mass media education and innovative smoking education in schools.

Support for the introduction of comprehensive interventions to target adolescent smoking prevention is strong although the evidence of success is relatively limited. Much of this stems from the need to consider the numerous predictors of adolescent smoking, and the idea that the more settings and influences that are targeted, the best chance of success. However, the reality of achieving this significant and long-term investment in terms of time, effort and money has not yet been realised. Furthermore, the multi-faceted nature of such interventions raises numerous issues for comprehensive and rigorous evaluation.

3.3.4 Summary

As a result of the range of influences which affect adolescent smoking, modern health promotion strategies are often required to be complex. Simple theories of behaviour change have been unsuccessful in driving the development of successful preventive efforts. A number of psychosocial theories of behaviour change are used to direct the development of smoking prevention interventions for young people. These include Social Learning Theory and Social Cognitive Theory, the Theory of Reasoned Action and Theory of Planned Behaviour, the Health Belief Model, Social Inoculation Theory and Diffusion Theory. However, the discussion above clearly shows that complex theories do not provide precise explanations of adolescent smoking behaviour, or necessarily guide successful prevention efforts (Petraitis et al., 1995; Scal et al., 2003; Simons-Morton et al., 1999; USDHHS, 1994).

Interventions grounded in these theories have shown positive results but in general, outcomes are mixed and there is little robust evidence of effectiveness, particularly long-term. Whilst enforcement and evaluation may be problematic, evidence of at least some success suggests that tax increases, enforcing tobacco access laws, mass media campaigns and changing the environment in which young people initiate tobacco use are worthy of further consideration. School-based social approaches have been the focus of much preventive activity but they are not without criticism. There is limited evidence of long-term effectiveness and they are criticised due to problems relating to the delivery by teachers. A possible approach which can be used to overcome some of these problems is to use peer educators. This is considered in the following chapter.

~ CHAPTER 4 ~

4 PEER EDUCATION

The previous chapter outlined a number of strategies for adolescent smoking prevention which are grounded in psychosocial theories of health behaviour change. Some of the most favoured of these are school-based interventions with a social influences component, but reliance on teachers to take responsibility for the delivery of these interventions may be one reason for failure. A more appropriate delivery method has been identified as peer education. This chapter describes peer education in the context of adolescent health promotion, discussing some of the merits of this approach over others. Informal peer education strategies grounded in diffusion theory are identified as a promising approach. Issues relating to the success of this approach are discussed.

4.1 Defining peer education

There is a growing body of literature relating to the use of peer education with young people (Shiner, 1999) and it has become increasingly popular in the last 15 to 20 years, particularly in North America (Milburn, 1995; Svenson & others., 1998; Wilton et al., 1995). Despite this, there is considerable ambiguity regarding what peer education *is* and how it should be defined (Shiner, 1999; Shiner & Newburn, 1996), which has resulted in the development of numerous alternative definitions (Parkin & Mckeganey, 2000). Furthermore, the term peer education seems to encompass a wide range of activities, and many different terms have been, and are currently used to identify individuals who carry out peer-led activities. These include peer educator (Stephenson et al., 2004; Svenson & others., 1998), peer

facilitator (Milburn, 1995), peer teacher (Wiist & Snider, 1991), peer leader (Pearlman et al., 2002; Story et al., 2002; Telch et al., 1990), peer counsellor (Milburn, 1995) peer helper (Lewis & Lewis, 1996; Peterson & Rigby, 1992), peer tutor (Fitz-Gibbon, 1992), peer informant (Whittemore et al., 2000), and peer supporter (Charlton & David, 1997; Naylor & Cowie, 1999; Turner, 1999).

These terms have been used to refer to both 'formal' planned educational sessions and 'informal' education which occurs within social networks (Backett-Milburn & Wilson, 2000). Some suggest that the subtle differences in terminology used reflect the various roles they adopt, and the different styles of working within these different approaches (Milburn, 1995; Orme & Starkey, 1999). However, this is not always the case as the roles adopted tend to overlap (Wilton et al., 1995). For example, peer education is a very generic term which has been used to describe approaches whereby peer representatives from a population actively inform and influence others. The terms peer teaching and peer tutoring are often used interchangeably to describe the use of (usually older) peers as classroom teachers. Peer counselling and peer helping are again often used interchangeably to describe one-to-one peer counselling undertaken by trained individuals to help young people deal with immediate personal and social problems. Nevertheless, regardless of the term used, the focus of peer education is on the role of the peer group in the acquisition and maintenance of positive behaviours and the avoidance of negative ones.

The definition of the term 'peer' also raises problems, and has been discussed in relation to peer education by a number of commentators (for example, Milburn, 1995; Shiner, 1999). Whilst the term is commonly associated with individuals of the same age, it has also been used to refer to older peers (Klepp et al., 1993). Age is often considered one of the most important factors when identifying peers, and defining what a peer may be. However, Shiner (1999), and Green (2001) suggest that other factors such as ethnicity, sexuality, social class and sex may be more important than age. The term 'peer' has

therefore been used to describe a range of individuals such as close friends, associates, or those who engage in the same activities in the same setting.

4.2 Issues targeted

Although not confined to use with young people, many peer education interventions have been focused on this age group. Amongst young people, peer education has previously been used within education in tutoring programmes (Cohen et al., 1982), and especially to assist with reading (Devin-Sheehan et al., 1976). In the public health domain, peer-led interventions for young people have targeted a wide range of issues. In particular, it has become increasingly popular within the field of sexual health, where interventions have had much success in the field of HIV prevention (Parkin & Mckeganey, 2000; Wilton et al., 1995). It is also becoming progressively more accepted as a pertinent approach to reducing tobacco (Botvin & Eng, 1982; Newman et al., 1991; Perry et al., 1983; Telch et al., 1990; Wiist & Snider, 1991), and substance use (Black et al., 1998; Massey & Neidigh, 1990; Perry et al., 2002; Ward et al., 1997).

4.3 Settings

As well as being applied in a number of fields, peer education has been used in a number of settings including schools (Borgia et al., 2005; Ozer et al., 1997; Phelps et al., 1994; Stephenson et al., 2004; Story et al., 2002) and community settings such as community centres or in an outreach context (Guy & Banim, 1991; Pearlman et al., 2002; Rhodes, 1994; Ward et al., 1997). A number of other interventions have utilised a combination of school and/or community settings (Newman et al., 1991; Orme & Starkey, 1999) or chosen to rely largely on informal networks through which to deliver information and/or redress social

norms (Kauth et al., 1993; Kegeles et al., 1996). The setting chosen is largely dependent on the group of individuals the intervention aims to target. For example, schools are appropriate to target young people whereas community settings might be more suitable to access groups exposed to particular risk factors such as intravenous drug use.

Whilst school-based health promotion is popular as an approach to adolescent health promotion, one of the major criticisms has revolved around the additional demands it places on teacher time, delivery by authority figures and problems with reaching disaffected and hard-to-reach groups. Peer education within the school setting addresses a number of the limitations of teacher-led interventions by placing emphasis on young people themselves taking the lead role. Support for peer education within schools, and as part of the health promoting school has been demonstrated by it's proliferation as a method of providing, in particular, personal and health education to young people (Frankham, 1998; Parkin & Mckeganey, 2000).

4.4 Methods applied

Peer education can adopt a number of different approaches. Whilst the majority of peer education interventions have used structured lessons or lectures to, for example, provide information or enhance skills in small group settings (Harden et al., 2001), a number of less structured approaches have also been used. These include preparing drama or theatre productions which focus on particular behaviours, operating resource centres or exhibitions in order to provide information and advice, running hotlines, and providing counselling services (Evans et al., 1998; Forrest et al., 2002; Frankham, 1998; Guzmán et al., 2003; Turner & Shepherd, 1999). A less formal approach such as outreach involves one-to-one counselling within the community setting. 'Diffusion' approaches are even more informal and utilise everyday communication within social groups as a vehicle for behaviour change (Harden et al., 1999). Turner and Shepherd (1999) suggest that the

methods chosen will be dependent upon the intended outcomes, and that they may be chosen according to their compatibility with the setting and target group i.e. peer education is generally more informal when run in the youth setting, whereas the school setting is more conducive to more formal approaches.

4.5 Theory

The theories most commonly associated with peer education are social learning theory (Bandura, 1977; Bandura, 1986), social inoculation (McGuire, 1964), and diffusion theory (Rogers, 1995) which have previously been mentioned in section 3.2.2. Common to these theories is the idea that peer educators should be similar to the target group to enable effective identification and communication (Harden et al., 2001) and that peer groups and social networks are important for learning and identity formation during adolescence (Shiner & Newburn, 1996). However, Turner and Shepherd (1999) argue that whilst a number of sociological and education theories may be applied to peer education, it is not *driven* by any theory in particular. Instead, they suggest that it is "a method in search of a theory" in which to embed itself.

4.6 Selecting peer 'educators'

The issue of selecting appropriate peer educators is one of contention, a number of methods having been used, and attaining varying degrees of success both in terms of retention of peer educators and the outcomes they have been capable of achieving. Valente and others (Valente & Davis, 1999; Valente & Pumpuang, 2004) identified a number of strategies used to nominate opinion leaders, a number of which have been recognised for several decades (Coleman et al., 1957; Katz, 1957; Rogers & Cartano, 1962) (see Table 3), and many of which have been used in peer-led health promotion interventions. These

strategies include: self-selection; self-identification; staff-selection; the positional approach; a 'judges rating' system; expert identification; the 'snowball' technique; sample sociometric; and sociometric nomination processes. In the latter three methods, social network methods may be employed to identify individuals with desirable network characteristics (for example, using sociometric segmentation which is described as occurring when messages are targeted to individuals based on their social network positions (Valente & Fosados, 2006)), or to 'match' peer leaders to individuals who nominated them (Valente & Davis, 1999; Wiist & Snider, 1991).

Table 3: Strategies used to identify opinion leaders

Strategy	Process
Self-selection	Peer leaders volunteer to take part
Self-identification	Peer leaders rate themselves on their perceived opinion leadership in the community.
Staff-selection	Project staff select opinion leaders based on information derived from community observation
Positional approach	Staff select leaders on the basis of, for example, occupational role in the community
'Judges rating' system	Key informants suggest individuals to be involved
Expert identification	Trained scientists study the community and select leaders
'Snowball' technique	A sample of the community select peer leaders who in turn select more peer leaders
Sample sociometric	A representative sample of the community is used to elicit names of opinion leaders
Sociometric nomination	The whole community nominates peer leaders

Several of these strategies have been employed in a range of school-based peer-led interventions directed at various health behaviours. A number of interventions have asked students to name peers who fitted certain criteria, such as who they 'admire' or 'respect', or 'who they would like to be like' (Orpinas et al., 1995; Perry et al., 1987; Perry et al., 2002; Severson et al., 1991; Story et al., 2002; Telch et al., 1990).

Others have asked teachers to select students who might be appropriate to undertake the intervention for particular reasons, for example, based on street credibility, reliability and potential leadership skills (Phelps et al., 1994; Wiist & Snider, 1991). Peer leaders have also been asked to volunteer to participate in peer-led interventions i.e. to self-select (Kegeles et al., 1996; Stephenson et al., 2004). Where students are asked to volunteer, the programme/intervention is often advertised through a variety of routes such as in school bulletins, by announcements over the school public announcement system, and by posters (see, for example, Botvin et al., 1984). Other studies have adopted a combination of these approaches to identify peer educators (Harrin, 1997; McAlister et al., 1980; Miller & MacGilchrist, 1996).

The strategies have been used to select different groups of individuals to act as peer educators. The majority of peer-delivered health promotion interventions use peer educators of the same age (Evans et al., 1998; Story et al., 2002; Telch et al., 1990), whereas others use older peers either from within the same 'community', for example, older students from the same school (Bell et al., 1993; Klepp et al., 1993; Ozer et al., 1997), or older peers from outside of the 'community', for example, college students (Elder et al., 1993; Perry et al., 1980).

A number of limitations of these identification methods have been identified by Valente and colleagues (1999; 2004). These will briefly be considered here. Whilst self-selected peer leaders are likely to be more motivated to participate, where peer educators are required to be perceived as credible and trustworthy by their peers, self- and staff-selection may not be as successful at identifying such individuals as methods where the community selects the leaders. In particular are concerns regarding whether those selected have agendas which are different from those of the community members, or even agendas which may be harmful to members of the community. Another issue is whether they have sufficient knowledge of the community's needs and the innovation in question. Valente and colleagues also questioned whether they will utilise the most appropriate persuasion methods for the

community. Since self-identification involves individuals reporting their perceptions of their own opinion leadership in a community, individuals may bias these reports intentionally in order to be involved. This problem can be avoided where other methods are used. Whilst selection bias is avoided with the 'snowball' method (by allowing all community members to participate as recruiters and recruitees), a number of other problems are associated with this method. It is dependent on the index cases being representative of the community's population. Secondly, it takes time to locate and question named individuals (through interview or questionnaire) in order to identify further individuals. This method is also unlikely to be useful for the communication of complex ideas and behaviour change recommendations. Allowing community members to nominate leaders (as in the sample sociometric strategy) overcomes these problems but using only a few individuals to nominate leaders reduces both the reliability and validity of the process. Whilst costly, Valente and Davis (1999) therefore support the whole-community approach to nomination as it is more likely to reduce the potential for bias and result in the nomination of more credible and trustworthy peer-educators from across the whole community.

This whole-community approach has been adopted in a number of school-based peer-led health promotion interventions (for example, Orpinas et al., 1995; Telch et al., 1990; Wiist & Snider, 1991). The effectiveness of this and other methods has also been compared. Wiist and Snider (1991) compared the effectiveness of smoking prevention education delivered by three different groups: teacher-selected 'model students' (intervention); peer-nominated, sociometrically-matched students (intervention); and science teachers (control). The different conditions demonstrated varying levels of success but the authors reported that peer leaders selected by other students were more effective at preventing smoking amongst sixth grade students than those selected by other methods. The method of matching whole-community nominated peer leaders to other network members using social network methods was also tested in two other school-based

smoking prevention programmes (Valente et al., 2003). These programmes, one of which was culturally tailored, were social influences-based smoking prevention curriculum for sixth graders which entailed college-aged students delivering eight 50-minute sessions. Peer leaders assisted by distributing materials, collecting materials, leading discussions and organising group activities. Three peer leader conditions were compared. These students were identified by asking students to name the five people in their class who would make the best leaders for working on group projects. In the 'network condition', those named most frequently were assigned to students who chose them. If students were not directly connected to a leader, they were assigned a leader to which they were indirectly connected. In the 'random condition', those who received most nominations were randomly assigned to groups of students. In the 'teacher condition', students selected by teachers identified leaders and group members using a questionnaire. The 'teacher condition' did not change attitudes. Relative to those in the 'random condition', students in the 'network condition' liked the prevention programme more and had improved attitudes, improved self-efficacy and decreased intention to smoke. The 'network condition' was identified as the most effective way of structuring the programme.

The choice of selection method used will also be determined by a range of other issues such as: the resources available; the theoretical framework driving implementation; the setting; the desirable route of communication; and the aims of the leaders within their community (awareness raising, persuasion, establishing or reinforcing norms, or providing leverage) (Valente & Pumpuang, 2004). It is not, however clear which methods identify the most appropriate and effective peer educators for individual interventions. A need to explore both this and the processes by which peer educators selected by different methods effect change is therefore evident.

4.7 Rationale for peer education

Peer education is consistently cited as an appropriate approach to health promotion with young people. This is not without justification and a number of reasons have been identified and reported on several occasions (for example, see Ebreo et al., 2002; Milburn, 1995; Parkin & Mckeganey, 2000; Turner & Shepherd, 1999; Wilton et al., 1995). The most commonly cited reasons are identified in Box 2. These reasons will be considered individually in further detail below.

Box 2: Most commonly cited reasons for conducting peer education

1. Peers are more credible sources of information and support than adults and/or other professionals.
2. Peer education is a more acceptable route of communication than other health education methods.
3. Peers are more successful than professionals at effecting behaviour change.
4. Peer education can be beneficial for those involved in providing it.
5. Peer education is able to reinforce initial information provision through informal and ongoing contact.
6. Within the peer education paradigm some individuals act as positive role models for others.
7. Peer education can be empowering to those involved.
8. Peer education harnesses everyday interaction utilising established channels of communication to tap into the information sharing processes which already exist amongst young people.
9. Peer education provides access to those who are hard to reach through more 'conventional' routes.
10. Peer education is more cost effective relative to using 'trained' staff.
11. Peer education recognises the importance of friendships and social networks for behaviour change.

4.7.1 Credibility

The notion of credibility is crucial to the success of peer education approaches and has been identified as an essential element in changing attitudes, knowledge and behaviour (McGuire, 1984; McGuire, 1985; McGuire, 1989). Within the peer education paradigm, peers are viewed as being more credible sources of information and support than adults and/or professionals. One reason given for this is that they are experts at communicating with their peers in both the methods they adopt and the manner in which they speak (Frankham, 1998). Another is that they are more likely to be similar and empathetic to those educated, and this is likely to increase the persuasiveness of the message delivered (Forrest et al., 2002; Milburn, 1995).

Shiner and Newburn (1996) identify three types of credibility: person-based, experience-based and message-based credibility. Person-based credibility arises from personal characteristics such as age and sex. Experience-based credibility arises from experience gained through either practical experience or study. Finally, message-based credibility arises from what is said by an educator and how they say it. While a number of commentators have stressed the importance of person-based credibility, emphasising the need for peer educators to be similar to their target group, some (Elder et al., 1994; Frankham, 1998; Ozer et al., 1997) suggest that demographic similarities may be less important than the personal characteristics of the peer educators. Shiner and Newburn (1996) also assert that in general this form of credibility may not be as important as the other forms of credibility, and can be overridden if, for example, peer educators have relevant experience. A number of specific factors have been identified as increasing the perceived credibility of peer educators, for example, the trustworthiness and expertise of the messenger (Berlo et al., 2001; Hovland et al., 1953).

Some researchers have reported that credibility should not be assumed. Whilst young people have been reported as more likely to turn to their friends than to parents for advice regarding sexual health,

research has shown that these friends are not necessarily seen as credible sources of information (Cline & Engel, 1991; Frankham, 1998). Furthermore, Helgerson and Petersen (1988) found peer educators to be unreliable sources of information, and reported that young people sought additional advice from health professionals.

The systematic review conducted by Harden and colleagues (2001; 1999) reported that a number of studies had problems either recruiting or retaining male peer educators in their programme and that male peer educators were more likely to maintain negative views about the intervention. Furthermore, the selection criteria used in a number of studies meant that peer educators tended to be 'high-achievers'. This is compounded where self-selected peer educators are viewed as being 'different' to those who do not volunteer. In each of these situations, it is unlikely that young people will seek to emulate such individuals. Peer leaders' history and disciplinary past may further affect how others view them and affect whether they would be effective peer educators (Phelps et al., 1994). Since it is important for other young people to view peer educators as credible sources of information, it is vital that care is taken to ensure that peer leaders have high levels of credibility with the broadest range of students. Whilst this could entail selecting individuals who will have high levels of credibility within the population as a whole, it is unlikely that this will be achieved. Instead, it is more probable that peer leaders will be credible with select groups of individuals within the population. It is therefore important that a broad range of peer leaders are identified.

A number of researchers have made conscious efforts to ensure that peer leaders have high levels of credibility by ensuring that the individuals identified to undertake the peer education were popular opinion leaders within the target community (Grossberg et al., 1993; Kelly et al., 1991; Wiist & Snider, 1991). These studies showed that these opinion leaders were successful at effecting change.

4.7.2 Acceptability

Peer education is cited as a more acceptable route of communication than other health education methods. Young people generally recount positive views of peer education (Frankham, 1998; Guy & Banim, 1991; Orme & Starkey, 1999; Strange et al., 2002b) and a number of researchers have reported that young people prefer peers to deliver health education (Erhard, 1999; Hamdan et al., 2005; Mellanby et al., 2000). On numerous occasions, young people have detailed a number of factors in support of peer education over other approaches, including teacher-led equivalents. A number of these reasons relate to *who* delivers the intervention whilst some relate to *how* the intervention is delivered.

In relation to *who* delivers the intervention, sessions delivered by peer-leaders have been reported as having a better atmosphere than those delivered by teachers, allowing students to feel more relaxed during lessons (Erhard, 1999; Harden et al., 2001; Strange et al., 2002b). Peer educators have been viewed as more understanding of their problems than adults and compared to adults they did not pretend to know everything (Harden et al., 2001). Young people have also reported that they felt that what they said to peer educators was confidential (Backett-Milburn & Wilson, 2000; Forrest et al., 2002).

There are a number of positive issues relating to *how* peer education is delivered. However, a number of negative aspects have also been reported. A number of these issues relate to peer educators being the same, or a similar age as those they are educating. When students are 'in-charge' of structured classroom-based sessions, some problems with classroom management have been encountered and students have expressed anxiety about recipients resisting authority (Forrest et al., 2002; Frankham, 1998; Strange et al., 2002b). The natural hierarchy in the classroom may also be disrupted by some students acting as the experts (Mellanby et al., 2000). Some issues relate more directly to the personal characteristics of individuals selected to carry out peer-led work. Peer-led approaches have been

criticised where peer leaders have been shy or embarrassed. Peer leaders who exhibit such characteristics have been demonstrably less effective than those who are not (Ozer et al., 1997).

The approach adopted in peer education which ordinarily is less authoritarian than adult-led interventions/education is also welcomed by young people who appreciate not being lectured to (Harden et al., 2001). Sessions have also been viewed as more fun or enjoyable (Erhard, 1999; Forrest et al., 2002; Harden et al., 2001; Stephenson et al., 2004) and engaging and useful (Forrest et al., 2002) compared to adult-led approaches.

The role of peer educators can raise other problems. These include feeling constrained over the message they are allowed to deliver; feeling undermined by teachers; having to deal with personal questions about their own experiences; lack of trust, derision or hostility from members of their peer group (Cowie, 1998); reduced confidence when unable to deal with difficult situations; frustration when hopes and expectations are not met; and feeling unable to address their own problems or ask for help (Frankham, 1998; Hartley-Brewer, 2002; Orme & Starkey, 1999). Giving up free-time and taking on additional work may also be regarded negatively by some young people and may discourage them to participate (Strange et al., 2002a). Therefore it is clear that it cannot be assumed that the benefits of being a peer educator outweigh the costs, or that all peer educators fulfil the role to the same extent.

4.7.3 Efficacy

Peer education assumes that peer educators will be more successful at delivering information than professionals because they identify with their peers. Peer-led health promotion interventions have been acknowledged as being more effective than equivalent interventions led by teachers or other adults (Black et al., 1998; Botvin et al., 1984; Hamdan et al., 2005; Mellanby et al., 2000; Orpinas et al., 1995; Wiist &

Snider, 1991). Then again, other studies have reported insignificant differences between programmes delivered by teachers and peers (Armstrong et al., 1990; Perry et al., 1983) or no effect of either group (Borgia et al., 2005; Vartiainen et al., 1986). There is therefore no real consensus about which outcomes peer-led health promotion is capable of achieving.

A meta-analysis conducted by Cuijpers (2002) included twelve studies which directly compared interventions delivered by peers or adults. The author reported that despite a number of limitations of the meta-analysis (small sample, variable quality of interventions included and variable research and intervention design), peer-led interventions demonstrated more effectiveness than the same interventions delivered by adults. However, the studies were heterogeneous in terms of both the intervention evaluated and the outcomes observed and it may be more appropriate to assert that peer-led interventions are only more effective than adult-led approaches under certain circumstances (which could not be identified by this study). The study proposed that the leader is not necessarily the most important factor in determining effectiveness, but rather a number of factors such as programme content, boosters, age group, and the degree of interaction between the leader and the led. This finding supports others which propose that it may be the nature of peer-led activities, which are likely to be more interactive than teacher-led approaches which is more effective, rather than the fact than they are being delivered by peers (Harden et al., 1999).

Conversely, Mellanby and colleagues (2000) who reviewed peer-led and adult-led health education reported a more positive view of peer-led interventions. Six of the thirteen studies reviewed reported that students in the peer-led condition gained as much, or more knowledge than those in the adult-led condition. Peers were as effective, or more effective in altering attitudes. Seven of the eleven studies reporting behavioural outcomes found the peer-led condition more effective than the adult-led condition. The authors concluded that peer-led education may be more successful at effecting health behaviour change than

adult-led interventions but that methodological problems exist. They, and others (Mellanby et al., 2001; Perry et al., 1983) suggest that it may be more practical to rely on teachers to deliver information and allow peer-educators to concentrate on social issues relating to health as peer leaders may be more effective at establishing behavioural norms and attitudes than adults, but not so effective at imparting information.

4.7.4 Peer education is beneficial to those involved

Peer education is reported as being beneficial for the peer educators (Hunter et al., 1997; Milburn, 1995; Phelps et al., 1994; Sawyer et al., 1997). This is an important element of peer education and it may in fact be the focus of some peer education interventions. Shiner (1999) reported that of the projects included in their evaluation, those located in youth and community settings focused more on the development of the peer educators as opposed to those being educated. Most published work has focussed on classroom-based interventions and has described a number of significant benefits to the young people who are selected and trained.

The most frequently reported benefit is the acquisition of new knowledge and skills (Backett-Milburn & Wilson, 2000; Cowie, 1998; Haignere et al., 1997; Hamdan et al., 2005; Pearlman et al., 2002; Sawyer et al., 1997; Strange et al., 2002a; Strange et al., 2002b). These skills include improved personal organisation and decision-making and leadership skills (Badura et al., 2000; Pearlman et al., 2002).

A number of young people have reported changed attitudes towards health behaviours, for example, holding more liberal views in relation to sexual practice (Strange et al., 2002a). These changed attitudes may subsequently lead to an increased likelihood of changing personal health behaviours (Badura et al., 2000; McAleavey et al., 1996).

Competencies have also been affected through involvement in peer education. Increased self-esteem and confidence has been reported on numerous occasions (Harrin, 1997; Hartley-Brewer, 2002; Orme & Starkey, 1999; Pearlman et al., 2002; Sawyer et al., 1997; Strange et al., 2002a; Turner, 1999). This improved confidence has been reported to facilitate communication, particularly in groups (Cowie, 1998; Strange et al., 2002a) and can therefore facilitate peer educators in their role. Self-efficacy has also been improved through involvement in peer education (Turner, 1999). Other benefits have been identified as gaining a sense of responsibility (Cowie, 1998; Milburn, 1995) and a belief that they as individuals were making a positive contribution to school life (Cowie, 1998).

4.7.5 Reinforcement

Since peer educators are generally drawn from within the same population, there is scope for the reinforcement of initial information dissemination through informal ongoing contact in, for example, social settings. Thus a message delivered through a one-off lesson by a peer, and reinforced in informal social situations is likely to be more effective than a one-off lesson delivered by a teacher or other adult (Turner & Shepherd, 1999). This benefit has been exploited in a number of peer-led interventions, for example, one conducted in the sexual health field (Kelly et al., 1991) and in an intervention to promote contraceptive use (Jay et al., 1984). Both these authors maintained that reinforcement contributed to the effective outcome of their interventions. However, despite this recognised opportunity for reinforcement, a number of interventions rely on one-off intervention such as a series of lessons (Phelps et al., 1994).

4.7.6 Role modelling

Within the peer education paradigm some individuals act as positive role models for others (Valente & Davis, 1999). This harnesses the peer pressure construct discussed in section 2.8.6.4.2 positively. Modelling and reinforcement can occur both directly and indirectly from role models whom individuals respect and identify with (Wilton et al., 1995). In particular, if peer educators have positive health-related behaviours, it is proposed that they can positively influence peers (Kandel, 1985).

The concept of peer modelling (Biglan et al., 1983) highlights the importance of peer educators being the 'correct' role model when carrying out their role. However, it is unclear whether all health behaviours are susceptible to modelling, and if in fact it is always feasible for behaviours such as safer sex to be observed and therefore modelled (Turner & Shepherd, 1999). For example, Kelly and colleagues (1991) reported a positive outcome of their intervention even though peer educators did not necessarily practise safe sexual practice themselves. Positive role modelling also expects young people to make the correct decisions about which messages are positive influences from peers and should be taken on board, and which are negative and should be ignored.

4.7.7 Empowerment

Peer education is reportedly empowering to those involved. However, this has justifiably been queried by a number of commentators (for example, Milburn, 1995; Parkin & Mckeganey, 2000). Parkin and Mckeganey (2000) question a) whether peer educators are financially empowered (due to them largely being volunteers) and b) whether they really have control over the information being delivered or if, in fact, it is the adults involved that are in control. For peer education to be truly empowering, it should meet the self-identified needs of the community

rather than being driven by any expert agenda and it is unclear whether it does (Perry et al., 1983).

4.7.8 Information sharing

Peer education harnesses everyday interaction utilising established channels of communication to tap into the information sharing processes which already exist amongst young people (Finn, 1991; Frankham, 1998; Harden et al., 1999; Milburn, 1995; Sawyer et al., 1997; Shiner & Newburn, 1996).

4.7.9 Accessibility

Peer education provides access to those who are hard to reach through more 'conventional' routes (Hunter et al., 1997; Power et al., 1995; Rhodes, 1994). This relates to the above points of information sharing and reinforcement. Because peer education can utilise such informal routes of communication, it is more plausible that it will reach a wider range of the population than interventions which involve delivery of structured sessions in particular settings. For example, young people who are disengaged with school may be more plausibly accessed through less formal peer education approaches rather than relying on structured health education provision in schools.

4.7.10 Cost-effectiveness

Peer education is consistently reported as being more cost effective relative to teachers or other 'trained' staff (for example, Jones, 1992). This is based on two assumptions (Wilton et al., 1995). Firstly, since peer educators tend to be unpaid volunteers, once they have been trained there is relatively little, if any outlay. Secondly, it is expected that the reach of the intervention will be more significant than professionally-

led methods because of the scope for ongoing dissemination within the peer group. However, criticism has been aired that peer educators will need substantial professional input at the start of any intervention (Wilton et al., 1995) and continued support and/or retraining will be required to ensure effectiveness (Harden et al., 1999; Jones, 1992; Milburn, 1995). Furthermore, Orme and Starkey (1999) question the cost-effectiveness of peer-led approaches on the basis that some peer leaders dropped-out of their role and only half achieved the required number of presentations to other young people.

4.7.11 Social networks

The importance of friendships and social networks in the uptake, maintenance and cessation of adolescent behaviour has been recognised (Milburn, 1995; Oetting & Beauvais, 1986; Valente et al., 2004) and has been discussed in detail in section 2.8.6.4.

Peer influence is most often characterised in terms of the negative role it plays in the uptake of risk behaviours in adolescence. For example, Higgins (2000) reported that 77 per cent of students who had ever smoked tried their first cigarette when they were with friends. Eight per cent of respondents said they did so because they wanted to fit in and 8 per cent said they had friends who suggested they tried it. However, as discussed in section 2.8.6.4, it is recognised that peer influence can have a positive influence which could be harnessed to have a protective effect against detrimental health behaviours. Moreover, Backett-Milburn and Wilson (2000) observed that peer education messages are often passed on through informal social interaction, for example, to friends and family members as well as through formal peer education sessions.

Research has reported that people are willing to actively support and help their peers to change health behaviours (Patten et al., 2004; Smart & Stoduto, 1997; Stanton & McGee, 1996). Amongst adults, supportive friends have predicted success in stopping smoking (Morgan

et al., 1988). Adolescent smokers have also reported that they have sought support and help from family and friends to stop smoking (Fuller, 2005).

4.8 Effectiveness of peer education

Whilst there is some evidence that substance misuse interventions which adopt a peer-led approach are more effective than those that do not (Lister-Sharp et al., 1999), the effectiveness of this approach is generally unclear (Milburn et al., 1995; Tobler & Stratton, 1997; Wilton et al., 1995). Much evaluation is carried out by those delivering interventions, is not rigorously conducted and is published in the grey literature (Backett-Milburn & Wilson, 2000).

Harden and others (Harden et al., 2001; Harden et al., 1999) identified 210 evaluations (largely North American) of peer-led health promotion interventions for young people, of which 64 met the inclusion criteria for their systematic review. Twelve of these were judged as 'sound' evaluations. Seven of these interventions were effective for one or more behavioural outcomes. Process evaluations of peer-led interventions were also included in the review. The key issues addressed in the 15 process evaluations examined were acceptability of the intervention, factors influencing implementation and the training of the peer deliverers. In general, the results of these process evaluations were much more positive than the mixed results of the outcome evaluations, raising methodological questions about the reliability of conclusions drawn from these qualitative studies. Nevertheless, the authors acknowledged the important role of process evaluations in providing greater understanding of why peer-delivered health promotion may be successful or unsuccessful in particular contexts, and go so far as to suggest that future systematic reviews might consider restricting the inclusion of outcome evaluations to those which have also conducted an integral process evaluation. Overall, whilst the review found limited evidence of effectiveness of peer-led approaches in

positively affecting behaviours the authors stated that the results should be treated with caution. They recommended that further attention should be paid to the careful development and evaluation of peer-led interventions.

Although findings are mixed, results of evaluative studies of peer-led interventions to prevent or reduce adolescent tobacco are generally promising (Bell et al., 1993; Severson et al., 1991). A number of studies (mostly North American) have demonstrated positive effects of peer-led interventions on adolescent smoking initiation and prevalence.

Several interventions which have used same-age peer leaders have demonstrated positive outcomes. In CLASP (McAlister et al., 1980) same-age peer leaders taught 12-13 year old students skills to resist social pressures through six structured classroom sessions in the first year of the intervention and two in the second year. At 3-month follow-up this intervention was effective at reducing the prevalence of smoking in the past week. The study was however only completed in one intervention school. Same-age students were also used in Armstrong and colleagues' (1990) 'resistance skills' intervention. This intervention was led by peer leaders and teachers and aimed to increase knowledge of the effects of smoking and awareness of non-smoking, and to teach resistance skills. The results revealed that this intervention was only effective at reducing uptake amongst females who were baseline non-smokers. As mentioned in section 4.6, Wiist and Snijder (1991) compared the effect of sixth and seventh grade peer leaders selected by different methods delivering smoking prevention education in friendship cliques. The eight-week long curriculum included social skills to prevent smoking. Whilst students selected to educate their own peer group were more effective than model students and adult teachers, all had an impact on smoking rates.

Interventions using older peer leaders have also demonstrated positive results. The intervention evaluated in Project SHOUT (Elder et al., 1994) involved pairs of trained college students delivering classroom-based sessions to school students between seventh and

ninth grade. At three-year follow-up, the intervention demonstrated a positive impact on the prevalence of recent tobacco use (in the previous month). An intervention which was based on social inoculation theory (Perry et al., 1983) involved college students leading tenth grade health classes in social skills to resist pressure to smoke, identify the immediate physiological effects of smoking, methods to quit smoking and ways to help others remain or become non-smokers. Two months following intervention, it had induced a significant reduction in smoking rates. The Life Skills Training smoking prevention programme reduced the proportion of experimental smokers progressing to regular smoking in the experimental, compared to the control group at one-year follow-up (Botvin & Eng, 1982). This intervention was a 12-session multi-component programme implemented by older peers which focussed on the acquisition of basic life skills and the improvement of personal competence (in particular coping with social influences to smoke).

As with school-based smoking interventions evidence of the long-term impact of peer education is also mixed. As mentioned in section 3.3.1, the North Karelia Project which involved the use of peer educators did not sustain intervention effects after one-year follow-up (Vartiainen et al., 1998; Vartiainen et al., 1986). Conversely, the peer-led element of the Oslo Youth Study which involved implementation of a 10-session smoking prevention programme, partly led by older students maintained an intervention effect at two-year follow-up. However, this effect was not maintained at ten-year follow-up, where an effect was observed only amongst baseline male non-smokers (Klepp et al., 1993). Project ALERT assessed the effect of an 11-session social influences curriculum delivered by older teenagers, assisted by teachers. The peer-led condition was more effective than both the teacher-led and control conditions but the effects on tobacco use decayed by 24-month follow-up (Bell et al., 1993).

The limited number of studies considered rigorous enough to be included in the review by Harden (Harden et al., 2001; Harden et al., 1999), and the conclusions drawn by the authors regarding future work indicates that the majority of evaluations of peer-led interventions have

been substandard. Parkin and Mckeganey (2000) identify a number of methodological difficulties of research in this area. They propose that reliance on self-report data is unreliable, particularly where socially acceptable responses are provided regarding health behaviours. Many studies have also had limited follow-up so have not been able to demonstrate the long-term benefit of peer-led interventions. Given that individuals participating in peer education are also exposed to numerous other sources of information, they also suggest that cause and effect is not always clear-cut and it is not always possible to attribute demonstrated behaviour change to peer education interventions. Finally, since a diversity of approaches are adopted in peer education, the same evaluation methods cannot be used on a one size fits all basis, making comparability of results problematic. This last issue is also raised by Milburn (1995) who asserts that issues such as the wide range of health behaviours which have been targeted and the considerable variability in both the methods of recruitment and the length of training received by peer educators restricts the comparability of the results of evaluative studies.

Furthermore, in support of Harden and colleagues who included relatively few process evaluations in their systematic review (Harden et al., 2001; Harden et al., 1999) others have stated that the *process* of peer education is rarely reported (Milburn, 1995; Sciacca & Black, 1996). The importance of conducting process evaluation is raised by others (Backett-Milburn & Wilson, 2000) who highlight it as an essential means of providing illumination into factors influencing the peer education process such as the recruitment process, the setting and organisational context, and also into issues relating to the personal development of peer educators and insight into aspects of the informal and formal work carried out by peer educators.

This discussion shows that current peer education initiatives are presently being conducted and continue to proliferate in the relative absence of a rigorous evidence-base of outcome or process. The need for further evaluation of this approach has therefore been identified (Lantz et al., 2000).

4.9 Reasons why peer education fails

Reasons why individual peer education initiatives fail have been cited on a number of occasions. Practical issues such as the classroom climate have been identified as important for success (Ozer et al., 1997). Walker and Avis (1999) provide an overview of other commonly quoted explanations for failure. They note that interventions often lack realistic clear aims and objectives and therefore evaluations cannot demonstrate effectiveness. The aims of the intervention should dictate its design. Intervention design will be driven by: the target group; the subject areas; the resources available; the timescale for the intervention; and the setting. Where there is an incompatibility between the project design and these factors, interventions are unlikely to be successful. Contrary to the assertion that peer education is a cost-effective approach to health promotion, they also identify lack of financial investment in peer education as a reason for failure and propose that it should not be viewed as a cheap option. Related to this is the need to provide peer educators with adequate training consistent with the task they are asked to undertake. Underestimating the time and expertise required to set up and manage peer education interventions can also result in failure. The final reason provided is a lack of clarity regarding professional and personal boundary issues, and the control given to peer educators.

4.10 Criticism of peer-led approaches

Peer education has not always been viewed positively. A number of negative issues relating to the peer leaders themselves have been identified in section 4.7.2. Furthermore, there are other issues relating to the processes by which peer leaders are identified (some of which have been considered in section 4.6), the methods used in peer education, and the reality of conducting school-based peer education.

As previously noted, a number of studies have reported that there is generally an under-representation of boys as peer educators (Cunningham et al., 1998; Harden et al., 2001; Harden et al., 1999; Naylor & Cowie, 1999). Since it is proposed that boys and girls usually seek help from the same sex peers (Naylor & Cowie, 1999), this raises questions about effectiveness of peer education amongst boys. A need to identify strategies to recruit and retain boys as peer educators has therefore been acknowledged.

The approach often adopted in school-based peer-led health promotion is that of structured didactic educational programmes led by young people. This formal approach of many peer-led interventions often requires peer educators to become 'mini-teachers', taking responsibility for the content of the sessions and maintaining control of any interaction which occurs during sessions. Since one of the rationales for peer education is that it can harness naturally occurring interaction and information sharing between young people, this formal approach is without doubt contradictory. Furthermore, it restricts the peer educators' ability to adopt less formal or imaginative approaches which may in fact be more appropriate and effective (Frankham, 1998; Harden et al., 1999).

A number of barriers relating to the reality of conducting peer education in the school setting have also been encountered. While several studies have reported that teachers are supportive of peer education initiatives (Newman & Nutbeam, 1989; Newman et al., 1991), others propose that teachers are not always in favour of peer education (Naylor & Cowie, 1999). This may be particularly salient where they are asked to hand control of the class, and the responsibility of imparting accurate information to students to a peer educator (Backett-Milburn & Wilson, 2000; Mellanby et al., 2000). Schools may also encounter difficulties when required to provide suitable accommodation for peer-led activities, particularly rooms for confidential discussions (Naylor & Cowie, 1999; Strange et al., 2002b). School-based peer-led interventions also have a limited lifespan as students leave school and are either no longer involved as peer educators or are no longer

exposed to interventions (Backett-Milburn & Wilson, 2000). A number of these criticisms can be overcome by adopting an informal approach to peer education which is also more coherent with the whole school approach to health promotion.

4.11 Informal approaches to peer education

A number of researchers report the need to address wider social and cultural determinants of health behaviour, looking to supplement school-based educational efforts with programmes which address the effects of peer pressure and friendship ties on uptake of regular smoking, (Fergusson & Horwood, 1995; Svenson & others., 1998; Wilton et al., 1995). Informal peer-led approaches which harness everyday interaction in naturally occurring social groups achieve this.

There are a number of advantages of informal approaches for peer-led health promotion with young people. Backett-Milburn and Wilson (2000) recognised that peer education messages can be disseminated through social interaction. Therefore, informal contacts made outside of the classroom environment between peer-educators and other young people may be as effective as the more formal work that they are asked to undertake (Orme & Starkey, 1999). It is also suggested that this approach may retain the credibility of peer-educators with their peers as they are not adopting an authoritarian role (Green, 2001). Furthermore, this approach allows young people to take more control of the message they deliver and choose (within reason) the most appropriate method of dissemination.

The theoretical basis for informal approaches to peer education is generally diffusion theory. Turner and Shepherd (1999) identify how the rationales for peer education relate to this theory, suggesting that it provides support for the following:

- peers are credible sources of information;
- peer educators act as positive role models;
- peer educators are more successful at imparting information;

- peer education is a more acceptable method of education than other methods;
- peer education provides the opportunity for ongoing reinforcement;
- peer education is more cost-effective than other methods;
- peer education draws on and utilises existing information sharing networks;
- peer education can access hard to reach groups.

Diffusion theory therefore appears to be easily applied to peer-led health promotion. It would therefore seem surprising that the majority of peer-led interventions have formal classroom-based approaches and that few interventions have utilised this theory to drive the design and delivery of more informal approaches. Diffusion theory was introduced in section 3.2.2.5. This theory will be considered in more detail here.

4.12 Diffusion Theory

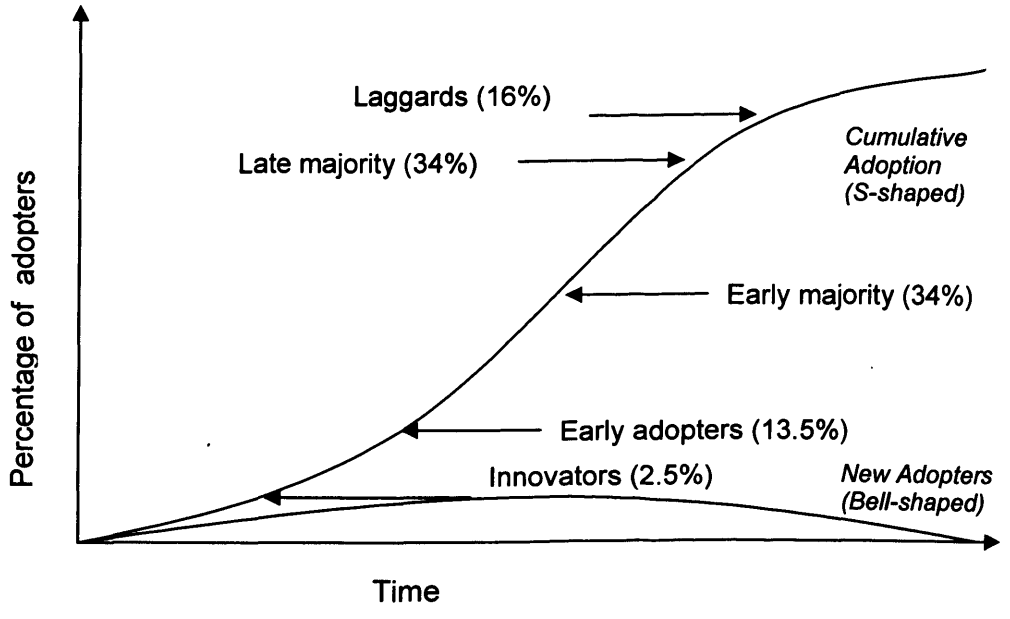
Diffusion theory, or diffusion of innovations theory (Rogers, 1995) explains the spread of new ideas within a population. The roots of diffusion theory are grounded in early social science. The earliest diffusion study was conducted by the French lawyer, Judge and sociologist Gabriel Tarde whose ideas in his influential book 'The Laws of Imitation' (Tarde, 1903) later evolved into diffusion theory. The landmark diffusion study was Ryan and Gross' (1943) influential hybrid seed corn study which explored the rate of adoption of this seed amongst Iowa farmers, and provided the framework for the diffusion model (Rogers, 2004). In the public health field, Coleman and colleagues (1957) studied the diffusion of the anti-biotic drug tetracycline among doctors in Illinois. During and since the 1960's there has been a proliferation of diffusion studies across the social science

discipline (Rogers, 2004; Valente & Rogers, 1995). Rogers (1995) identifies eight main types of diffusion research:

1. Earliness of knowing about innovations
2. Rate of adoption of different innovations in a social system
3. Innovativeness
4. Opinion leadership
5. Diffusion networks
6. Rate of adoption in different social systems
7. Communication channel use
8. Consequences of an innovation

Diffusion theory explains how the adoption of practices and ideas traditionally follows an 'S'-shaped curve, with slow uptake at the start, followed by a period of rapid uptake, and a decrease in rate at the end of the adoption period (see Figure 10).

Figure 10: Traditional 'S'-shaped diffusion curve



Adapted from Valente (2002a, p37) and Tones and Tilford (2001, p85)

As shown in Figure 10, different groups of individuals adopt an innovation at various stages through the adoption period (see Table 4),

beginning with 'innovators' who comprise a small proportion (approximately 2.5 per cent) of the population. These individuals are probably the more 'radical' in the community and therefore have little impact on further diffusion. The next to adopt are the 'early adopters' which includes 'opinion leaders' (see section 4.12.1.1) within the community. These individuals have the most influence in communicating the innovation throughout the community. Following these are the 'early majority', the 'late majority' and finally, the 'laggards'. As more members of the community adopt the innovation, the rate at which adoption occurs slows, characterising the 'S'-shaped curve. These adopter categories can be created with respect to the social system as a whole, or with respect to the individual's more immediate personal network (Valente, 1996).

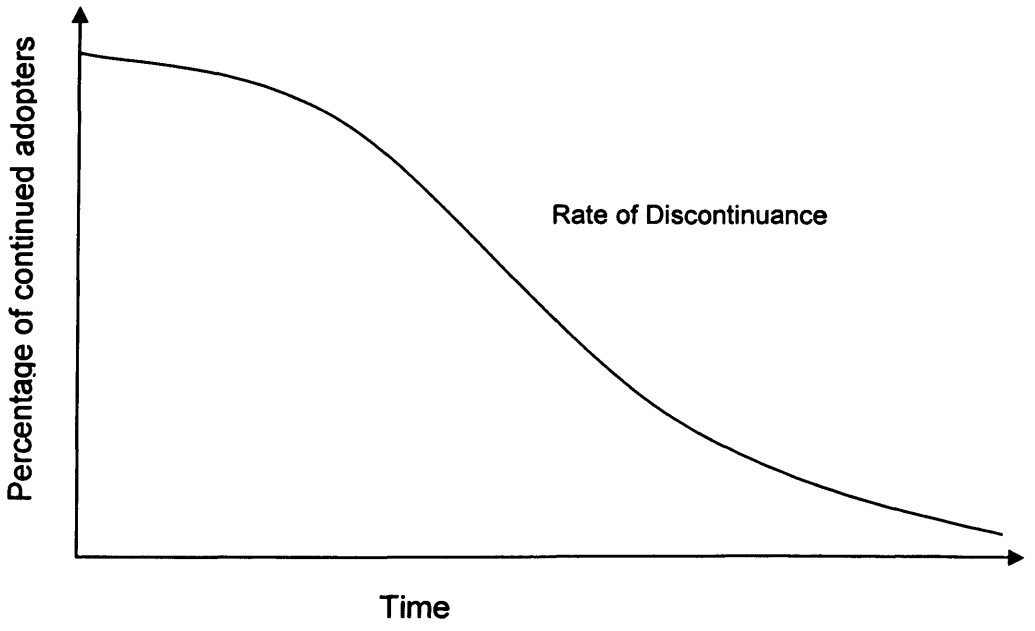
Table 4: Major Adopter categories

Adopter category	Proportion of population (%)	Adopter characteristics
Innovator	2.5	Eager but 'radical'; probably mistrusted by safe majority
Early adopter	13.5	Respectable but amenable to change; good candidate for opinion leader
Early majority	34	Unlikely to be the first nor the last to try a new innovation
Late majority	34	Reluctant to change until benefits have been proven
Laggards	16	Diehard conservatives, including a subgroup who will never change and appear to be against everything most of the time

Source: Rogers and Shoemaker (1971), Rogers (1995)

Diffusion theory is not only applied to the uptake of practices and behaviours but also to the discontinuation of a practice, as shown in Figure 11.

Figure 11: Diffusion curve showing the discontinuation of a practice



Adapted from Rogers (1995, p109)

At the heart of the diffusion process is modelling and imitation of innovations already adopted and/or endorsed by influential opinion leaders (section 4.12). The two-step flow model of communication (Katz, 1957; Rogers, 1995) asserts that diffusion of information occurs in a population through two processes. The first stage involves the transfer of information from media sources (although this in theory could be from other sources) to opinion leaders. The second stage involves the transmission of this information to non-adopters through interpersonal communication. Since these adopters may then become adopters, they can subsequently pass this information on to other non-adopters.

The innovation-decision process is not a simple progression from non-adopter, to adopter status. It involves individuals passing through five phases which are discussed in detail by Rogers (1995). The *knowledge* stage occurs when an individual is exposed to an innovation and becomes aware of its existence and function. *Persuasion* occurs when an individual forms an attitude towards the innovation. *Decision*

occurs when an individual engages in activities that result in a decision to adopt or reject the innovation. *Implementation* occurs when an individual utilises the innovation. Finally, *confirmation* occurs when an individual seeks to reinforce or reverse this decision.

4.12.1 Issues affecting the diffusion of an innovation

Rate of adoption is the speed at which an innovation is adopted within a community (Rogers, 1995). The rate at which innovations are adopted has largely been explained using threshold (Granovetter, 1978) and critical mass (Oliver & Marwell, 1988) models. These models consider the rate of adoption in terms of the number of individuals in the social system who have already adopted the innovation.

Threshold models are based on the premise that *individuals* have a threshold of adoption and will adopt behaviours once a certain proportion of the population has already engaged in the behaviour (Granovetter, 1978). Therefore, a laggard, who has a higher threshold than an early adopter will require more members of the community to have engaged in the behaviour prior to adoption, resulting in a slow rate of adoption.

Critical mass models require the *social system* to have a critical point of adoption. The critical mass occurs when enough individuals have adopted the innovation so that the further rate of adoption becomes self-sustaining (Rogers, 1995). Once this mass has been achieved, others in the social system will adopt the innovation. This is clearly related to the idea that individuals are more likely to adopt an innovation if other people in their immediate network have already adopted (Rogers & Kincaid, 1981). Compared to threshold models, fewer individuals (approximately 10-20 per cent of the population) are required to propel the innovation to the rest of the population (Valente, 1995).

Rogers (1983) identified a number of factors which affect and explain the rate of adoption within a population. Many of these factors

have since been revised and re-named but the fundamental concepts remain (Wejnert, 2002). These factors can broadly be grouped under the following headings: change agents and opinion leaders; characteristics of adopters; characteristics of the innovation; nature of the social system; and environmental context. Each of these issues will be considered individually.

4.12.1.1 Opinion leaders and change agents

Change agents are individuals external to the social system who exert influence on individuals in order to promote desirable change (either encouraging or preventing adoption of an innovation). They can be individuals such as teachers, public health workers, development workers and salespeople who facilitate information flow within the community (Rogers, 1995). Rogers (1995) identifies seven roles that change agents play in introducing innovations into a community: identify and develop a need for behaviour change; establish an information-exchange relationship with 'clients'; identify why existing alternatives do not meet 'client' needs; motivate 'clients' to adopt the innovation; translate intent into action; stabilise action and prevent discontinuance; and finally, encourage 'clients' to become self-reliant.

Change agents ordinarily have a high level of expertise regarding the innovation in question and must have the skills required to deliver relevant information and persuade people to change their lifestyle (Tones & Tilford, 2001). It is, however recognised that empathetic change agents (professionals who have learned skills) can also influence behaviour change (Rogers, 1983; Tones & Tilford, 2001). The perceived credibility of the change agent and the extent of effort in contacting clients is positively related to their success i.e. the rate at which the innovation is adopted. The degree of contact clients have with change agents is related to social status, greater social participation, higher formal education and cosmopoliteness amongst clients. This

suggests that where clients are more homophilous with change agents, communication will be more successful (Rogers, 1995).

It should be noted that opinion leaders are not necessarily innovators as was shown in the study conducted by Kelly and others (Kelly et al., 1991) (see section 4.7.6). In general, opinion leaders provide information and advice about innovations to others in the system (Rogers, 1983; Rogers & Cartano, 1962). They in turn are able to influence others' attitudes or behaviour informally. The behaviour of opinion leaders is therefore important in determining the rate of adoption of an innovation. Valente and Pumpuang (2004) identified a number of functions of the opinion leader in health promotion: providing entrée and authorisation to external contacts (change agents); acting as intermediaries between implementers and communities; acting as role models for behaviour change; conveying health messages; and ensuring that the innovation becomes routine practice once the intervention period is complete. Computer simulations have demonstrated the value of opinion leaders in accelerating the diffusion of innovations in a social system (Valente & Davis, 1999).

Katz (1957) acknowledged opinion leaders as having a number of characteristics depending on their: values and traits; competence or expertise; and social position. Attributes associated with opinion leaders include: being more exposed to all forms of external communication such as mass media; being more cosmopolite; having more change agent contact; of higher social status; being in a unique and influential position in their system's communication network (they are highly central, have extensive interpersonal networks and greater social participation); and being more innovative (although not necessarily innovators) compared to others (Katz, 1957; Rogers, 1995; Rogers & Cartano, 1962). Opinion leaders with high levels of perceived credibility are more likely to be successful at inducing adoption of innovations. Credibility has been discussed in section 4.7.1 in relation to peer education.

Homophily, the degree to which adopters and opinion leaders have similar attributes, for example, beliefs, education and social status

also affects the rate of adoption (Rogers, 1983; Rogers & Shoemaker, 1971; Tones, 2002) as people are more likely to be influenced by those with whom they can identify. Homophily has also been proposed to increases the persuasiveness of the message being delivered (Milburn, 1995; Wolf & Bond, 2002). Despite this, the nature of the diffusion process means that there has to be a degree of heterophily between two individuals for them to be capable of imparting information (expertise) and for others to consider their opinions important. For example, higher status opinion leaders may act as role models to individuals with lower status. Alternatively, those with learned knowledge can impart information. Furthermore, Rogers (1995) proposes that heterophilous interpersonal links are important for information flow as they may connect socially dissimilar groups in the population (as in Granovetter's (1973) 'strength of weak ties' theory), facilitating diffusion. He also suggests that homophily can also act as a barrier to adoption as a high degree of homophily between opinion leaders may result in horizontal rather than vertical diffusion i.e. opinion leaders just talk amongst themselves, limiting diffusion to the rest of the population. Since change agents tend to be professionals from outside the community they are likely to be less homophilous compared to members of the community than opinion leaders.

As noted, the position of opinion leaders in their interpersonal network allows them to serve as social models to others. This position is therefore important for the diffusion process. Moreover, given that opinion leaders are those whose views, attitudes and behaviours can influence others because of their social standing, opinion leaders within one sector of the population will not necessarily be opinion leaders for other members of the population (Katz, 1957). Opinion leaders should be strategically located within social groups or the community such that they are able to effect change, and should be credible and reliable sources of information or support. As noted in relation to peer education (section 4.12.1.1) this is likely to require opinion leaders to represent a diversity of social groups. Hence, the process by which appropriate opinion leaders who represent different sectors of the population, in

particular the target group, are identified is clearly vital to interventions relying on informal diffusion.

4.12.1.2 Characteristics of adopters

As previously discussed in section 4.12, and outlined in Table 4, some individuals adopt innovations more readily than others. The speed at which adopters progress through the five stages of the innovation-decision process determines the adopter category to which they are assigned.

Three individual factors that influence the rate at which new innovations are adopted have been identified (Haider & Kreps, 2004; Rogers, 1995): personal characteristics, personality variables and communication behaviour. Important personal characteristics include higher levels of formal education, higher socioeconomic status, higher social status and higher upward social mobility. Actors with a high social status, and therefore high prominence in their network are likely to adopt innovations first, and then impress adoption on others as was seen in Coleman and colleagues' medical innovation study (1957). Relevant personality variables include empathy, dogmatism, rationality, intelligence, favourable attitudes towards change and science, ability to cope with uncertainty, fatalism and aspirational level. Communication behaviour is discussed in relation to the nature of the social system (section 4.12.1.4). However, other issues related to communication include higher levels of social participation, greater interconnectedness in social systems, being more cosmopolite, having more change agent contact, having greater exposure to mass media, being more proactive about seeking information about innovations, having greater knowledge of innovations and having a higher degree of opinion leadership.

A number of other factors have been identified as important. An individual's perception of similarity with other members of the network affects the homogeneity of adopters' behaviours and therefore the rate at which they will adopt behaviours (Burt, 1987; DiMaggio & Powell,

1983). The potential adopter's perception of opinion leader's credibility is also an important factor in the adoption process (Kelly, 2004; Tones, 2002; Valente & Davis, 1999). Furthermore, the impact of the message is likely to be stronger if adopters already know and like the opinion leader (Kelly, 2004). Finally, the prior level of knowledge the adopter has about the innovation influences the speed at which they will adopt the innovation (Valente & Rogers, 1995).

Issues relating to communication behaviour in particular infer that the position of adopters in their social networks is important to their ability to adopt (Wejnert, 2002). One important factor is network connectedness (how close individuals are to each other in the network), which is dependent on the size of the network and the number of ties an individual has (Valente, 1995). Rate of adoption is also dependent on frequency of interaction, prestige (Burt, 1976), position in networks, and actors' social connectedness (Valente, 1995)

4.12.1.3 Perceived attributes of innovation

Several attributes of innovations have been identified which affect, and help to explain differential rates of adoption (Fliegel & Kivlin, 1966; Rogers, 1983; Rogers & Shoemaker, 1971; Tones & Tilford, 2001). It should be noted that these attributes are the receivers' perceptions and not attributes assigned by, for example, experts or change agents.

Relative advantage is the extent to which the innovation is perceived advantageous compared to existing practice and indicates the benefits and costs resulting from adopting an innovation. The nature of the innovation and adopter characteristics determines the type of relative advantage (economic profitability, low initial cost, decrease in discomfort, social prestige, savings in time and effort, immediacy of reward) which may be important. If new innovations are viewed as having low relative advantage, they will not be readily adopted (Tones, 2002; Wejnert, 2002). Relative advantage has been identified as one of the best predictors of an innovation's rate of adoption.

Compatibility relates to how consistent the innovation is with existing culture and norms such as values and beliefs (also considered in section 4.12.1.4), past experiences and the needs of potential adopters. Previous diffusion research (as discussed by Rogers, 1995) suggests that compatibility may be less important than relative advantage in predicting adoption of innovations.

Complexity refers to how easy it is to understand and use the innovation. As might be expected, simple innovations will be preferred and adopted more readily than complex innovations.

Trialability is the degree to which the innovation can be experimented with without permanent commitment. An innovation that can be tried is less uncertain for the potential adopter and is therefore more likely to be taken up. Individuals who adopt early in the diffusion process may view trialability as less important than those who adopt later. These early adopters act as human 'guinea pigs' for later adopters so they invariably do not have to trial the innovation themselves (Rogers, 1995).

Observability is the degree to which the effects of adopting the innovation are visible to others. Innovations which are easy to observe and describe to others will be more readily adopted than those which are not.

Rogers (1995) discusses a number of these issues in relation to preventive innovations. He highlights that the reward achieved by adopting such innovations are delayed and uncertain. Furthermore, the event one is attempting to avoid by adopting the innovation has not yet occurred so it is difficult for potential adopters to rationalise. Preventive interventions therefore need to clearly communicate and emphasise the relative advantage of the innovation. In terms of observability, where the preventive innovation is ambiguous as in safe sex (it can relate to abstinence, monogamy and condom use), diffusion may be slow.

4.12.1.4 Nature of the social system

Several issues relating to the nature of the social system have the potential to affect the rate of diffusion. Communities which are more 'cosmopolitan' will be more susceptible to change than more 'traditional' communities (Rogers & Shoemaker, 1971; Ryan & Gross, 1943; Tones, 2002). These communities are likely to include a higher proportion of innovative and 'radical' individuals who will be more readily influenced to change. Within these communities, norms exist which may affect the rate of diffusion, serving as barriers to change. These are established behavioural patterns within a social system such as behaviours determined by religious beliefs and practices (Rogers, 1983).

The nature of diffusion is dependent on the societal entity of adopters as the influences which affect the rate of adoption, and the manner in which adoption occurs is different for an individual compared to groups of actors (Wejnert, 2002). It can affect the type of innovation chosen for adoption, the nature of interaction between adopters and the source of the innovation. For example, communication on an individual level is largely dependent on face-to-face interaction whereas on a collective level communication is more likely to be through institutionalisation and mass media.

The needs of the adopters also drive the rate of adoption. If a community recognises that they have a need to change, they will require little, if any external influence to facilitate this change (Tones, 2002; Tones & Tilford, 2001). If change agents supply solutions to recognised problems, this will inevitably ensure rapid adoption of the innovation. If the community does not recognise it has a problem, even the input of change agents is unlikely to effect change. The community may, however be 'encouraged' to become aware of the need to change behaviour/lifestyle through strategies such as community development.

The nature of the information-exchange relationship between a pair of individuals determines the conditions under which an innovation is communicated and the success of this communication (Rogers, 1983). Communication can occur through a variety of channels

including mass media channels and interpersonal channels. Lin and Burt (1975) also proposed that the local media is important in the diffusion process. The nature of the information-exchange will be determined by the societal entity. Different forms of communication are also utilised at different stages of adoption. Interpersonal channels are most likely to provide evaluative information in the final stages of innovation adoption or rejection. When used in the earlier stages of the decision making process, adoption is likely to be slower than when mass media channels have been used to increase awareness of the innovation.

These issues clearly show that diffusion is reliant on whom interacts with whom and under what circumstances and that this patterning of communication determines the flow of information within the social system. This patterning therefore has the potential to affect the rate of adoption. Furthermore, networks with particular structures may be conducive to faster rates of adoption (Valente, 1995). For example, simulations on networks have shown that diffusion is accelerated in centralised networks (Valente, 2002b).

4.12.1.5 Environmental context

Wejnert (2002) also recognises the importance of the environmental context in which diffusion occurs. Geographical settings affect adoption in two ways: because they render the innovation inapplicable to the adopter i.e. because the geography restricts use of the innovation (for example, soil type, climate etc); or because geographical proximity constrains or facilitates adoption i.e. because it restricts interpersonal communication. The effect of societal culture includes the manner in which belief systems (values, norms, language, religion, and ideology), cultural traditionalism, cultural homogeneity and socialisation of individuals affect adoption (previously discussed in section 4.12.1.4). Political conditions can inhibit, postpone or facilitate the adoption of innovations, for example, through the introduction and/or enforcement

of policies or laws. Finally, global uniformity (the view of the world as one cultural community) affects diffusion and adoption through institutionalisation, global technology, and world connectedness via communication and the media etc.

4.13 Identifying appropriate opinion leaders

This discussion has recognised the importance of identifying opinion leaders with the correct personality traits i.e. who are credible, well known and liked by the target population, homophilous with adopters, and those who are located in strategic positions within their social networks so as to facilitate the diffusion process.

The manner in which these individuals are identified is therefore important as different identification methods will result in different groups of individuals acting as opinion leaders. The processes by which opinion leaders can be selected have been discussed in section 4.6. Each selection method differs in the extent to which they select individuals with appropriate characteristics. For example, social network methods will be more successful in identifying opinion leaders in particular social positions whereas the positional approach will be more successful at identifying individuals with a particular level of competence.

Given that interpersonal contacts are of paramount importance for the communication of ideas and practices in communities, the significance of social networks must also be recognised. These networks ultimately accelerate or impede the spread of ideas and the adoption of new practices (Valente, 2003). Furthermore, the structural characteristics of the social networks, and the location of opinion leaders within their social networks may mean that some individuals will be more effective at controlling and changing the behaviour of network members than others. It is therefore important to consider the relevance of social networks in the diffusion process.

4.13.1 Social networks

The social world is comprised of components (individuals and organisations etc.), all of which have a place relative to each other. These components are inextricably linked through their actions and relationships, forming a *social network.* Within a social network, the persons, objects or events are termed *actors* or *nodes*. These are 'joined' to one another by *ties* or *links*. A multitude of relations can form ties between two actors, including: the transfer of resources between individuals or companies; association or affiliation to, for example, a club or company; social interaction or friendship; physical connections such as roads or rivers; and movement, for example, migration (Knoke & Kuklinski, 1982).

Social structures are characterised by the existence of these networks of actors (although it may seem more applicable when referring to actors who are people, this term will be used interchangeably with the term node throughout this thesis) connected by ties (Knoke & Kuklinski, 1982; Wasserman & Faust, 1994; Wellman & Berkowitz, 1988). From the social network perspective, the social environment can be represented as patterns of regularities in relationships among actors in a network. These regular patterns are termed *structure*.

As well as recognising the importance of relations, social network theory is based on several other premises: that the components of the social world are not independent of each other; ties between actors represent the mode of passage of resources; networks can either aid or impede the actions of individuals; and structure is characterised by the patterns created by ties between actors (Wasserman & Faust, 1994).

4.14 Applying diffusion theory to public health

In the public health domain, diffusion theory can be used to inform the design of interventions to facilitate the uptake of healthy behaviours, and the prevention or cessation of unhealthy behaviours (Haider & Kreps, 2004). It can also be used to understand the increase in negative health behaviours within populations. For example, smoking may diffuse successfully through a population, assisted by, for example, social acceptance of a behaviour (Ferrence, 2001; Redmond, 1999). Change agents and opinion leaders can be utilised to encourage the adoption of a new behaviour or attempt to slow the diffusion or adoption of an undesirable behaviour. Health promotion interventions which adopt this theory are based on the premise that behaviour change in a population can be initiated and *"will 'diffuse' to others if enough natural and influential opinion leaders within the population visibly adopt, endorse, and support an innovative behaviour"* (Kelly, 2004, p140). The idea is that when norms are changed in this way it makes it easier for others to initiate and maintain risk reduction behaviour practices.

In the preventive health field diffusion theory was comprehensively applied in the 'Gay Hero' sexual health intervention. This intervention was a successful peer-led intervention which used informal contacts to diffuse a health promotion message and was developed and evaluated by Jeff Kelly and colleagues in the USA (Kelly et al., 1997; Kelly et al., 1992). The intervention was based on the STOP AIDS prevention programme conducted in San Francisco in the 1980's (Wolhlfeiler, 1998). Kelly asked bar staff in bars frequented by the gay community of small mid-Western towns to identify popular individuals (popular opinion leaders) who patronised the bar. These individuals were then recruited and trained to promote the message of safe sexual practice to other individuals in the community.

More recently, a similar approach was implemented with gay men in gyms in London (Elford et al., 2001; Elford et al., 2002b) and bars in Glasgow (control group in Edinburgh) (Flowers et al., 2002; Williamson et al., 2001) but did not demonstrate such positive

behavioural effects. The process evaluations of these studies (Elford et al., 2002c; Hart, 1998) provided some indication for the lack of success. They identified problems in the recruitment and retention of sufficient opinion leaders to effect change. For example, in London only one in five individuals identified as peer educators remained involved until the end of the project. Barriers to communication were also identified as peer educators found talking about sex with strangers difficult as they felt that initiating a conversation about sex might be construed as a sexual advance. Doubts were also raised by peer educators about the use of this model in large cities questioning whether this intervention, which was originally implemented in small towns, could be transferred to and implemented in larger metropolitan areas, and into different settings. A final factor identified in London was that the critical mass for diffusion was not achieved and only 3 per cent of men surveyed reported having spoken with a peer educator during the intervention period. Conversely, in Glasgow, a third of men surveyed reported speaking to a peer educator but no significant impact on sexual behaviour was observed, although an increased uptake in hepatitis B vaccination was reported.

Recent debate has sought to provide further insight into the reasons for the disappointing results seen in the UK projects (Elford et al., 2004; Hart et al., 2004; Kelly, 2004). Kelly (2004) suggested nine core elements of this popular opinion leader (POL) model (see Table 5), and argued that some of these features were not present in the UK projects. He therefore proposed that these interventions were not actually based on the POL model. These elements were identified as relating to: identifying and selecting POLs who represented different segments of the target population to be trained to deliver risk-reduction; achieving the critical mass of POLs required to establish new norms of behaviour; developing appropriate prevention messages relevant for the population; using weekly sessions to encourage POLs to deliver behaviour change messages during everyday conversations; repeatedly over time motivating POLs to maintain their role as POLs; and

establishing an ongoing programme with momentum to establish and sustain safer social norms.

Table 5: Core elements of the popular opinion leader (POL) model

1	Intervention is directed to an identifiable target population in well-defined community venues and where the population's size can be estimated
2	Ethnographic techniques are systematically used to identify segments of the target population and to identify those persons who are most popular, well-liked, and trusted by others in each population segment
3	Over the life of the programme, 15% of the target population size found in intervention venues are trained as POL's
4	The programme teaches POL's skills for initiating HIV risk reduction messages to friends and acquaintances during everyday conversations
5	The training programme teaches POL's characteristics of effective behaviour change communication messages targeting risk-related attitudes, norms, intentions, and self-efficacy. In conversations, POL's personally endorse the benefits of safer behaviour and recommend practical steps needed to implement change
6	Groups of POL's meeting together weekly in sessions that use instruction, facilitator modelling, and extensive role play exercises to help POL's refine their skills and gain confidence in delivering effective HIV prevention messages to others. Groups are small enough to provide extensive practice opportunities for all POL's to shape their communication skills and create comfort in delivering conversational messages
7	POL's set goals to engage in risk reduction conversations with friends and acquaintances in the target population between weekly sessions
8	POL's conversational outcomes are reviewed, discussed, and reinforced at subsequent training sessions
9	LOGOs, symbols, or other devices are used as 'conversation starters' between POL's and others

Taken from Kelly (2004, p141)

In defence of this criticism, Elford and colleagues (2004) argued that all these core elements were incorporated into the intervention design, and seven into the intervention delivery. They reiterated the findings of their process evaluation, that the major barriers to diffusion were failing to recruit sufficient opinion leaders and difficulties in communicating the

message. And while Hart and colleagues (2004) acknowledged that they did not implement the intervention exactly as had been done in the USA, they identified problems which prevented them from achieving this, in particular, difficulties in recruiting opinion leaders and limited resources. Both research teams also suggest that the implementation of their interventions was not as timely as when Kelly implemented his intervention at the height of the HIV epidemic and prior to the development of highly active antiretroviral therapy.

Thus, in addition to issues relating to opinion leaders and change agents, the characteristics of adopters, the attributes of the innovation, the nature of the social system and the environmental context, the debate in 'AIDS Care' clearly shows that a number of intervention-specific issues also have the potential to affect the adoption of innovations. Investigating these issues can allow researchers to identify innovations perceived as advantageous, the most effective routes by which to communicate an innovation, those individuals most receptive to adoption, and the most appropriate opinion leaders (in terms of characteristics and position in their social networks) to reach the target population.

4.15 Summary

The benefits of peer-led interventions for young people have been acknowledged. The use of this approach within the field of adolescent smoking prevention is increasingly popular although the methodological quality of many evaluations of these interventions has been questioned, and the need to improve the quality of both outcome and process evaluation recognised. Informal approaches to peer education which are grounded in diffusion theory are promising and can overcome some of the problems relating to more formal peer-led interventions.

However, a number of issues which affect the adoption of innovations have been identified and can have consequences for the success of these interventions. These relate to the opinion leaders and

change agents, the characteristics of adopters, the attributes of the innovation, the nature of the social system and the environmental context. In particular, social networks are crucial for the outcomes of these interventions both in terms of the structure of the network as an entity and in terms of the position of key actors within this network, particularly opinion leaders. Furthermore, the characteristics of these opinion leaders are crucial for the successful diffusion of innovations. This highlights the importance of the methods by which these opinion leaders are identified.

The recent debate surrounding the use of informal peer education in the field of sexual health identified a number of intervention-specific factors which can also affect the uptake of an innovation. A number of these relate to the more general issues discussed. The need to examine these critical factors and processes that affect the process and outcomes of social diffusion interventions is therefore recognised.

The following chapter describes a recent application of diffusion theory in the field of adolescent smoking prevention and in the context of this intervention identifies two specific factors relating to the successful diffusion of the health promotion message.

~ CHAPTER 5 ~

5 THE CONTEXT OF THE CURRENT STUDY – THE ASSIST INTERVENTION

This chapter provides the context for this study. It provides detail of a recent application of diffusion theory in the field of adolescent smoking prevention (the ASSIST intervention), on which this study will focus. Issues relating to the successful adoption of innovations identified in the previous chapter will be discussed in the relation to this intervention and the main aims for this study will be identified.

5.1 The ASSIST intervention

A recent application of diffusion theory was in the ASSIST intervention which was implemented in thirty schools in the south west of England and in south Wales in 2001 and 2002.

5.1.1 Approach

The ASSIST intervention was a schools-based approach to smoking prevention which was not based in the curriculum, or led in any way by teachers. It adopted an informal approach to peer education and was grounded predominantly in diffusion theory (section 4.12). Since this theory relies heavily on the modelling of behaviours, the intervention also embraced elements of social learning theory (section 3.2.2.1). The successful 'Gay Hero' model used by Kelly and colleagues (1997; 1992) was adapted and adopted the idea that popular opinion leaders ('peer supporters') would use informal interactions with their peers to disseminate a message of being *smoke-free* through their school year. The aim was that this would subsequently change the smoking culture in the school and reduce smoking prevalence.

5.1.2 Development

The intervention was developed during a feasibility study undertaken in Mid-Glamorgan, Wales in the mid 1990's (Bloor et al., 1997; Bloor et al., 1999). This intervention was conducted among Year 8 and 9 students (12 to 14 years of age) in two intervention schools (further funding was secured at a later stage to conduct it in another two intervention schools). Peer leaders were selected using a whole-community approach to peer nomination (section 4.6). All Year 8 and 9 students were asked to name other students in their year in response to the question "If you were worried about something, who would you go to for advice and support?" Students nominated most frequently were asked to attend a meeting at which they were told about the project and asked to volunteer to take part. In total 53 students (8 per cent of the intervention group) were recruited and attended a two-day out-of-school training session. All trainees completed a diary detailing their attempts at conversing with peers about smoking, and attended five fortnightly in-school support sessions.

A number of difficulties were encountered during the feasibility study. The original target population for this intervention was Years 9 and 10 (Bloor et al., 1997). However, there were significant problems recruiting peer leaders from Year 10 (general lack of interest and reluctance to give up weekends). Thus, the focus of the intervention was changed to concentrate on students in Years 8 and 9. Furthermore, the training was to be held on a weekend which was also thought to discourage uptake. Therefore, the training was re-scheduled to take place during school time.

Effectiveness was evaluated using a matched quasi-experimental design which involved 1,247 students in two intervention and two control schools (Bloor et al., 1999). This small-scale trial which had an immediate-, and three-month post-intervention follow-up found no difference between intervention and control schools immediately post-intervention ($\chi^2 = 1.5$, df = 1, p= 0.22) but demonstrated that self-reported ex-smokers who were exposed to the school-based

intervention were less likely to resume smoking at three month follow-up than the equivalent group in control school (χ^2 = 4.3, df = 1, p= 0.04). Sub-group analysis revealed that Year 8 students were significantly less likely to re-start smoking (χ^2 = 5.3, df = 1, p= 0.02), whereas no effect was observed amongst Year 9 students. Furthermore, girls in intervention schools were less likely (although not statistically significantly) than girls in control school to restart smoking (χ^2 = 3.4, df = 1, p= 0.06), but little difference was observed between boys in the two arms of the trial. There was also no significant impact on the propensity of regular smokers to stop smoking at three-month follow-up, nor on the propensity of baseline non-smokers to remain smoke-free.

A number of issues relating to the adoption of the innovation were raised and are likely to have contributed to the limited success (Bloor et al., 1997; Bloor et al., 1999). Only 8 per cent of the intervention population were recruited as opinion leaders which is significantly lower than the recommended 15 per cent critical mass for successful diffusion (Rogers, 1983). Secondly, the limited impact seen amongst boys may have been due to the imbalance in peer leader recruitment, in which more than twice as many girls were recruited than boys. It has been suggested that this was partly due to a 'gendered' nomination question which referred to 'advice-giving' (Starkey et al., submitted). Finally, the intervention had a more significant impact among Year 8 students than Year 9, suggesting that this approach is better suited for this age group. Following the evaluation, recommendations were therefore made regarding improvements to the intervention. These included making it more attractive to boys and retargeting to a younger age group.

The positive result observed in this feasibility study led the Medical Research Council to fund a full-scale evaluation of the intervention. During this evaluation, the intervention conducted previously was re-designed bearing these recommendations in mind, and was evaluated in a large scale randomised controlled trial and with longer follow-up (see chapter 7).

Following on from the feasibility study, extensive work was carried out at the start of the trial to develop both the training programme and follow-up sessions (Audrey et al., 2004), and the peer nomination questionnaire (Starkey et al., submitted). The re-designed and updated intervention and peer nomination procedure were tested for acceptability and practicability, and refined during a pilot study conducted in three schools geographically removed from the final trial area. The final content of the intervention, which would be evaluated during the main trial, was agreed by senior ASSIST trainers in consultation with external agencies. Based on the recommendations of the feasibility study, the intervention developed in ASSIST was directed at students in Year 8 (12 to 13 years old). A brief description of each stage of the intervention evaluated in the main trial is provided in Figure 12. Further detail is provided in sections 5.1.3 to 5.1.6 and elsewhere (Audrey et al., 2004). An outline of the objectives of the activities included in the training and follow-up sessions (as detailed in the intervention manual (Cordall et al., 2004)) are included in Appendix 5.

5.1.3 The nomination process

The intervention utilised a whole-community approach (Valente & Davis, 1999) to nominating peer leaders. The rationale for this decision was based on the discussion highlighted in section 4.6. The primary reason was a need to identify a range of influential students who collectively would act as opinion leaders for the whole year group and not just for a subgroup of the year. Therefore, the nomination approach aimed to identify: individuals from across the school year group, in order to maximise the number of friendship groups involved; students who were 'influential' instead of just those who were 'popular'; groups of peer supporters who represented the social diversity of their school year; young people with different experiences of smoking (both non-smokers and smokers); and groups that represented the gender balance of the school year (Starkey et al., In Preparation).

Figure 12: Stages in the ASSIST intervention

Nomination of peer supporters

- Completion of questionnaire by all Year 8 students to identify influential peers. Questions asked were 'Who do you respect in Year 8 at your school?', 'Who are good leaders in sports or other groups activities in Year 8 at your school?', and 'Who do you look up to in Year 8 at your school?'.
- To achieve a 15% critical mass of the year group participating as peer supporters, the 17.5% with the most nominations were invited to a recruitment meeting.

Recruitment

- Meeting with nominees to explain peer supporter role, answer questions, and obtain their agreement to attend the training course.
- Parental consent for training course participation sought.

Training

- Two-day training event held out of school, facilitated by a team of external trainers, led by health promotion specialists.
- The training aimed to:
  - give information on short-term risks to young people of smoking and the health, environmental, and economic benefits of remaining smoke-free;
  - develop communication skills, including verbal and non-verbal communication skills, listening skills, expression of feelings and ideas, group work, team building, cooperation and negotiation, ways of giving and receiving information, and conflict resolution;
  - enhance students' personal development, including their confidence and self-esteem, empathy and sensitivity to others, assertiveness, decision-making and prioritising skills, attitudes to risk-taking, and exploration of personal values.
- Methods used to achieve these aims included participatory learning activities such as role-plays, student-led research, small group work and discussion, and games.

Intervention period

- Ten-week period in which peer supporters undertook conversations about smoking with their peers and logged a record of these in a simple pro forma diary.
- Four follow-up school visits by trainers to meet with peer supporters to provide support, trouble shooting, and monitoring of peer supporters' diaries.

Acknowledgement

- Presentation of certificates to all peer supporters.
- Presentation of gift vouchers to peer supporters who handed in their diary.

Adapted from Campbell et al. (Campbell et al., Submitted)

At the baseline outcome evaluation datasweep, all Year 8 students who had received parental permission (obtained using an opt-out consent procedure in which schools sent letters to the homes of parents/carers on behalf of the research team (see section 7.1.3)) to take part in ASSIST nominated influential individuals (who were termed 'peer supporters' for the ASSIST intervention) in their year using a peer nomination questionnaire. This datasweep was conducted in-school during lesson time (see section 7.1.2). Unlike the feasibility study which used just one question to nominate peer leaders, the ASSIST intervention used three. The questionnaire asked respondents to name up to five individuals in answer to each of the following questions "who do you respect in Year 8 at your school?," "who are good leaders in sports and other group activities in Year 8 at your school?", and "who do you look up to in Year 8 at your school?" The purpose of this questionnaire was not disclosed at the time of completion in order to avoid any bias this may have introduced. To avoid distinctions between students named in response to these nomination questions, and those not named, a more general dummy question about general social contact was also included. This question was "who have you had a conversation with in Year 8 at your school today?"

The number of times an individual was named (being named more than once on a questionnaire constituted one nomination) in response to the first three questions was tallied to arrive at a nomination 'score' for each student in Year 8. Students with the top 17.5 per cent of scores in their school were then invited to the recruitment meeting (section 5.1.4). The gender balance of the peer supporters reflected that of the school year by selecting the top 17.5 per cent of girls and the top 17.5 per cent boys named most frequently. This aimed to overcome the problem encountered in a number of other peer-led interventions, including the feasibility study in which fewer boys were recruited than girls. It also allowed for some attrition, and expected the required 15 per cent of Year 8 to act as peer supporters. A number of smokers were nominated, and were encouraged to participate so long as they made a concerted effort to quit during the intervention period.

5.1.4 Recruitment

Individuals named most often in response to these questions were then asked to attend a peer recruitment meeting. This meeting was conducted by ASSIST trainers (who were either employed by the universities, or who were from external agencies contracted to work for the universities i.e. not schoolteachers) and was held on school premises and during school time. It had the purpose of providing attendees with information relating to their involvement as peer supporters, and gave them the opportunity to raise any questions about the intervention. At the end of this meeting students were provided with written information about the intervention and consent forms which were to be completed by their parents or carers if they wished to participate.

5.1.5 The ASSIST training

Following the peer recruitment meeting, individuals who wished to be involved, and who gained parental consent, attended a two-day non-residential training programme conducted for students in their school. A description of the development and implementation of the intervention can be found elsewhere (Audrey et al., 2004). This training was conducted off the school premises but during school time and was again run by the ASSIST trainers. These training sessions were held in a variety of venues, ranging from hotels and conference centres to sports clubs, but were close to the school in order that the training could be conducted and the students returned to school within the school day.

The overall aim of the course was to train the young people to intervene in everyday situations (such as at break-time or after school) to encourage other Year 8 students not to smoke. Within this aim, the objectives were: to provide information and increase students' knowledge about the health, economic and environmental risks of smoking; to practice intervening in every day situations; and to gain the skills to talk informally to their peers about smoking. There were also

opportunities for the young people to engage in fun activities, especially when concentration waned or they had excess energy which hampered concentration.

The training was devised as a student-centred experiential learning process. There was no explicit theoretical basis for the content of the training but it was specifically designed to be highly participative, and aimed to allow the potential peer supporters to discuss issues which arose as a result of activities with the trainers and the rest of the group. Materials used came from tried and tested health promotion and youth work programmes, and where necessary, were adapted to the needs of the ASSIST training. The resources used were considered the best available at the time of the evaluation. It is therefore possible that these resources will have been used outside the context of the ASSIST intervention as part of the PSHE/PSE curriculum, or through other smoking education activities in both intervention and control schools. The training was conducted with a variety of students, with a broad range of abilities. Consequently, the majority of the activities were oriented towards oral participation rather than being written activities.

The activities used in the training programme, which are outlined in Appendix 5 fell into three broad categories of information provision, communication skills and personal development (see Table 6).

The training began by assessing the potential peer supporters' current knowledge base, attitudes towards smoking, and life-skills. The use of activities such as 'Personal Shield' which involved participants drawing a 'personal shield' of talents and interests identified individual skills and knowledge and acknowledged that some of these could be successfully used in their new role. It also boosted confidence and allowed group members to share information about specific interests with each other. The programme then developed from exploring current skills to acquiring new ones, including listening and observing, decision-making and team negotiation. Throughout, participants were asked to reflect and discuss their views.

Table 6: ASSIST training programme: aims and examples of activities

Aim/Purpose	Example
Information giving • Short-term risks to young people of smoking (smell, kissing people who smoke is like 'snogging an ashtray') • Longer-term potential health outcomes for young people who continue to smoke • Health, environmental, and economic benefits of remaining smoke-free	**True or False?** Cards labelled True, False, Don't Know are displayed at different points around the room. Statements are read out, for example, 'Smoking does not affect you until you are over 30'. Students are asked to stand by the card displaying their chosen answer and encouraged to say why they have chosen either True, False, or Don't Know. Students are permitted to move on the basis of points made. After discussion, the correct answer is given.
Communication skills • Verbal and non-verbal communication • Listening skills • Expression of feelings and ideas • Group work, team building, cooperation and negotiation • Ways of giving and receiving information • Conflict resolution	**When? And When Not? Role plays** Trainers begin by demonstrating examples of conversations. Students are asked to decide whether these are good or bad times to talk about smoking. Students then practise similar scripted scenes in small groups. Finally, in the whole group, volunteers role-play pre-prepared scripts or scenes they have written themselves.
Personal development • Confidence and self-esteem • Empathy and sensitivity to others- moods, problems, tolerance • Assertiveness • Decision-making and prioritising • Attitudes to risk-taking • Exploration of personal values	**Skills of a peer supporter** In small groups students are asked to think of at least nine skills they think are important for the role of peer supporter and write each one on a post-it note. Groups are then given a template with boxes arranged as a Nine of Diamonds playing card and asked to discuss and rank the skills with the most important at the top, the next two below etc. Templates are displayed at a plenary session in which comparison and discussion between groups takes place.

Taken from Audrey and colleagues (2004, p275)

New information was introduced by encouraging the students to undertake their own research using commercially available health

promotion resources (Islands of Information), and through activities led in a more vivid style by the trainers, for example, making a 'cigarette cake' where ingredients included a range of toxic substances found in cigarettes (Ready, Steady, Cook).

Role-play enabled the potential peer supporters to anticipate the different reactions they might experience in their attempts to disseminate information about smoking and allowed them to explore the opportunities there might be to instigate informal conversations about smoking with their peers.

The training package was not entirely rigid, and allowed flexibility where organisational, educational and behavioural needs required it. Each training activity was colour-coded red, amber and green, each colour denoting the importance of that activity. Red activities were essential elements of the programme, amber activities were activities used to consolidate skills and information already covered, and could be omitted if necessary, and green activities were group dividing activities or games with a purpose, and whilst considered the least important aspect of the training in terms of content gave the peer supporters the chance to be active.

After the training, individuals were asked to indicate whether they wanted to carry on with the role, and provided written consent to continue as peer supporters. At the end of the training they were given a simple pro-forma type diary which they were asked to complete when they had conversations with people in their school year about smoking. These diaries asked them to provide the date of the conversation, the initials, sex and smoking status of the person/people they had the conversation with, and brief details about the nature of the conversation and how it went. Each school was provided with copies of posters (selected by the peer supporters during the 'Jigsaws' activity) to display strategically on the school premises in the hope that they could be used as conversational aids.

The peer supporters were then asked to spend the next ten weeks having conversations about smoking with other Year 8 students, encouraging them to be smoke-free. They were not asked to provide

written information in the form of leaflets. Instead, information dissemination was intended to be solely verbal. If their peers requested further information or further support, for example, to give up smoking, the peer supporters were provided with a short list of telephone helpline numbers and useful websites which they could direct them to. This was particularly pertinent in the case of peers who wanted to quit smoking as the role of the peer supporters was not to facilitate cessation, and they were not provided with any training to enable them to adopt this role.

5.1.6 Support

During the ten-week intervention the peer supporters were provided with support from the ASSIST trainers during four follow-up sessions. These follow-up sessions were planned to take place in weeks one, four, seven and ten of the intervention period and were held during school time and on the school premises. Each follow-up session was delivered in a single school lesson (approximately 45-60 minutes duration). They provided an opportunity to recap on issues from the training, provide new information, and practise the skills required as a peer supporter. They also allowed the trainers to monitor the diaries the young people were completing throughout the intervention. The activities covered during these follow-up sessions are outlined in Appendix 5.

At the end of the intervention, peer supporters received a certificate of achievement to recognise their involvement in the intervention. On handing in a completed diary they also received a £10 gift voucher to acknowledge their efforts. Depending on the wishes of the students and the schools involved, these certificates and vouchers were presented either in a school assembly or during a smaller group meeting.

5.2 Issues affecting successful diffusion in the ASSIST intervention

The ASSIST model is an innovative intervention, and even at the time of writing this thesis, no other examples of informal social diffusion approaches to adolescent smoking have been found. There has, however been much interest in the methods used in the intervention, for example, the process by which influential students were nominated, as well as in more general terms as a strategy to address adolescent health behaviours. Currently, the only re-application of the intervention amongst young people has been to problem drinking (AERC, n.d.). The ASSIST intervention provides an ideal opportunity to examine key factors that may facilitate or attenuate the effective and successful implementation of social diffusion interventions.

As shown in section 4.14, Kelly (2004) identified nine intervention-specific elements of the POL model which will facilitate the success of such interventions. The feasibility study identified a number of these core elements which were not achieved, for example, only 8 per cent of students acted as opinion leaders. However, changes were made to the intervention design, and in the ASSIST intervention all nine of these elements were incorporated into intervention design albeit in a modified form (see Table 7).

Table 7: Incorporating Kelly's core elements of the POL model into the ASSIST intervention

	Kelly's core element of the POL model	Incorporation into the ASSIST intervention
1	Intervention is directed to an identifiable target population in well-defined community venues and where the population's size can be estimated	Intervention directed at Year 8 students attending 30 secondary schools
2	Ethnographic techniques are systematically used to identify segments of the target population and to identify those persons who are most popular, well-liked, and trusted by others in each population segment	Whole-community peer nomination process used to identify influential individuals to act as peer supporters
3	Over the life of the programme, 15% of the target population size found in intervention venues are trained as POL's	Aimed to invite 17.5% of the target population of Year 8 students invited to train as peer supporters, allowing for 2.5% attrition. In practice, 18.2% of cohort nominated, 15.8% trained and 15.6% consented to continue as peer supporters
4	The programme teaches POL's skills for initiating HIV risk reduction messages to friends and acquaintances during everyday conversations	The ASSIST training taught peer supporters skills for initiating conversations about being smoke-free with peers during everyday conversations
5	The training programme teaches POL's characteristics of effective behaviour change communication messages targeting risk-related attitudes, norms, intentions, and self-efficacy. In conversations, POL's personally endorse the benefits of safer behaviour and recommend practical steps needed to implement change	The ASSIST training provided peer supporters with the information, skills and confidence to communicate an effective smoke-free message to their peers. If smokers, peer supporters encouraged to quit

Table 7: Incorporating Kelly's core elements of the POL model into the ASSIST intervention cont.

	Kelly's core element of the POL model	Incorporation into the ASSIST intervention
6	Groups of POL's meeting together weekly in sessions that use instruction, facilitator modelling, and extensive role play exercises to help POL's refine their skills and gain confidence in delivering effective HIV prev ention messages to others. Groups are small enough to provide extensive practice opportunities for all POL's to shape their communication skills and create comfort in delivering conversational messages	Peer supporters attended a two-day training programme and four school-based follow-up sessions during the intervention period which aimed to reinforce information and skills learned at the training
7	POL's set goals to engage in risk reduction conversations with friends and acquaintances in the target population between weekly sessions	Peer supporters encouraged to have as many conversations about smoking with their peers as they were able to (the suggested minimum was ten over the lifetime of the intervention), and to provide evidence of these conversations in a structured diary
8	POL's conversational outcomes are reviewed, discussed, and reinforced at subsequent training sessions	Peer supporters' diaries monitored by trainers and discussed with them on an individual basis at each follow-up session. Peer supporters encouraged to make further attempts to engage in conversations about smoking with their peers
9	LOGOs, symbols, or other devices are used as 'conversation starters' between POL's and others	Posters provided to schools by trainers which could be used as conversational aids

As discussed in chapter 4, it should be acknowledged that a variety of other issues affect the diffusion of innovations within populations. Many of these cannot be controlled through intervention design. Despite successfully adhering to Kelly's recommendations a number of these issues are of relevance to ASSIST.

The previous chapters have highlighted the importance of nominating the 'right' kinds of individuals to act as opinion leaders for these kinds of interventions in terms of their position within their community, homophily with the target population and their credibility as a source of information. Kelly recognised this in his second core element of the POL model, and whilst the ASSIST intervention used a nomination method which aimed to achieve this, it is unknown whether it was successful in nominating students with these characteristics. Furthermore, in contrast to others (Valente et al., 2003) who have adopted social network methods to ensure that students are selected from across the school year group in order to maximise diffusion, the whole-community nomination approach used in ASSIST relied on measures of 'influence' to select appropriate opinion leaders. This raises questions as to whether they were well placed in their social networks to diffuse the smoke-free message.

The acceptability of interventions is also clearly important for their success. As highlighted in section 4.7.2 previous studies have found that young people find peer education more acceptable than adult-led intervention but have noted problems with formal peer-led approaches. Informal approaches have therefore been identified as more appropriate. Since the ASSIST intervention is a novel application of an informal approach in the field of adolescent smoking, it is unclear whether it is an acceptable approach amongst this target group.

This study will aim to explore these issues in the context of the ASSIST intervention, and will provide valuable learning which may be utilised to maximise the effectiveness of future applications of this model, particularly in the context of school-based substance misuse interventions.

5.3 Study aims

The main aims of this study are given in Box 3. Two of the study aims relate to who was nominated to act as peer supporters in ASSIST. In section 5.2, questions have been raised regarding the ability of the whole-community approach to peer nomination used in the ASSIST intervention to successfully nominate 'socially influential' peer supporters whose opinions their peers would value. Extensive work was conducted to identify questions which would best enable influential peer supporters to be nominated (Starkey et al., submitted). The ASSIST peer nomination process did not aim to nominate those at the centre of friendship groups, or those who were capable of reaching the entire year group, in terms of their proximity to other individuals in the year. Consequently, there was no guarantee that they could disseminate the smoke-free message across the entire year group. This study will therefore aim to examine issues relating to the school social networks and the ability of the peer supporters to disseminate a smoke-free message through one-to-one communication, in terms of their social position within their school networks.

Box 3: Main aims of the study

- To gain insight into the ability of the peer supporters to disseminate a smokefree message, in terms of their positions within their social networks.
- To ascertain Year 8 students' opinions about the suitability of peer supporters to carry out the role.
- To examine issues relating to the acceptability of this approach to reducing smoking amongst young people.

In terms of the characteristics of the peer supporters, the peer nomination process did not ask students to nominate young people "who would be good at talking to others about smoking" or "who they would speak to if they wanted to talk about smoking related issues".

Instead, it identified influential individuals on the basis of 'prestige', for example, students who were 'good leaders', or who were 'respected'. This does not necessarily mean that they would have been appropriate to undertake the peer supporter role and talk to fellow students about smoking. However, since it is essential that the peer supporters were perceived as *suitable* to undertake their role, the second aim of this study is to ascertain Year 8 students' opinions about the suitability of peer supporters.

The third aim relates to the *acceptability* of this informal social diffusion approach to reducing adolescent smoking from the perspective of those who were in receipt of the intervention (non-peer supporters) and those who delivered it (peer supporters). If the intervention is not acceptable, it is likely that even with the most meticulously engineered intervention and selection process, the intervention will be doomed to fail. This study will therefore examine whether the peer supporters were willing to diffuse the smoke-free message (Valente & Davis, 1999), and whether all of the young people involved considered the approach appropriate and acceptable.

5.4 Summary

The ASSIST intervention was developed in response to an acknowledged need for innovative approaches to adolescent smoking prevention. In recognition that schools are convenient and often appropriate settings for adolescent health promotion and informal peer-led health promotion has a number of potential advantages over teacher-led interventions in this setting, it adopted a schools-based, peer-led approach which utilised diffusion theory.

A number of issues which may have affected the diffusion of the smoke-free message have been identified as relevant to social diffusion approaches such as the ASSIST intervention. Whilst the intervention incorporated Kelly's nine core elements of the Popular Opinion Leader model the need to examine issues relating to the selection of

appropriate opinion leaders has been identified. Furthermore, it is unclear whether social diffusion approaches to adolescent health are appropriate and feasible with young people.

This study will aim to explore these issues in the context of ASSIST, with the aim of providing learning which can be fed into similar interventions. In relation to who was nominated as peer supporters, it will look, in particular at whether the school social networks and the position of peer supporters within these networks facilitate the spread of the smoke-free message. It will also examine whether the peer supporters were considered 'suitable' opinion leaders. Finally, it will explore whether or not the students involved found this an acceptable approach to reducing adolescent smoking.

Chapter 6 considers two appropriate methodologies for addressing these research aims.

~ CHAPTER 6 ~

6 CHOICE OF METHODS

Chapter 5 acknowledged a number of factors which have the potential to affect the successful diffusion of innovations in communities. The potential of some of these to affect the success of health promotion interventions has been illustrated using ASSIST as an example. Two important issues have been identified. The first is the importance of selecting appropriate individuals to act as opinion leaders (peer supporters in ASSIST). The other is the need for the approach adopted in the intervention to be acceptabe to both the young people asked to deliver it and those who are in receipt of it. This study will address number of aims relevant to these issues.

The first aspect of the research requires methods that will allow the characteristics of the school social networks to be examined, and the exploration of whether the peer supporters hold strategic positions within these networks to facilitate diffusion. It will also involve identifying social groups and ascertaining if the peer supporters are positioned within those groups. These analyses will involve looking directly at the friendship ties that exist in the school year groups i.e. which students are friends with each other. The most direct methodology to achieve this is social network analysis. This allows the calculation of measures which can describe and compare the social position of members of a social network. Using social network analysis it is also possible to identify social groups in social networks and scrutinise their composition. This methodology will be discussed further in section 6.1.

The second aspect of the research involves ascertaining in-depth information about the young people's (both those who acted as peer supporters and those who did not act as peer supporters) perception of the suitability of the peer supporters, and their views about the appropriateness of this informal approach to smoking prevention. A popular strategy used to gather information regarding participants'

views of an intervention, including its acceptability is through methods incorporated into process evaluation. A number of methods can be utilised in process evaluations, each of which elicits different information. Qualitative methods, for example, individual and group interviews, would appear to be the most suitable to obtain comprehensive data on the suitability of the peer supporters and the acceptability of the intervention as they are able to provide illumination into opinions and ideas. Quantitative methods such as self-complete questionnaires may also be valuable to obtain more general information on the acceptability of the approach from a range of individuals. In this context, process evaluation is discussed in section 6.2.

6.1 Social network analysis

The most direct way of examining issues relating to social networks is using social network analysis. A number of general texts relating to social network analysis are available (for example, Holland & Leinhardt, 1979; Knoke & Kuklinski, 1982; Scott, 2000; Wasserman & Faust, 1994; Wellman & Berkowitz, 1988). The following discussion does not aim to explore every issue in these texts, but to provide brief descriptions of elements relevant to the current study.

Social network analysis is a collection of tools used to study social networks and social structures. Thus, it provides a vocabulary and set of definitions for expressing theoretical concepts and properties of networks. The methodology focuses on relationships among social entities, on the patterns among them and the implications of these relations. Network models can also be used to test theories about relational processes or structures.

Interest in where actors in a network lie relative to each other, and the effect this might have on both actors, and on the network as a whole has meant that the study of networks has proved popular in a range of social and behavioural science disciplines (see Knoke & Kuklinski, 1982; Wasserman & Faust, 1994 for examples), including:

social support (Wellman & Wortley, 1990); political and economic systems (Snyder & Kick, 1979); decision-making (Laumann et al., 1977; Laumann & Pappi, 1976); group problem-solving (Bavelas, 1950; Leavitt, 1951); diffusion and adoption of innovations (Coleman et al., 1957; Rogers, 1995; Valente, 2002b); and organisation networks (Milward & Provan, 1998).

The pattern of communication, and the flow of information within social networks can be investigated using social networks analysis (De Nooy et al., 2005; Scott, 2000; Wasserman & Faust, 1994), allowing one to gain an understanding of how actors may be influenced in the social system. Network analysis therefore allows further insight into the diffusion process as it enables the identification of who influences whom (Valente, 2002b), and has the potential to identify ties in the population which can be used to promote positive health behaviours (Latkin et al., 2003).

6.1.1 Fundamental concepts

There are several fundamental concepts in social network analysis. At the most basic level, a tie exists between two actors (a *dyad*). Many kinds of network analyses consider ties between dyads, for example, whether or not ties are reciprocated. Other social network methods and models focus on ties present between three actors (a *triad*), for example, whether or not relations are *transitive* (if actor *i* likes actor *j* and actor *j* likes actor *k*, actor *i* will also like actor *k* (Granovetter, 1973; Holland & Leinhardt, 1970; Holland & Leinhardt, 1979)). *Subgroups* of actors are any subset of actors within the network and all ties among them. *Groups* are collections of actors on which all ties will be measured in order to model the relationships among them. A collection of ties of a specific kind measured on pairs of actors from a specific actor set is called a *relation*. Relations between actors can be *directed* (has an origin and a destination), or *undirected*. Ties can be

dichotomous (either present or absent) or *valued* (has a strength, intensity or frequency attached to it).

6.1.2 Network data

Social network data can be collected using a variety of methods, for example, questionnaires, interviews, observation, archival records and experiments (Marsden, 1990; Wasserman & Faust, 1994). Questionnaires can adopt a number of formats: roster versus free-recall; free- versus fixed-choice; and ratings versus complete rankings. Where roster formats are used, respondents are provided with a list of possible actors in the network and they then identify ties from this list. Free-recall allows respondents to identify actors in response to questions/statements. Fixed-choice designs restrict the number of actors a respondent can identify, whereas free-choice does not. Ratings require actors to assign ratings or values to each tie made whilst complete ranking asks respondents to rank the ties made to others. Interviews can adopt similar formats. These methods can be used to obtain information on all ties within a closed population (complete network data) (Knoke & Kuklinski, 1982), for example, the work on adolescent networks conducted by Kirke (1996; 2004) and a number of studies considered by Knipscheer and Antonucci (1990). Alternatively, information can be gathered solely on ties adjacent to specific nodes (egocentric network data) (Burt, 1984; Wellman & Wortley, 1990). Raw network data can be represented in a number of formats, *matrix format, nodelist format* and *edgelist format.* These data formats are outlined in Appendix 6.

6.1.2.1 Accuracy

Accuracy is a potential problem when collecting social network data, particularly when data are collected retrospectively. This is considered

by Marsden (1990). In particular, Bernard and others (1990; 1984) have reported that individuals do not reliably report interactions. However, a number of other researchers (Hammer, 1985; Romney & Faust, 1982; Romney & Weller, 1984) argue that stable relations are the most important, and that these are likely to be recalled accurately. Another issue relates to the 'ability' of informants to provide accurate data i.e. whether they have the knowledge to report ties accurately. Observation of interaction or exchange provides valid data as it involves direct reporting of relations, but is confined to small populations. The ability of 'outsiders' to recognise complex relations and interactions should however be questioned. On the other hand, researchers are totally removed from the data when archival records are used (Knoke & Kuklinski, 1982).

6.1.2.2 Network sampling

It is not always realistic to anticipate collecting data on an entire population, particularly where populations are large and data collection methods are costly. In many cases the network of interest will have a natural boundary, such as the population of a village, the young people attending a youth group or the staff in a school. Sometimes, however, it is not straightforward to apply such fixed limits when collecting network data and sampling may be necessary (Laumann et al., 1983).

A number of methods can be adopted to select respondents from whom to obtain data (Knoke & Kuklinski, 1982). Selection can be on the basis of particular roles or positions, for example, the directors of a set of companies from which the trading activity is required. Respondents may be selected on the basis of their reputation, i.e. that they are knowledgeable about a particular topic. Snowball sampling involves selecting a representative group of respondents and then asking then to identify further respondents. Respondents can also be selected on the basis of events or activities, for example, all those who attend a function on a particular occasion.

A number of problems of sampling from populations have been identified, which largely relate to whether the network produced is an accurate depiction of the true network.

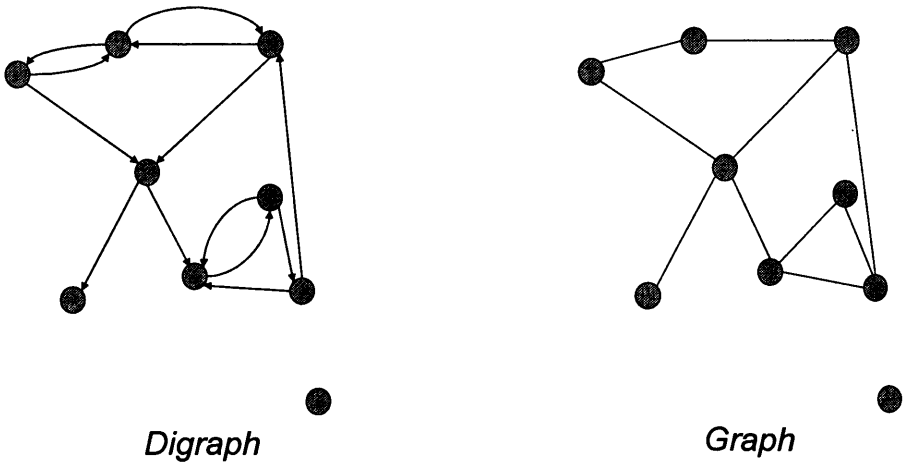
6.1.3 Mathematical representation

There are a number of ways to describe social network data mathematically. These notations include: graph theoretic, sociometric and algebraic. Notation will not be considered here. See Wasserman and Faust (1994), for further details.

6.1.4 Graph theory

A *graph* is a visual representation showing the presence or absence of ties between actors in a network as a set of points and lines. When relations between actors in a graph are directed, it is known as a *digraph*, as shown in Figure 13.

Figure 13: Diagrammatic representations of digraphs/graphs

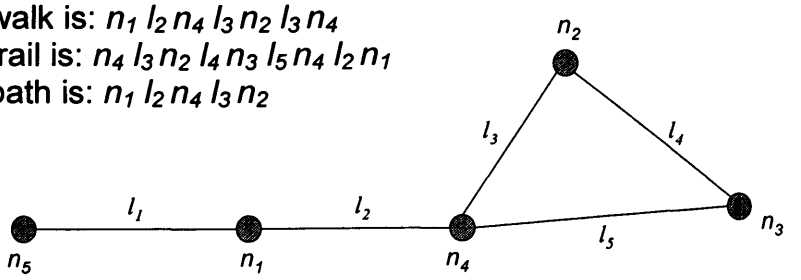


Digraph *Graph*

Two nodes are linked directly by a tie, but they can also be linked by indirect 'routes' that pass through other nodes. A number of terms are used to refer to the sequence of nodes and ties resulting from such associations. A *walk* is a sequence of nodes and lines in which lines and nodes may be repeated. The length of the walk is the number of lines in the walk. A *trail* is a sequence of nodes and lines in which lines cannot be repeated but nodes can. A *path* is a sequence of nodes and lines in which nodes cannot be repeated but lines can. See Figure 14 for examples.

Figure 14: Walks, trails and paths in a graph

An example of a walk is: $n_1\ l_2\ n_4\ l_3\ n_2\ l_3\ n_4$
An example of a trail is: $n_4\ l_3\ n_2\ l_4\ n_3\ l_5\ n_4\ l_2\ n_1$
An example of a path is: $n_1\ l_2\ n_4\ l_3\ n_2$



Adapted from Wasserman and Faust (1994, p106)

Within networks, the nature of the 'commodity' determines the 'route' by which it is transferred. Borgatti (2005) illustrates this in relation to used goods, money, gossip, email, attitudes, infection and packages (Table 8). The manner in which traffic is transmitted can be distinguished into three categories: parallel duplication (simultaneous duplication); serial duplication (duplication occurs one at a time) and transfer. The trajectory the traffic follows can be described as geodesics (see section 6.1.5.1), paths, trails and walks.

Therefore, the presence or absence of the appropriate route of exchange will affect successful diffusion. in addition to the 'route' information may take, a number of network-related issues affect the diffusion of information between actors (Rogers & Kincaid, 1981; Shaw, 1964). These are discussed below.

Table 8: Commonly encountered flow processes

Traffic	Mechanism of node-to-node transmission	Trajectory
Used goods	Transfer	Trails
Money	Transfer	Walks
Gossip	Serial duplication	Trails
E-mail	Parallel duplication	Trails
Attitudes	Parallel duplication	Walks
Infection	Serial duplication	Paths
Packages	Transfer	Geodesics

Adapted from Borgatti (2005, p59).

6.1.5 Structural and locational properties

6.1.5.1 Network cohesion

The connection of the population as a whole also has consequences for the spread of information through a population. Networks with a number of basic characteristics are likely to be more conducive to the diffusion of an innovation.

The size of a network is important. With increasing size, the likelihood that any one actor will know all other actors in the network decreases. This is partly due to density. The *density* of the network ranges from 0 where no lines are present to 1 where all lines are present.

Density is calculated as the number of ties expressed as a percentage of the number of possible ties. In a graph, where *l* = number of lines in graph and *n* = network size,

$$density = \frac{l}{n(n-1)/2}$$

In a digraph, where *l* = number of lines in graph and *n* = network size,

$$density = \frac{l}{n(n-1)}$$

Density poses methodological issues pertaining to the use of fixed-format response questionnaires. Where respondents are allowed to

identify only a certain number of ties, and the maximum network size is variable, inconsistent representations of the true network structure will be produced. Table 9 shows that where the number of ties allowed is five, and all actors identify the maximum number of ties, the density of the graph will change with increasing network size. It should be recognised that networks with very different structures can have exactly the same density (Niemeijer, 1973).

Table 9: Density changes with increasing network size

	Graph			Digraph		
Network size (*n*)	**Number of ties (l)**	$n(n-1)/2$	**Density**	**Number of ties (l)**	$n(n-1)$	**Density**
10	25	45	0.56	50	90	0.56
50	125	1225	0.1	250	2450	0.1
100	250	4950	0.05	500	9900	0.05
200	500	19900	0.025	1000	39800	0.025

In a dense network, where many actors are connected to others, resources flow freely. As a result, actors are more likely to be able to access resources and information within that network. Students in dense networks are therefore more likely to be able to access information from peer supporters than those in sparse networks.

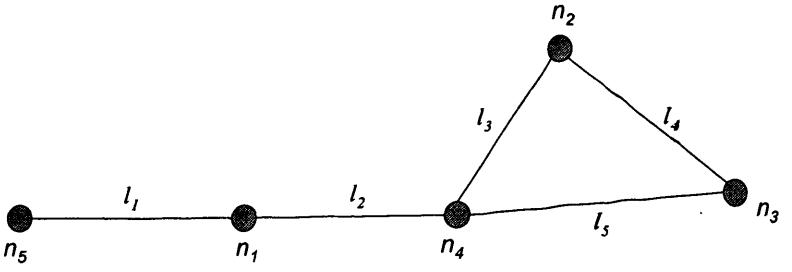
In a *connected network*, every actor is *reachable* from every other actor, even if this if not through direct ties but via a number of other actors. Where this is not the case, the population is comprised of more than one group. In many networks, some nodes and lines are critical for the connectivity of the graph. *Cutpoints* are nodes that if deleted would disconnect the graph. *Bridges* are ties that if removed would disconnect the network. For example, in Figure 15, node n_4 is a cutpoint and line l_2 is a bridge. When considering the diffusion of information, this has significant consequences as information will only be able to reach those who are connected to others in the network, i.e. are reachable (De Nooy et al., 2005). Therefore, reachability matrices can be used to identify the number of students who will not receive

information from the peer supporters through interpersonal communication. Reachability is also related to network size; where size increases, the likelihood that it will be spilt into more than one group increases.

Another related concept is distance which determines the extent to which actors can access others in the network, either to access resources or to act as a resource. Where distance between an actor and a peer supporter is great, it will be harder for them to access information, or for information to diffuse to them from the peer supporter. The shortest path between two actors is termed the *geodesic*. The *geodesic distance* refers to the length of the geodesic. If there is no path between two nodes, they are not reachable and the distance between them is infinite. The longest geodesic in a graph represents the *diameter* of the graph. For the graph used previously in relation to walks, paths and trails, the relevant geodesic distances are shown in Figure 15. *Distance matrices* represent the geodesic distance between all actors in a network.

Figure 15: Geodesic distances and diameter

$d(n_1, n_2) = 2$
$d(n_1, n_3) = 2$
$d(n_1, n_4) = 1$
$d(n_1, n_5) = 1$
$d(n_2, n_3) = 1$
$d(n_2, n_4) = 1$
$d(n_2, n_5) = 3$
$d(n_3, n_4) = 1$
$d(n_3, n_5) = 3$
$d(n_4, n_5) = 2$



Diameter = $d(n_2, n_5)$ and $d(n_3, n_5) = 3$

Therefore, diffusion is likely to be more efficient in highly connected networks i.e. those where all actors are reachable and density is high, and in those networks where actors are close to one another i.e. the diameter is small.

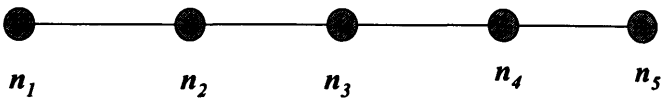
6.1.5.2 Individual cohesion

Some actors within networks are in central or strategic positions and are crucial for the transmission of, or have better access to, for example, information (De Nooy et al., 2005). Measures of individual cohesion can be used to identify individuals in networks who occupy these most central/strategic positions and therefore who are more capable than others of facilitating the diffusion of an innovation i.e. would be good opinion leaders. They can also be used to examine if individuals identified as opinion leaders are in more central/strategic positions in their network than others.

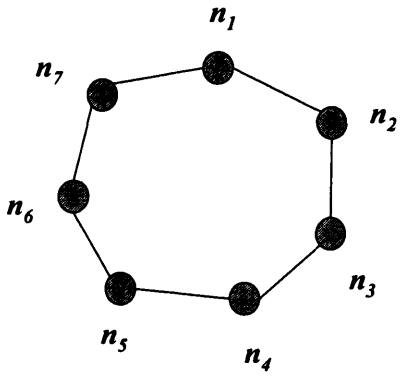
One valuable measure of prominence or importance is centrality. The notion of centrality was introduced by Bavelas in the late 1940's, and numerous studies reported the results of laboratory experiments exploring the notion of centrality around the turn of the decade (for example, Bavelas, 1950; Leavitt, 1951). Over the years a range of centrality measures have been proposed (Scott, 2000; Wasserman & Faust, 1994), but only a few of them are widely used, the main ones being *betweenness*, *degree*, and *closeness centrality* (Freeman, 1979). The association between positional centrality and social power has been documented for many years. However, more recently, the concept within network theory that the most central actor will be the most powerful has been contested (as discussed in Mizruchi & Potts, 1998). These critics suggest that the degree to which centrality determines power is also dependent on the structure of the network. Figure 16 will be used to illustrate the features and applicability of centrality measures to this study.

Centrality is mainly based on dichotomous relations. For non-directed relations, central actors are those involved in many ties. For directed relations, the direction of the tie is also relevant.

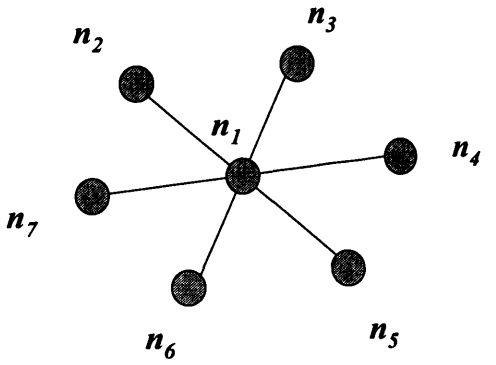
Figure 16: Graphs for the study of centrality



Line graph



Circle graph



Star graph

Degree centrality is the most basic measure of centrality and can be considered a measure of popularity and a measure of the actor's immediate influence (Borgatti, 2005). The *degree* of an actor is the number of nodes to which it is adjacent and is an important index of its potential communication activity (Freeman, 1979). In digraphs, the degree of an actor is divided into two measures: the number of ties an actor makes to others is the *outdegree* and the number of ties made to an actor is the *indegree*. An actor's indegree can be considered a basic measure of structural prestige when the relation is a positive one (such as friendship) and becomes particularly relevant when these ties are not reciprocated (De Nooy et al., 2005). Actors with a high indegree are also in a position to receive a lot of information from others. An actor's outdegree can be used as a measure of how influential the actor can be.

The normalised degree centrality of an actor is the proportion of all nodes that are adjacent to it in the network. This allows measures observed in one network to be compared with those observed in other networks.

Where, C_D = actor degree, and n = network size, $C_D'(x) = \frac{C_D}{n-1}$

Therefore, for Figure 16, the normalised degree centrality measures for actors in each graph are shown in Table 10. For example, all nodes in the circle graph have equal degree centrality, whereas in the star graph, actor n_1 has a significantly higher degree centrality compared to the other nodes in the network.

Table 10: Degree centrality measures for star, line and circle graphs

Graph	n-1	Actor	Actor degree	Normalised degree centrality
Star	6	n_1	6	1
		$n_2, n_3, n_4, n_5, n_6, n_7$	1	0.167
Line	4	n_1, n_5	1	0.25
		n_2, n_3, n_4	2	0.5
Circle	6	$n_1, n_2, n_3, n_4, n_5, n_6, n_7$	2	0.33

Degree centrality measures are therefore useful to identify if the peer supporters have the most social ties and therefore the greatest potential to exert immediate influence (through interpersonal contact) on other students in their year.

Within a network, however, it is unlikely that every actor will be directly connected to every other actor in the network. It is therefore reasonable to examine measures that extend further than these immediate connections and consider the distance between actors. As previously noted, in a communication network, information reaches actors who are closer to the source of information than those who are further away from it. Moreover, information will only reach those who are connected to others in the network.

Closeness centrality focuses on how close to all other actors in the network a particular actor is and is defined as the sum of graph theoretic distances from all other nodes, where distance is the length of the shortest path between actors (Freeman, 1979). Actors with high closeness centrality are therefore good at communicating information to other actors in the network as they have very short communication paths to others (Beauchamp, 1965). As geodesics increase in length, the closeness centrality of an actor decreases. Again, normalised closeness centrality measures allow comparison of measures across networks.

Where, C_C = actor closeness^{-1}, and n = network size, $C_C'(x) = \frac{n-1}{C_C^{-1}}$

Therefore, for Figure 16, the normalised closeness centrality measures for actors in each graph are shown in Table 11.

Table 11: Closeness centrality measures for star, line and circle graphs

Graph	n-1	Actor	Actor closeness^{-1}	Normalised closeness centrality
Star	6	n_1	6	1
		n_2, n_3, n_4, n_5, n_6, n_7	10	0.6
Line	4	n_1, n_5	10	0.4
		n_3	6	0.67
		n_2, n_4	7	0.57
Circle	6	n_1, n_2, n_3, n_4, n_5, n_6, n_7	12	0.5

Since actor n_1 in the star network is connected to every other actor in the network, they are closest to all others, and therefore have the maximum closeness centrality. Conversely, actors n_1 and n_5 have the lowest closeness centrality measure in the line graph as they are farthest away from all other actors in the network.

Therefore, closeness centrality measures can be used to identify if the peer supporters are more capable of exerting not just immediate influence (through direct communication) but also wider influence

(through diffusion from them to other actors via intermediaries) than other actors in the network. Peer supporters with high closeness centrality measures will have an increased ability to successfully communicate an innovation through the population compared to those with low closeness centrality measures.

Betweenness centrality (Freeman, 1977; Freeman, 1979) is defined as the proportion of times node *i* needs node *k* to get to node *j* via the shortest path, i.e. the number of times an actor lies along the shortest path between two others. Actors who lie on paths between two actors are likely to have some control over the interaction between them (Freeman, 1979; Friedkin, 1991). This measure can be calculated for undirected and directed graphs (White & Borgatti, 1994), and in whole networks and ego networks (Everett & Borgatti, 2005). It generally assumes that information travels only along shortest paths (Borgatti, 2005) (which in reality is not always the case), although alternative measures have been proposed such as flow betweenness (Freeman et al., 1991) and random-walk betweenness (Newman, 2005). Again, normalised betweenness centrality measures allow comparison of measures across networks.

Where, C_B = actor betweenness, and n = network size,

$$C_B'(x) = \frac{2C_B}{(n-1)(n-2)}$$

Therefore, for Figure 16, the normalised betweenness centrality measures for actors in each graph are shown in Table 12.

Actor n_1 in the star graph and actor n_3 in the line graph have the highest betweenness centrality measures as they lie on more geodesics than any other actors in their respective networks.

Actors with high betweenness centrality are important intermediaries in communication networks. Therefore, using betweenness centrality measures it is possible to identify which peer supporters in the network are most likely to have some control over the flow of information in a network, or whether those selected as peer supporters are more able to control this flow than those who were not peer supporters.

Table 12: Betweenness centrality measures for star, line and circle graphs

Graph	n-1	Actor	Actor betweenness	Normalised betweenness centrality
Star	6	n_1	15	1
		n_2, n_3, n_4, n_5, n_6, n_7	0	0
Line	4	n_1, n_5	0	0
		n_3	4	0.67
		n_2, n_4	3	0.5
Circle	6	n_1, n_2, n_3, n_4, n_5, n_6, n_7	3	0.2

Centrality measures have been used to explain behaviours, and characterise groups of individuals. For example, boys with high network centrality measures have been characterised as 'Model' (co-operative, studious, leaders) and 'Tough' (anti-social, athletic, cool) (Rodkin et al., 2000). This association of network centrality measures (number of times a participant was named to a social group) with both pro-social and anti-social behaviours has been demonstrated elsewhere amongst 7- and 8-year old children (Gest et al., 2001).

Therefore, peer supporters who have high centrality measures have the potential to be more influential than those with lower centrality measures. From a diffusion point of view, it is therefore important for peer supporters to be sufficiently more central than other actors in the network to facilitate diffusion. This was acknowledged as being an important attribute of opinion leaders in section 4.12.1.1.

6.1.5.3 Group and subgroup cohesion

Social network analysis can be used to give a precise definition to 'social groups' (Alba & Moore, 1978; Frank, 1995; Freeman, 1992; Mokken, 1979; Seidman & Foster, 1978a; Seidman & Foster, 1978b), a term used frequently in the social sciences, often to describe groups of individuals who have little or no overlap, and are linked by regular interaction (Falzon, 2000). In social network terms, these cohesive subgroups are subsets of actors among *"whom there are relatively*

strong, direct, intense, frequent or positive ties" (Wasserman & Faust, 1994, p249). Furthermore, Alba (1973) identifies cohesive subgroups as having more important and frequent relationships among members than between members and non-members.

Cohesive subgroups can be identified by examining a number of different properties of the ties between actors in a network and the resultant groups can differ in size, composition and nature of interaction. Actors need not be confined to one group only and cohesive subgroup analysis often identifies many overlapping groups. This can cause some problems in analysis, although methods can be employed to describe and reduce this overlap (for example, see Everett & Borgatti, 1998). Wasserman and Faust (1994) identify four general network-related properties which drive the identification of cohesive subgroups:

- Mutuality of ties (subgroup members chose each other)
- Closeness or reachability of subgroup members
- Frequency of ties among subgroup members
- Relative frequency of ties among subgroup members compared to non-members

Methods used to identify cohesive subgroups have been a topic of discussion for several decades (see De Nooy et al., 2005; Lankford, 1974; Scott, 2000; Wasserman & Faust, 1994 for further details). A number of different kinds of subgroups which can be obtained from graphs are outlined in Figure 17 below and are discussed briefly in section 6.1.5.3.1.

6.1.5.3.1 Cohesive subgroups

A *component* of a graph is a maximal connected subgraph. Where there are two or more components, the graph is said to be disconnected.

Cliques (Luce & Perry, 1949) are maximal complete subgraphs which contain three or more actors, and in which every actor is connected to every other actor. Cliques are therefore collections *"of actors all of whom 'choose' each other, and there is no other actor in the group who also 'chooses' and is 'chosen' by all of the members of the clique"* (Wasserman & Faust, 1994, p254). Cliques in a graph can overlap i.e. the same actor can be a member of more than one clique but all actors in a network need not be assigned to a clique. This definition of a subgroup is not ideal for identifying clusters in large networks (Freeman, 1996). The rigidity of the clique definition has led to the strict requirements being relaxed (Moody & White, 2003) as shown in Figure 17. The next three subgroups relax the clique rule based on length of path between nodes.

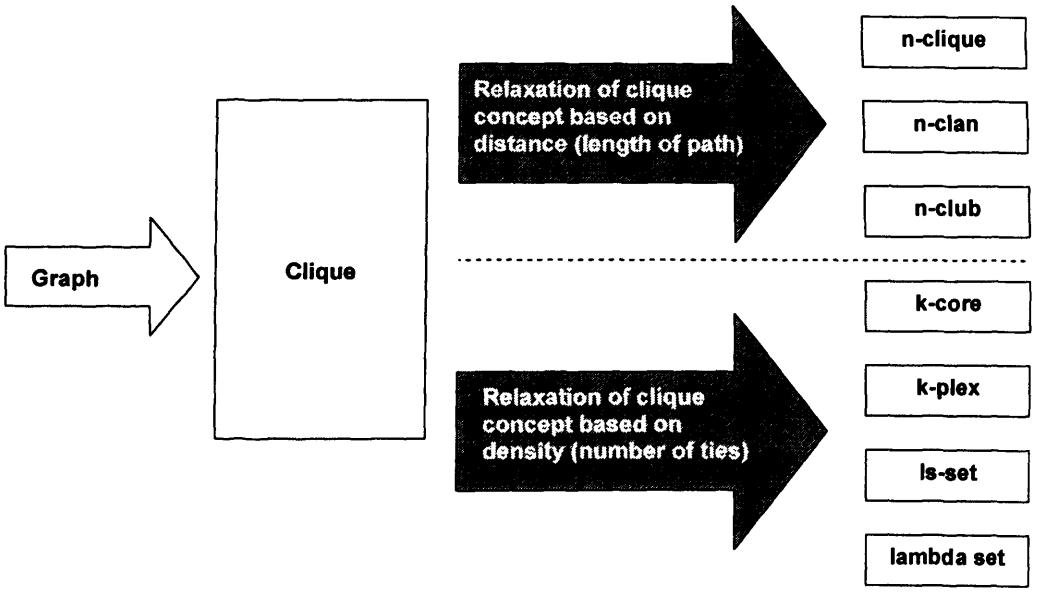
The central premise of *n-cliques* (Alba, 1973; Luce, 1950) is that a maximum length of geodesics is defined by *n*. For example, 2-cliques are overlapping subgroups in which all actors need not be adjacent, but are reachable through at least one intermediary (a geodesic distance of 2). This definition allows actors which lie on the geodesic between two other actors in the clique to lie outside the clique (Alba, 1973). Furthermore, the actors in an n-clique need not be connected.

n-clubs and *n-clans* (Mokken, 1979) are more cohesive than n-cliques. An n-clan is an n-clique whose diameter has been restricted to a specified *n*. An n-club is a maximal subset whose diameter has been restricted to a specified *n*.

The next four subgroups relax the clique rule based on the number of ties between actors i.e. nodal degree (defined in section 6.1.5.2). Another generalisation of a clique is a *k-plex* (Seidman & Foster, 1978a). This is a maximal subgroup where every actor is connected to all but *k* of the actors in the network. As *k* gets larger, each actor is allowed to have more missing lines in the subgroup. K-plexes may overlap.

A *k-core* (Seidman, 1983) is a subgroup in which each actor is adjacent to at least a minimum number, *k*, of the other actors in the subgroup. This produces non-overlapping sub-groups.

Figure 17: Cohesive subgroups in graphs



An *ls-set* is a subgroup defined by comparing the frequency of ties within the sub-group with those outside the subgroup (Seidman, 1983). All ls-sets are non-overlapping.

A lambda set is an extension of ls-sets (Borgatti et al., 1990). These are subgroups where there are more independent paths to other group members than to outsiders. Therefore, removing lines from the subgroups will not necessarily disconnect the subgroups. They are non-overlapping subgroups.

6.1.5.3.2 Methods for identifying cohesive subgroups

Matrix permutation approaches, for example by re-ordering rows and columns within a matrix are a basic technique which can reveal the subgroup structure of the network (see Figure 18).

Given a matrix of proximities i.e. distance between actors, *multi-dimensional scaling* (Kruskal, 1978) enables researchers to display the proximities among actors in a group as co-ordinates of points in *k*-dimensional space. *Factor analysis* (Bonacich, 1972) of a sociomatrix will reveal non-overlapping subsets of actors in a network.

Figure 18: Matrix permutation to identify non-overlapping subgroups

	Frank	Jane	Ann	Sarah	Bill	Kate
Frank	0	1	0	1	0	1
Jane	1	0	1	0	1	0
Ann	0	1	0	1	0	1
Sarah	1	0	1	0	1	0
Bill	0	1	0	1	0	1
Kate	1	0	1	0	1	0

	Jane	Sarah	Kate	Frank	Ann	Bill
Frank	1	1	1	0	0	0
Ann	1	1	1	0	0	0
Bill	1	1	1	0	0	0
Jane	0	0	0	1	1	1
Sarah	0	0	0	1	1	1
Kate	0	0	0	1	1	1

More recently developed tools for cohesive group detection measures include: Frank's (1995) stochastic criterion for identifying non-overlapping cohesive subgroups using a reduced form of the p_1 (Holland & Leinhardt, 1981) and p_1* (Frank & Strauss, 1986) models; Freeman's (1996) model based on the concept of overlapping social network cliques; a variation of this algorithm which determines disjoint groups formed from the union of all overlapping sets represented by the nodes in each layer of the lattice (Falzon, 2000); the segregation matrix index (SMI) (Fershtman, 1997); and the recursive neighbourhood mean (RNM) algorithm for identifying peer groups (Moody, 2001).

The results of subgroup analysis can be interpreted at three levels: the individual level; the subgroup level; and the network level. At the individual level analysis is concerned with determining whether actors belong to more than one subgroup. It also enables different 'types' of actor subgroups, such as isolates, group liaisons, or group members to be identified. At the subgroup level, the characteristics of members of subsets can be determined in order to describe the subsets. At the network level, the number of subgroups, the number of actors in subgroups, and the degree of overlap in subgroups can describe the network as a whole.

In order for successful communication of information within a network, it is essential that it is able to diffuse both within and between subgroups i.e. if opinion leaders are all part of one subgroup which is disconnected from others, information is unlikely, if ever going to find a way to traverse the subgroups through interpersonal communication.

Cohesive subgroup analysis can therefore be used to determine if peer supporters are contained in a range of subgroups in order to maximise diffusion of the innovation.

6.1.6 Network analysis software

Until relatively recently, computational limitations have restricted the analysis which could be conducted in network research, and much work concentrated on networks of less than 100 nodes (Moody, 2001). A number of bespoke packages are now available which can handle these kind of data, for example, Pajek, UCINET (Borgatti et al., 2002), Negopy (Richards, 1989), Kliquefinder©, and GRADAP. See http://www.insna.org/INSNA/soft_inf.html for a comprehensive list of available network analysis software. Furthermore, algorithms for social network analysis have been prepared for statistical packages such as SAS and SPSS.

6.2 Process evaluation

Process evaluation is frequently used to gain comprehensive insight into issues relating to the complexities associated with different settings, mechanisms and contexts (Pawson & Tilley, 1997). This form of evaluation focuses on the process and contextual aspects of the activity, not the outcome, providing an understanding of how a programme operates, how it is conducted, or how it produces the outcomes achieved, and why. Therefore, it does not provide an understanding of what it produces (this is the role of outcome evaluation), but *how* the programme has brought about any changes that have occurred.

Process evaluation can also have other purposes. Firstly, it can have a formative role, providing feedback as an intervention progresses so that changes can be made to improve implementation and therefore

effectiveness (Cunningham et al., 2000; Helitzer et al., 1999). Secondly, detailed scrutiny of the process of an intervention can have a 'quality control' effect that can help to reduce variation in implementation (McGraw et al., 1994), ensuring that, for example, an intervention is delivered consistently across a number of sites.

In particular, this form of evaluation can be employed to explore issues such as: how an intervention is implemented; what it's strengths and weaknesses are; whether the intervention 'reached' all of the target population; the reasons for success or failure, including acceptability and the activities of those involved; and inform changes to successful interventions which will improve their effectiveness and efficiency so they can be repeated with equal or greater success (Nutbeam, 1998). As with the discussion of social network analysis (section 6.1), the following consideration of process evaluations is not a comprehensive exploration of every issue relating to the methodology, but instead it aims to identify elements of relevance to this study.

6.2.1 Methods used to gather data in process evaluations

Qualitative methods are particularly suited to examining the process issues described above as familiarity with all aspects of the intervention and concentrated access to the experiences of multiple participants is required (Murphy et al., 1998). Nevertheless, process evaluations often utilise quantitative methods. Methods frequently used include observation and qualitative or quantitative surveys in the form of qualitative individual and group interviews, and questionnaires. Every intervention depends on several interested groups for its success, each of which may have a legitimate, but different interpretation of events. Therefore, capturing these different views is essential in process evaluation, and is often best achieved using intensive study design such as case studies. A number of methods which can be incorporated into the design of process evaluation are briefly considered below, and their suitability to examine the issues relevant to this study discussed.

6.2.1.1 Observation

Observational methods can be adopted when the phenomenon under study can be observed directly (Bowling, 1997). It involves generating data by becoming immersed in the situation being studied (Mason, 1997) and is used to gain first-hand experience of a research setting. Observation, in general, refers to methods which involve systematic and detailed observation of behaviour and dialogue, and the subsequent recording of this, for example, in field notes, on video or on tape. This method can be undertaken for any reasonable length of time, with a wide variety of participants, and in numerous settings. Since observational study concentrates on examining the actions and interactions of participants as well as the setting in which interventions are conducted, they can be usefully incorporated into process evaluation.

A number of researcher roles can be adopted in observational studies, the use of each which is governed by the setting and subject of interest (Murphy et al., 1998). These have been identified by Gold as: complete participant, participant as observer, observer as participant, and complete observer (see Table 13 for a brief description of each, and Gold (1958) for a comprehensive discussion).

Table 13: Roles adopted in observational studies

Role	Description
Complete participant (participant observation)	Covert observation
Participant as observer (participant observation)	Overt observation where informant is aware of the research
Observer as participant (non-participant observation)	Formal observation for short periods of time in an attempt to undertake one-off interviews
Complete observer (non-participant observation)	Overt observation where observer role is removed from any social interaction with informants

Observation has a number of advantages over other methods (Mays & Pope, 1995a). As the researcher is witnessing actions and processes at first-hand, it avoids discrepancies between what people say and what they actually do. This is particularly relevant when conducting research with young people as in the case of the ASSIST intervention (see section 6.3). Secondly, it can reveal behaviours or practices which participants themselves may not be aware of.

However, gaining access to study sites can be problematic due to suspicion and feelings of threat (Grbich, 1999). Negotiation with gatekeepers may also be required (Bowling, 1997) although in the ASSIST intervention, access to the young people was secured for all aspects of the evaluation prior to the trial commencing. Where the observation being conducted is covert, the researcher will only gain sufficient access if they are accepted as a member of the group prior to the research being undertaken (Berg, 2004; Bowling, 1997). However, considering the nature of the ASSIST intervention it would not be possible for the trainers, or indeed the young people themselves to undertake this role.

Since participant observation would not be relevant in ASSIST, it is necessary to consider issues relating to overt observation. The presence of a researcher conducting overt observation is likely to have an impact on that being studied (The Hawthorne effect) and it will be necessary to try to overcome this. Observer bias is also possible, particularly when only one researcher is involved the interpretation of situations and dialogue. Finally, since this method can be very resource and time intensive it is, by and large, only possible to examine small-scale cultures, therefore limiting generalisability of findings to other populations and settings (Holloway, 1997). However, effort can and should be made to ensure that the observations are representative of the events studied. This can be achieved by spending as long a time as possible in the setting, and by observing as many different aspects of the setting (times, days, informants) as possible (Bowling, 1997). It would therefore be unrealistic to gain insight into issues relating to the

ASSIST intervention from the perspective of a wide range of students (peer supporters and non-peer supporters) using this method alone.

In process evaluation, observational work is ordinarily used to explore issues relating to implementation i.e. fidelity, style and context; participants' reactions to the content and approach of sessions; interaction between and within groups of participants and leaders; and the perceived effect of the intervention on participants. The ability to examine issues relating to *acceptability* of the social diffusion approach using this method is limited. However, it would be possible to gain an insight into the acceptability of the trainer-led sessions (recruitment, training and follow-up sessions) by observing the response of the young people who attend these sessions. The degree to which this could be achieved is dependent on the role the researcher adopts whilst undertaking the observation. Observation of training sessions would best be achieved through participant observation but as previously recognised, this would not be possible. Therefore, the most appropriate and feasible observational method to gather these kind of data is non-participant observation (in the form of complete observer). However, this is not the focus of this study and will not be considered further. Observation is unsuitable to ascertain whether the peer supporters were suitable to adopt the role as it would not enable the collection of in-depth information about opinions and experiences. Observation is therefore limited in the contribution it can make to this study.

6.2.1.2 Surveys

Another method relevant to this study, and which is frequently incorporated into process evaluation is a survey. The term survey can be used to refer to both qualitative and quantitative methods of research. The primary feature of surveys is that they allow the same (or similar, in the case of unstructured surveys) data to be collected from individuals questioned. Quantitative surveys aim to measure attitudes, knowledge and behaviour in an accurate and precise manner (Bowling,

1997). These survey results are extensively used to provide results which are generalisable to a wider population. Qualitative surveys on the other hand are used to ascertain in-depth understandings, experiences, views and perceptions of events and actions.

Information is obtained from surveys by asking questions, either in the form of face-to-face, or telephone interviews, or questionnaires which can be self-administered or administered by post, on disk, or through the internet. Surveys can be conducted once (cross-sectional), or on more than one occasion, maybe spanning a prolonged a period of time (longitudinal). Cross-sectional (or descriptive) surveys obtain (generally retrospective) measurements relating to specific events, behaviours or attitudes. Longitudinal surveys are used to establish cause and effect relationships, for example, to investigate the effect of a new intervention or to study behaviour trends over time. The use of interviews and questionnaires in process evaluation will be considered.

6.2.1.2.1 Questionnaires

Questionnaires used in surveys can be unstructured (qualitative), semi-structured and structured. The nature of the questions used will partly determine the method of administration. For example, telephone surveys and written surveys largely use structured questionnaires, whereas unstructured and semi-structured questionnaires are most likely to be administered in an interview situation. Unstructured and semi-structured questionnaires are considered in section 6.2.1.2.2.

Structured questionnaires include both open-ended questions and forced-choice questions such as yes/no answers, checklist category scales, or rating scales (such as Likert scales which require respondents to indicate their view on a scale ranging from strongly agree to strongly disagree (Likert, 1952)).

There are a number of advantages of structured questionnaires in surveys (Bowling, 1997). They provide a systematic method of collecting information from large numbers of people within a relatively

short timeframe. Questionnaires which include forced-choice responses allow the collection of unambiguous quantitative data which are easier to interpret (using statistical methods) than those using open-ended questions (which collect qualitative data which is usually coded). Questionnaires can therefore be utilised to obtain repeatable objective information on behaviour, attitudes towards an intervention, and experiences of an intervention from numerous respondents at the same time. They are therefore a more suitable method than observation to collect data related to the acceptability of the intervention and the suitability of the peer supporters from the perspective of the young people involved (both peer supporters and non-peer supporters).

Since they are comparably easier to administer than other questionnaires, structured questionnaires are generally more economical and can be administered to larger samples. Thus, they are suitable to obtain the opinions of all the young people involved in the ASSIST intervention. Where face-to-face administration is not possible, for example, due to geographical location, an alternative approach is to administer them by telephone (Berg, 2004; Bowling, 1997). However, in the ASSIST intervention, locality is not sufficiently restrictive to warrant this and compared to face-to-face administration to large groups of students telephone interviews would be hugely labour intensive.

Despite their obvious usefulness, questionnaires also have their disadvantages. Questionnaires which collect data retrospectively are criticised because they are liable to suffer from recall bias. Where forced-choice responses are used, the options provided may not be broad enough to cover all possible responses and there is no scope for respondents to elaborate on answers. Therefore, this method is limited in its scope of enquiry as it has a restricted capacity to explore attitudes and experiences in depth. Nevertheless, the inclusion of open-ended questions gives respondents the opportunity for free thought, and free speech, and consequently to provide more in-depth information.

Questionnaires rely on honest and accurate completion by respondents which can be particularly problematic when used with young people (section 6.3). This is exacerbated where questionnaires

are administered by post or using the internet. When administered in this way there is also no opportunity to correct misunderstandings, no control over the order questions are answered in, and they are generally unsuitable for individuals with poor literacy, or visual impairment (Oppenheim, 1992). Another problem with questionnaire surveys is non-response, particularly to postal questionnaires. However, various strategies can increase response rates to surveys. These are discussed elsewhere (Oppenheim, 1992). Face-to-face administration with planned follow-up therefore generally achieves the highest response rate. In this study it would be necessary to maximise completion rates and accuracy of responses. This provides further support to administer any questionnaires on a face-to-face basis.

6.2.1.2.2 Individual and group interviews

"Interviewing may be defined simply as a conversation with a purpose." (Berg, 2004, p75). Interviews allow respondents to talk freely, providing their opinions and experiences of the topic of interest. The most common type of interview is individual face-to-face dialogue, but the term can also include telephone interviews, and face-to-face group interviewing. Individual and group interviews can be incorporated into process evaluation to explore issues relating to participants' experiences of the intervention, the methods used, the acceptability of the intervention, and perceived usefulness of the intervention, both in terms of direct and indirect benefits to them and others.

Interviews can be brief one-off encounters or comprise multiple lengthy sessions over a prolonged period of time (Fontana & Frey, 1994). Audio recording of the interview, and subsequent transcription of tapes is recommended to accurately retain the spoken content of the interaction (Grbich, 1999). However, this is time consuming and costly and is liable to restrict the number of interviews which are possible.

6.2.1.2.2.1 Individual interviews

Individual interviews can be structured, semi-structured, or unstructured (Berg, 2004; Denzin, 1989; Fontana & Frey, 1994). Details of each approach are considered briefly in Table 14.

Table 14: Interview structure

Structured interviews	Semi-structured interviews	Unstructured interviews
• Most formally structured • No deviation from question order • Wording of each question asked exactly as written • No adjusting of level of language • No clarification or answering of questions about the interview • No additional questions may be added • Similar in format to a pencil-and-paper survey	• More or less structured • Questions may be reordered during the interview • Wording of questions flexible • Level of language may be adjusted • Interviewer may answer questions and make clarification • Interviewer may add or delete probes to interview between subsequent subjects	• Completely unstructured • No set order to any questions • No set wording to any questions • Level of language may be adjusted • Interviewer may answer questions and make clarifications • Interviewer may add or delete questions between interviews

Adapted from Berg (2004, p79)

Unstructured interviews are face-to-face interviews conducted using an interview schedule which contains a list of topics but no set questions, and allow the respondent to tell their personal accounts of the topic or event of interest. When more specific information is required, the schedule is more structured, hence the use of semi-structured interviews (Bowling, 1997). Semi-structured interviews involve asking the respondent a series of predefined questions but the schedule allows the researcher to change the wording and ordering of these questions, and they are able to probe and clarify unclear points of interest.

Structured interviews require the researcher to utilise a formal set of interview questions which are asked of the respondent without deviation from wording or order. This is essentially an oral method of administering a written structured questionnaire (see section 6.2.1.2.1).

6.2.1.2.2.2 Group interviews

"Group interviews are a research technique that takes advantage of group dynamics to produce new and additional data" (Frey & Fontana, 1991, p175). However, there seems to be little consensus in the literature about *what* a group interview truly *is*. Morgan (1996) reports that there are two general viewpoints. One is that most forms of group interviews are treated as types of focus groups while the other is that focus groups are a narrower method which should not be classed as other types of group interview. Nevertheless, most group interviews appear to be termed focus groups. Morgan (1998) suggests that there are a number of occasions when group interviews are not focus groups, namely: when they do not involve research; are not focused; and do not engage in discussions. Frey and Fontana (1991) also identify the focus group as only one of a number of different group interviews which can have a variety of purposes. These purposes include: exploratory, to understand a new or unfamiliar social context; pre-test, to test questionnaire items, or post-test to interpret results; triangulation (see section 6.4); and phenomenological, as a sole data collection tool to gain insight into opinions and attitudes at a different level from that possible through the use of individual interviews. They also distinguish between two styles of interviewing: non-directive where the interviewer asks only enough questions to maintain the discussion; and active interviewing where the interviewer further controls the interview by administering a structured set of questions. The possible group interviews are identified in Table 15 overleaf.

Table 15: Types of group interviews and dimensions

Type	Setting	Role of Interviewer	Question format	Purpose
Focus group	Formal-preset	Directive	Structured	Exploratory, pre-test
Brainstorming	Formal or informal	Nondirective	Very structured	Exploratory
Nominal/Delphi	Formal	Directive	Structured	Pre-test, exploratory
Field, natural	Informal, spontaneous	Moderately nondirective	Very structured	Exploratory, phenomenological
Field, formal	Preset, but in field	Somewhat directive	Semi-structured	Phenomenological

Much discussion surrounding the use of group interviews concentrates on the use of focus groups. Many of the issues raised apply equally to other types of group interviews and will be discussed.

Typically, group interviews are conducted with groups of between four and eight participants. The group interview enables the researcher to gain insight, not only into the content of the interview discussion between participants but also the nature of the relations which exist between participants and how opinions and views are negotiated. Therefore, in addition to audio recording, notes are often taken to record this dynamic. The group dynamics which form during group interviews are seen as being both an asset and a threat to open discussion (Catterall & Maclaren, 1997; Krueger, 1994; Morgan, 1988). Whilst debate within group discussions allows the development of opinions and a group perspective on an issue, group members may influence the formation of these ideas and opinions, responses being different when individuals are exposed to the views and experiences of others. This is especially noticeable if there is a dominant individual present, or if conflict arises within the group (Reed & Payton, 1997). The interviewer should pay attention to this and attempt to ensure that all participants have the opportunity to offer their views. The extent of group interaction may also be influenced by the degree to which individuals have had contact with each other in the past, or if there is a hierarchy (for example, if managers are interviewed with other staff from the same company, or if older students are interviewed with those who

are younger) within the group (Reed & Payton, 1997), which may increase reluctance of individuals to be open about the topic under discussion. Furthermore, this group dynamic can have implications for data analysis.

There are a number of advantages and disadvantages of both the individual and group interview method. Compared to structured interview approaches, both allow probing and clarification of issues raised by the respondent to ensure a coherent narrative. They therefore allow researchers to access substantive content of verbally expressed views, opinions, experiences and attitudes (Berg, 2004). If interested in how issues are negotiated within the group setting, group interviews also enable these negotiations to be observed (Berg, 2004; Wilkinson, 2003). Berg (2004) further suggests that the group context of focus groups reduces the power dichotomy created in individual interviews and creates a level playing field for participants and the investigator.

Compared to individual interviews, group interviews enable a large amount of rich data to be gathered from a number of individuals over a relatively short period of time (Berg, 2004; Cohen & Garrett, 1999; Crabtree et al., 1993; Reed & Payton, 1997; Robinson, 1999). They are therefore comparatively inexpensive and less time consuming to conduct. Consequently, given the financial and time constraints, group interviews would provide an ideal opportunity to conduct an in-depth exploration of peer supporters' opinions on a larger-scale basis than would be possible using individual interviews. Group discussions would be ideal to examine why the peer supporters were suitable or not and provide information on the most important characteristics for them to have, and will provide opportunity to qualitatively explore with the young people involved why the intervention was considered acceptable or not. However, preparation and organisation on the part of the researcher may be extensive (Cohen & Garrett, 1999; Crabtree et al., 1993; Krueger, 1994; Wilkinson, 2003) compared to individual interviews but would be facilitated by schools bearing most of the organisational burden in terms of organising venues and liaising with participants.

It is argued that focus groups are not the most suitable method for exploring controversial and complex issues (Greenbaum, 1998; Morgan, 1988). Some participants may find some topics of discussion unacceptable in the group context (Morgan, 1996). Moreover, they do not offer the same depth of information as individual interviews, in particular because the size of the group does not allow so many issues to be discussed (Berg, 2004; Crabtree et al., 1993; Morgan, 1996). A strategy to provide both breadth and depth of information in this study would be to conduct both individual and group interviews with peer supporters.

Within the individual and group interview situation a number of factors should be considered. Firstly, the researcher is 'part' of the interview process and therefore has an impact on the content of the discussion. The role played by the researcher in individual and group interviews differs and is much more informal in the group situation (Crabtree et al., 1993). Within the group situation the researcher is consequently likely to have less control over the discussion compared to during an individual interview (Krueger, 1994). However, it is recognised that the standardised and controlled interview situation inhibits the respondent's responses resulting in less liberated conversation than in the group situation. The characteristics of the researcher (gender, race, sexuality) all have the potential to influence the outcome of the interview, as do the characteristics of the respondent(s). The nature of the researcher-respondent(s) 'relationship' which is built during the interview will also inevitably affect the dynamics of the interview and how openly and candidly the respondent(s) is/are willing to converse with the interviewer (Patton, 2002; Steinar, 1996). Finally, it should also be acknowledged that within the interview context, subjects do not necessarily "know all" or "tell all". Since interviews are generally conducted with a small sample of respondents (compared to questionnaire surveys, see section 6.2.1.2.1), the responses provided in the interview context are not necessarily a true depiction of the opinions of the whole population. Therefore, the possibility of using this method

in addition to a questionnaire survey should be considered for this study.

6.3 Research with young people

In order to gain access to the thoughts, ideas, beliefs and activities of the young people involved in ASSIST, this study will require the collection of data from the young people themselves. This is important so as to obtain direct explanations and understandings about issues and events from their perspective (Lewis, 2004). It is therefore necessary to consider the ways in which research with this group differs (if at all) to research with adults, and the factors that should be taken into consideration when using some of the relevant methods described in sections 6.1 and 6.2.

A number of issues relating to conducting research with children and young people are raised in the book edited by Fraser and colleagues (2004). Further guidelines on research with young people are also available in a number of other documents (for example, Kirby, 2004; Laws & Mann, 2004). These sources will form the basis of the following brief discussion which will, in particular, consider young people as informants, not young people as researchers.

Research with young people raises ethical and legal issues about the rights of children and young people, and the obligations of researchers (Alderson, 2004; Laws & Mann, 2004; Masson, 2004). The legal aspects of children's involvement is dictated by the Children Act 1989 (HMSO, 1989). The ethical aspects of research with young people will only be considered briefly here.

Gatekeepers will usually control access to young people participating in research, and researchers will frequently be asked to justify their research in terms of the importance of young people being involved and how the risks and inconvenience of being involved will be minimised (Masson, 2004). In the case of school-based research, these gatekeepers will generally be teachers who can control access at the

level of the school and the student. Even if access is obtained they remain relatively in control of researchers' activities, allowing access when and where is most convenient in terms of timetables and their own commitments.

Unlike research with adults, which ordinarily requires the consent of the person participating, research with young people often requires the prior consent of someone who has parental responsibility for the young person in addition to their own assent (young person's positive agreement to participate in research). In this situation, the researcher must provide the parent/carer with sufficient information to allow them to decide to allow their child to participate. This is a substantial and complicated literature and is considered in further detail by numerous authors (for example, Alderson, 2004; France, 2004; Laws & Mann, 2004; Masson, 2004). In order to ask young people to provide informed consent to participate in research, they should be provided with comprehensible information about the nature of the commitment to participate (including their rights as respondents) and understand this commitment and the purpose of the research. They should also be clear that the information is being collected to gain understanding, and have been given the opportunity to refuse participation (Laws & Mann, 2004; Masson, 2004).

When choosing research methods to use with young people, the potential for distress should be minimised. For example, Laws and Mann (2004) suggest that in some cases, it may be more appropriate to conduct paired or group interviews than ask them to participate in individual interviews (see also Table 17). However, group interviews with young people can be challenging. Furthermore, researchers should be aware that young people might experience upset when talking about particularly sensitive or distressing experiences. For ethical reasons, it may not be possible to guarantee young people the same degree of confidentiality as adults. Whilst conducting research with young people, researchers may encounter the need to break confidentiality agreements, for example, if the research uncovers child protection issues relating to the young person such as abuse, or medical

conditions which parents should be aware of. As a consequence, interviewees may require information on support agencies and thus interviewers may also require assistance (Masson, 2004). Other child protection issues relate to ensuring the appropriate behaviour of the researcher towards the young person and checking the suitability of researchers for working with young people (Laws & Mann, 2004). In conducting research about the suitability of the peer supporters and the acceptability of the ASSIST approach, it is unlikely that the young people would experience distress or reveal issues relating to child protection. However, the possibility should be borne in mind. The opportunity to minimise the distress of engaging in the research process by conducting group or paired interviews should be considered. In the UK it is a legal requirement that individuals who have contact with children and young people through their work should undergo Criminal Records Bureau clearance and will be required in this study.

There is considerable debate about the ways in which the practicalities of conducting research with children and young people, and the choice of research methods themselves differ to those used with adults. Punch (2002) argues that there *are* differences and summarises them as shown in Table 16. However, in considering that children are often viewed as the same as adults, she questions the need for methods to be different and asks *"if children are competent social actors, why are special 'child-friendly' methods needed to communicate with them?* (Punch, 2002, p321).

Table 16: What is different in research with children and why?

Research issue	What is different?	Why?
Not to impose researcher's own perceptions	As adults we have all been children, so think we know about childhood, but we see the world and our own childhood from an adult perspective	b) Adult: danger of imposing adult views because of our assumptions about childhood c) Children may have a different way of viewing the world
Issues of validity/reliability: subjects may exaggerate or lie to please the researcher	Children are potentially more vulnerable to unequal power relationships in research	a) Childhood: children are used to having to try and please adults, and may fear adult reactions b) Adults are used to controlling children, and in some cases, abusing their power
Clarity of language	More conscious use of language	b) Adult perceptions of children's lack of articulateness c) Children (particularly younger): may have limited vocabulary and use different language
Research context and setting	Many research environments are adult spaces where children have less control	a) Childhood: adult spaces dominate in society so it can be difficult to find child spaces in which to conduct research b) Adults assume that children would prefer their own spaces

Table 16: What is different in research with children and why cont.

Research issue	What is different?	Why?
Building rapport	Adults may lack experience of building rapport with children	a) Childhood: children's status in adult society means that researchers have to build rapport not only with children but also with adult gatekeepers b) Adult: fears of not being patronizing, behaving appropriately, and finding common ground but not faking
Analysis: care not to impose inappropriate interpretations	Ultimately the power lies with the adult researcher to interpret children's perspectives	a) Childhood: children's generational position tends to mean that an adult has access to wider knowledge to be more able to analyse children's social status b) Adult: danger of imposing adult interpretations because of our assumptions about childhood c) Children may not fully understand the adult world
Using appropriate research methods: attempts to use the research subjects' preferred methods, and familiar sources or techniques	More attempts to make research fun with children and to tap into their interests: for example, use of photographs or drawings	a) Childhood: children tend to lack experience of adults treating them as equal and may lack confidence in a one-to-one situation with unfamiliar adults b) Adults: presume children prefer these methods, are more competent at them, and that they have a shorter attention span c) Children: are more used to visual and written techniques at school and may have different competencies. Younger children may have a more limited concentration span

a) childhood constrained by adult society b) adult perceptions of children as different c) children are different to adults

Taken from Punch (2002, p326)

A number of research techniques have been used successfully with children and young people, including individual and group interviews, using stimuli (stories, objects, photos, pictures, newspapers, puppets), using visual techniques (mapping, 'draw and write', photos) and using creative methods (video, theatre and artwork) (Alderson, 2004; Fraser, 2004; Laws & Mann, 2004). However, it should be recognised that young people are not generally used to interacting with adults on a one-to-one basis and may lack the confidence to communicate in this capacity (Punch, 2002). This has been raised as a particular issue amongst children who may be likely to remain silent, answer questions in monosyllables or with "I don't know" (Mauthner, 1997). This suggests that more interactive methods may be more appropriate in some cases. However, a number of those identified above are more relevant to younger children while others are more appropriate for those in older age categories.

Two promising methods to collect social network data and process data from the young people involved in the ASSIST intervention have been identified as written questionnaires, and interviews. These have been used successfully with adolescents but a number of issues pertaining to their use should be considered. These are outlined in Table 17.

Of particular importance in questionnaires and individual and group interviews, is the need for the young person to have the vocabulary and conceptions capable of relating to the context of the research. In turn, the researcher must also have the vocabulary and conceptions that relate to those of the young person (Fraser, 2004). It will therefore be necessary to use language appropriate to the young people involved. Furthermore, the limited attention span of young people (Punch, 2002) suggests that the use of long scales in questionnaires is inappropriate (Kellett & Ding, 2004).

Table 17: Problems of research with young people

Method	Issues of use with young people
Questionnaires	• May be less successful where literacy is poor • Children and young people tend to lose interest where long scales are used • Be aware of the need to use appropriate language • Young people may be liable to provide socially acceptable answers or 'lie'
Individual interviews	• May not be happy about being interviewed on individual basis • Power imbalance between adult interviewers and the young person may make them uncomfortable • Be aware of the need to use appropriate language • Rapport may not develop between interviewer and interviewee in the same way it would with an adult • Interview setting should be appropriate in terms of access, familiarity • Young people may be liable to provide socially acceptable answers or 'lie'
Group interviews	• Young people may be happier being interviewed in groups than on an individual basis and can gain confidence in the group situation since there are others present • May be more comfortable if groups are conducted with young people who know each other. Different dynamics exist where they do not know other participants • Can be especially challenging with young people • Power imbalance between adult interviewers and the young people may make them uncomfortable • Be aware of the need to use appropriate language • Rapport may not develop between interviewer and interviewees in the same way it would with adults • Interview setting should be appropriate in terms of access and familiarity • Young people may be liable to provide socially acceptable answers or 'lie'

In general, researchers should be aware of and make efforts to redress the power dichotomy which exists when adults research young people, and which is largely due to the generational gap and knowledge gap between these groups (Robinson & Kellett, 2004). However, involving young people and giving them a voice can also help rectify power imbalances (Kirby, 2004). In particular, where research is conducted in the school setting it will be important to avoid being seen as a teacher (Kellett & Ding, 2004). This may be easier to achieve in an interview setting than when administering questionnaires to a large group of students in a classroom or large group setting.

It will also be essential to consider a number of other issues. Firstly, since these methods are all dependent on self-report, there is no guarantee that respondents are being honest. This can be encouraged in this study by face-to-face administration of questionnaires and assuring the young people that their answers are confidential and will not be divulged to any third party. Secondly, the setting in which these data, in particular, interview data are collected is important to consider. However, it should be acknowledged that where data is collected in the school setting, it may not be possible to make precise stipulations regarding the type of room required as schools are generally limited in space and are likely to assign rooms at their convenience.

It should also be noted that gender issues are also relevant to research with young people. For example, Pattman and Kehily (2004) acknowledge that it may be harder for female researchers to engage with groups of young female respondents than it is for male researchers to engage with young men. Furthermore, "*single sex groups can be more successful than mixed ones where boys who often talk more, more loudly and determine the conversation tend to overshadow girls*" (Mauthner, 1997, p23). They also describe how young men may behave differently in individual interviews to when interviewed in a mixed sex group and suggest that where mixed sex group interviews are conducted, they should be conducted with small numbers of young people.

6.4 Using multiple methods

Within research in general (not just process evaluation) it is recognised that different methods provide different views of the issue under study (Berg, 2004). Moreover, each research method has it's weaknesses and is subject to different biases, a number of which have been identified. It is argued that if different methods elicit the same results, a 'true' picture of events or a situation will be reported. Therefore, it is argued that 'triangulation' strengthens research and enhances the validity of findings. Triangulation not only refers to the use of multiple methods, but also multiple researchers, respondents and data collection points. Denzin (1989) argues that triangulation avoids personal biases which result from individual methodologies. Furthermore, combining methods and researchers can overcome the deficiencies of using only one and increases the depth of understanding an investigation can produce (Miles & Huberman, 1983). However, researchers should be aware that whilst this strategy is generally supported, it is also possible that triangulated methods may produce incorrect but corroborating evidence (Hammersley & Atkinson, 1995).

6.5 Summary

Two research methodologies have been identified as particularly appropriate to address the aims of this study. These are social network analysis and process evaluation.

Social network analysis is the most direct way of studying social networks and social structures. Measures of network cohesion can contribute to identifying networks in which the diffusion of innovations may be more successful than in others. Furthermore, measures of individual-level cohesion can be used to identify individuals who may be more successful in facilitating diffusion i.e. acting as peer supporters. Cohesive subgroup analysis can be used to examine whether peer supporters were contained in a range of friendship groups, maximising

their ability to diffuse the smoke-free message through the whole population. A number of routines have been implemented in bespoke network analysis software packages to enable these analyses.

Process evaluation enables researchers to gain insight into the how?, why? and for whom? questions which outcome evaluation fails to answer. Using methods such as observation, and qualitative and quantitative surveys, process evaluation provides comprehensive insight into the process by which each stage of an intervention is conducted from the perspective of researchers and other interested parties. Each of these methods has its particular uses, advantages and disadvantages and therefore plays a different role in evaluation. However, the use of a number of different methods, respondents and data collection points is considered a pertinent approach to strengthening research. Of particular relevance to this study is the use of qualitative and quantitative surveys. Structured questionnaire surveys are able to provide objective information relating to the suitability of the peer supporters and insight into the acceptability of this approach to the young people involved. Since individual and group interviews allow a more in-depth consideration of issues of interest, these methods are more able to provide reasons for suitability and acceptability. In designing and implementing these tools with young people, it is necessary to consider a number of ethical and practical issues which make research different to that conducted with adults.

Chapter 7 will discuss the collection of these data during the evaluation of the ASSIST intervention, and their use in the current study.

~ CHAPTER 7~

7 A STOP SMOKING IN SCHOOLS TRIAL (ASSIST)

The promising results from Bloor's feasibility study resulted in the funding of a full-scale evaluation of the peer-led smoking prevention intervention. The ASSIST intervention has been described in chapter 5. Therefore, this chapter will consider the evaluation methods used and the data collected. It will then describe in detail the design of the data collection methods used to address the research questions in this study. Finally, it will consider the analysis methods adopted.

7.1 Study design

The lack of comprehensive evaluation of schools-based and peer-led interventions has been noted in chapters 3 and 4. The literature is clear that there is a dearth of large-scale, rigorously conducted evaluations with long-term follow-up. Therefore, the ASSIST intervention was evaluated in 59 schools using a randomised controlled trial design with two-year follow-up. The trial was conducted by research teams at Cardiff University and the University of Bristol.

It also acknowledged that there is a paucity of evaluations which examine the *process* of peer-led interventions. Whilst the randomised controlled trial (RCT) is seen as the 'gold standard' evaluation approach, the complexity of health promotion interventions has prompted debate about the appropriateness of trials for evaluating such initiatives. Efficacy trials measure the effectiveness of interventions under standardised, 'ideal' conditions (Roland & Torgerson, 1998). It is argued that they are unsuitable for evaluating health promotion interventions because they require standardisation of interventions (World Health Organisation, 1998a), which, within the field of health promotion is neither feasible nor desirable. Furthermore, they ignore

contextual issues associated with these interventions (Oakley, 1998). It is also argued that such trials may also produce misleading results (World Health Organisation, 1998a), particularly since outcomes are likely to differ when interventions are implemented under 'real world' conditions (Resnicow & Botvin, 1993) as shown in the smoking education initiative conducted by Nutbeam and colleagues (1993) (section 3.3.2.2.4).

The tension between the demands for scientific rigour and the need to achieve results reproducible in the 'real world' can be addressed using pragmatic RCTs (Medical Research Council, 2000). These evaluate interventions as they would be delivered in practice where variations in participants, context, delivery and receipt will be inevitable (Flay, 1986; Roland & Torgerson, 1998). Whilst they relinquish some of the standardisation of the efficacy trial, they provide a more realistic evaluation of interventions as they might be conducted in the 'real world', thus producing more convincing and generalisable evidence of effectiveness (Hawe et al., 2004).

The complexity of the ASSIST intervention and the diverse nature of the individuals (for example, students, trainers) and schools involved meant that it was neither desirable nor feasible to conduct an efficacy trial and evaluate the intervention under 'clinical' conditions. The evaluation of the ASSIST intervention therefore adopted a pragmatic cluster RCT design

Both efficacy trials and pragmatic RCTs often adopt a 'black box' approach to evaluation (Wight & Osabi, 2003), allowing the intervention to take its course and focussing on outcome measures to test effectiveness, while ignoring process. However, combining process and outcome evaluation will generally strengthen evaluation (Strange et al., 2001; Wight & Osabi, 2003) as the strengths of one method will complement the weaknesses of another. Therefore, the mixing of these evaluative approaches in this way should be seen as good practice in the evaluation of health promotion interventions (Greene et al., 2001; Hearn et al., 2003; Pope & Mays, 1995; Rogers & Nicolaas, 1998).

The value of process evaluation can be practically illustrated using the UK evaluations of the ASSIST approach in the field of sexual health (Elford et al., 2001; Elford et al., 2002b; Flowers et al., 2002; Williamson et al., 2001) as examples. The outcome evaluations found no impact of the intervention on behavioural outcomes and raised concerns regarding the transferability of Kelly's model from small towns to lager metropolitan areas. The process evaluations of these interventions successfully provided some reasons for this (Elford et al., 2002c; Hart, 1998) (see section 4.14).

In ASSIST, this intervention was applied not only to a different target population in a different setting, but also to a different health behaviour. Therefore, the trial incorporated elements of evaluation which aimed to provide insight into what worked well for whom and in what context (Pawson & Tilley, 1997); how the intervention was implemented in practice; what variability occurred and why; and how and why the intervention may or may not transfer into this field. These were a comprehensive integral process evaluation and an analysis of the students' social networks. Each aspect of the evaluation and the resultant data will be discussed

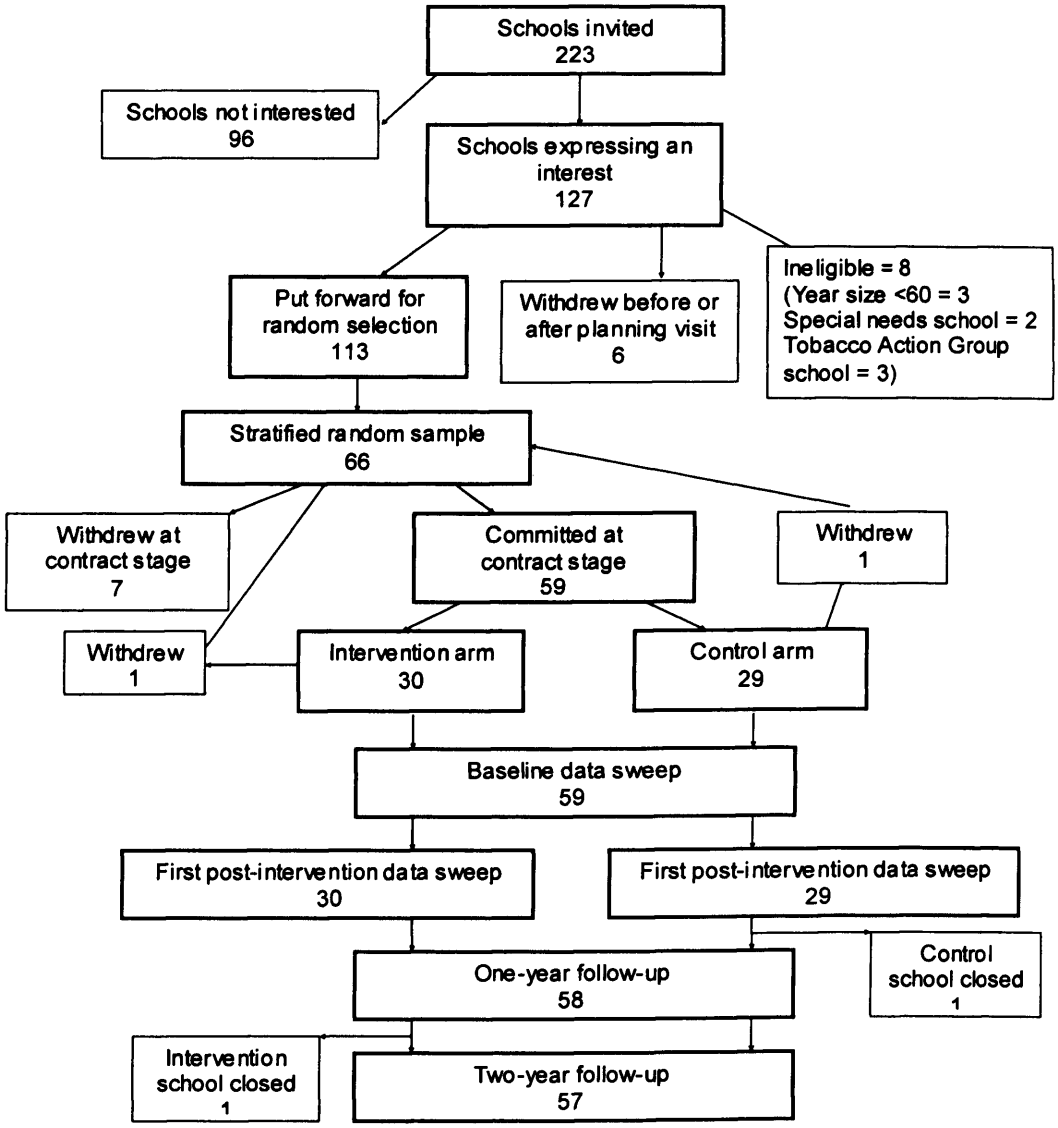
7.1.1 School recruitment and retention

Two hundred and twenty three schools were invited to be involved in the trial, and an eventual 66 schools were randomly selected from 113 who were interested and eligible to participate. Reasons for non-participation are included in Appendix 7 but the main reasons were the time commitment entailed, involvement in other research, and concerns about parental reaction to covering the issue of smoking in school. Schools with less than 60 students in year 8, special needs schools, or schools already involved in intensive tobacco initiatives such as Tobacco Action Groups and Smoke-free class with the target group were excluded from selection. Fifty nine of these 66 schools agreed to take part in the study. These schools were allocated into the control or

intervention arm of the trial (see Figure 19) using stratified randomisation (Starkey et al., 2005). Thirty of the 59 schools involved were allocated to the intervention arm whilst 29 schools acted as the control group. All schools were asked explicity not to change the content of their PSHE/PSE curriculum or involvement in smoking education initiatives in any way as a consequence of their trial status Control schools were asked to carry on with their usual smoking education provision for the duration of the trial. In addition to their usual smoking education, intervention schools received the peer-led smoking intervention. A wide range of schools participated in ASSIST, including single sex, private (fee-paying), Welsh medium, denominational, and urban and Welsh valleys locations with varying degrees of social deprivation. However, the majority were state-funded, co-educational schools.

A mentioned in relation to the development of the intervention, (section 5.1.2), it was necessary to carry out a pilot study prior to the main trial commencing in 2001. This was conducted in three schools outside the final trial area and ensured that the intervention, process evaluation and outcome evaluation of the trial was piloted. Difficulties in the administration of data collection tools were assessed, and the design, contents and methods of administration amended accordingly.

Figure 19: School recruitment, randomisation and retention



7.1.2 Study timetable

The evaluation of the ASSIST intervention was carried out between September 2001 and May 2004. Table 18 outlines the timing of the pilot study, the main trial datasweeps, and the data collected at each stage.

Table 18: Timing of ASSIST evaluation activities

Datasweep	Timing	Activities completed
Pilot study	May 2001-July 2001	(Peer nomination process) Behavioural questionnaire administration Saliva collection for cotinine validation Process evaluation data collection
Baseline	Sept 2001-April 2002	(Peer nomination process) Behavioural questionnaire administration Saliva collection for cotinine validation Process evaluation data collection
First post-intervention	May 2002-July 2002	Behavioural questionnaire administration Saliva collection for cotinine validation Process evaluation data collection Social networks data collection
Second post-intervention (one-year follow-up)	Sept 2002-May 2003	Behavioural questionnaire administration Saliva collection for cotinine validation Process evaluation data collection Social networks data collection
Third post-intervention (two-year follow-up)	Sept 2003-May 2004	Behavioural questionnaire administration Saliva collection for cotinine validation Process evaluation data collection Social networks data collection

7.1.3 Consent

Parental consent to participate in the trial was obtained through letters sent to the parents or carers of every Year 8 student in each school. Because of data protection issues, these letters were posted to the homes of students by the school. It was also thought this would be more reliable than sending letters home with students themselves. An 'opt out' consent system was adopted whereby parents/carers returned a consent form only if they *did not* wish their child to participate in the trial. Students who were granted permission to take part were subsequently asked to provide assent prior to completing the study activities at the baseline datasweep. The same process was carried out

for students who were new to the study cohort at the second and third post-intervention datasweeps.

7.1.4 Outcome measures

Based on the effects observed in the feasibility study which demonstrated a significant impact of the intervention on the propensity of self-reported ex-smokers to resume smoking at three month follow-up, the primary outcome measure was weekly smoking prevalence in the 'high-risk' group, defined as those who had experimented with cigarettes, were ex-smokers or occasional smokers at baseline. A secondary outcome measure was weekly smoking prevalence across the whole year. Weekly smoking was used instead of daily smoking as daily smoking remains relatively rare amongst 14-15 year olds, and weekly smoking amongst adolescents is a strong risk factor smoking amongst adults. Thus, this outcome measure ensured the trial 80 per cent power to detect a 5.8 per cent difference in weekly smoking among the high-risk group (Starkey et al., 2005).

To allow the results of ASSIST to be compared with other studies, a number of questions incorporated into the behavioural questionnaire, including questions relating to these outcome measures were taken from large-scale surveys such as the ONS surveys for young people in England (see, for example, Fuller, 2005) and the World Health Organisation's Health Behaviour of School-Aged Children (HBSC) Study (Currie et al., 2004). Outcome measures remained constant in each behavioural questionnaire. However, substantial amounts of other data were collected at each of the four datasweeps. These data included: future smoking intentions, ethnicity, smoking behaviour of friends and co-residents, parental approval of smoking, opinions about smoking, alcohol intake, socioeconomic status and self-esteem. Where possible, additional questions had previously been used and validated.

Outcome measures were validated by salivary cotinine (a metabolite of nicotine) measures collected at each datasweep (Starkey et al., 2005). Salivary cotinine has been found to be the most reliable, and suitable biomarker of exposure to tobacco smoke in the previous 72 hours (Dolcini et al., 2003; Rebagliato, 2002; Velicer et al., 1992). The relatively long half-life of cotinine makes it particularly useful when respondents are less than regular smokers. These measures were taken to minimise the extent of reporting bias (Murray & Perry, 1987).

7.1.5 Data collection

Data were collected at baseline, immediately post-intervention and at one- and two-year follow-up as shown in Table 18. These data were collected in the school setting in either classrooms or large venues such as school halls and dining rooms. It was usual for the entire school year to be involved at the same time. Data collections were conducted by the ASSIST research team although the non-participatory presence of school staff was requested, mainly for disciplinary reasons.

The rationale behind the trial, and the purpose of the data collection was explained to students at the start of each session. They were then talked through each aspect of the data collection procedure by the ASSIST team member, and assured that the data they provided was confidential and would only be seen by the university staff and no-one else. They were also advised that identification numbers on the questionnaires were used instead of their names, and reassured that only the research team were able to link these numbers with their names.

Response rates were maximised by returning to each school within two weeks of the main data collection to collect data from students previously absent. This approach was adopted at baseline, and the second and third post-intervention datasweeps. At the first post-intervention datasweep, questionnaires were left with school staff who arranged for them to be completed and returned by freepost to the

study team. School staff were not expected to ask students to provide saliva samples due to the difficulties of returning these samples to the universities. Therefore, data collected via this method does not include validated outcome measures. This approach also provided a lower response rate than returning to the school and was not used again.

7.1.6 Other elements of evaluation

7.1.6.1 The ASSIST process evaluation

Whilst the outcome evaluation can demonstrate if the intervention has been successful, it cannot provide illumination into the complexities of what worked well, what did not, and in what context (Pawson & Tilley, 1997). This has been a criticism of previous research into the effectiveness of school-based and peer-led interventions (for example, Harden et al., 1999). With the increasing complexity of these interventions, along with the possibility that they may be conducted across multiple locations, at multiple levels and for multiple audiences, the value of integral process evaluation is increasingly acknowledged (Harden et al., 1999; Hearn et al., 2003; Linnan & Steckler, 2002; McGraw et al., 1994; Nutbeam, 1998; Parry-Langdon et al., 2003; Springett, 1998; Wimbush & Watson, 2000). Therefore, a comprehensive integral process evaluation was incorporated into the design of the ASSIST evaluation.

The ASSIST process evaluation adopted a broad scope of enquiry and set out to answer the key questions for 'rolling out' the intervention. The main aims of the process evaluation were to examine the implementation, receipt and intensity of each stage of the trial (both the datasweeps and the intervention), and identify factors external to the intervention which might impact upon its success. The main objectives were to provide ongoing monitoring over time and provide snapshots at various time points throughout the study (Audrey et al.,

2006b). Both qualitative and quantitative data were collected from key participants at each stage of the intervention using a range of methods.

7.1.6.1.1 Design of the process evaluation

The ASSIST process evaluation was developed by a sub-group of the research team which also oversaw data collection and analysis. As previously discussed, a number of process evaluation tools were piloted alongside outcome evaluation tools and the intervention prior to commencing the full-scale trial allowing these tools to be refined where necessary.

Table 19: Characteristics of 'in-depth' process evaluation schools

South Wales		West of England	
Control	**Intervention**	**Control**	**Intervention**
260 Year 8 students 8.3% free school meal entitlement	250 Year 8 students 4.8% free school meal entitlement	209 Year 8 students 23.9% free school meal entitlement	240 Year 8 students 21.8% free school meal entitlement
116 Year 8 students 26.1% free school meal entitlement	140 Year 8 students 25.9% free school meal entitlement	165 Year 8 students 6% free school meal entitlement	170 Year 8 students 6% free school meal entitlement

Due to time and resource constraints, and a desire not to overburden respondents, two levels of process evaluation were conducted: a process evaluation carried out in all trial schools and an in-depth study carried out in eight purposively selected schools (four control schools and four intervention schools). These schools were selected on the basis of three criteria; size (<200, or ≥200 students in Year 8); location (England or Wales) and high or low deprivation (based on free-school meal entitlement). Appendix 8 details the selection process used to identify schools. This used data provided by schools prior to the trial commencing and which was also used during the randomisation procedure. In order that in-depth process evaluation schools were

representative of the majority of schools included in the trial, Welsh medium and independent schools were excluded from the selection process. The characteristics on which the eight in-depth process evaluation schools were selected are provided in Table 19.

7.1.6.1.2 Data collection

Process evaluation data were collected at various key points throughout the evaluation of the intervention. Data collection began at a two-day training session where the trainers who were to deliver the training and follow-up sessions to the young people were trained to do so, and finished at the third post-intervention datasweep (see Table 20). All data collection was initiated and carried out by two researchers; one at the University of Bristol and myself at Cardiff University.

The design of the process evaluation recognised the importance of using multiple methods to collect data from a range of respondents. A variety of qualitative and quantitative research methods (observation, individual and group interviews, and questionnaires) were used to obtain process evaluation data from a range of individuals who were involved in the trial (students, teachers, trainers and researchers). Mirroring questions across a range of respondents allowed different opinions about the same issue to be sought from various perspectives. Using multiple methods to explore the same issue allowed comparison of results from these different sources. The data collection methods used with each respondent are comprehensively documented elsewhere (Audrey et al., 2003).

In all schools involved in the trial, data were collected (though the media, websites and local health promotion agencies) regarding context and external influences which might impact on the study in some way. In addition, contextual differences relating to school policies and practices were gathered from teachers and students in the study cohort who were asked about their experiences and understanding of, and

attitudes towards school smoking policies in self-complete questionnaires completed at the first, third and fourth datasweep.

In all intervention schools, additional process data were collected at each stage of the intervention (recruitment, training and the four follow-up sessions) from school staff and trainers who completed evaluation questionnaires on which they were asked to comment on the relevant session.

Individual interviews were conducted with all students who did not act as peer supporters when invited, or who 'dropped out' at some stage throughout the intervention. Post-intervention individual interviews were also conducted with the trainers who delivered the training and follow-up sessions to the young people.

Significantly more data were collected in intervention schools which acted as in-depth process evaluation schools. Non-participant observation of the recruitment, training and follow-up sessions was carried out by the two researchers who conducted the process evaluation. Individual interviews were also completed with school staff contacts and/or other relevant school staff such as PSHE/PSE co-ordinators or the Head of Year 8 prior to intervention delivery and after the final follow-up session had been conducted in their school. In addition, individual and group interviews were carried out with students who had acted as peer supporters and individual interviews were conducted with a sample of students who reported in their first post-intervention questionnaire that they had spoken to a peer supporter about smoking.

Additional data collected in the four in-depth control schools comprised individual interviews with key staff regarding the perceived effect of carrying out data collection in the school and the value of peer-led health promotion.

Table 20: Process data collection: key stages and methods in intervention schools

Outcome data collection sweeps	Stage of the intervention	Key process information	Process data collection methods
N/A	Training the trainers	▪ General arrangements at each stage (venue, timing, staff ratios etc) ▪ Whether stated aims and objectives were met ▪ Variations in content and style of delivery ▪ Interactions between participants ▪ Response of participants ▪ Issues/concerns raised ▪ Extent to which peer supporters were carrying out their role ▪ Understanding of/attitudes towards school smoking policies and practices	▪ Non-participant observation* ▪ Self-complete questionnaires (peer supporters, health promotion trainers, school staff)
Baseline	Peer nomination		
	Peer supporter recruitment		
	Peer supporter training		
	Follow-up sessions		
	Presentation of certificates and vouchers		
First post-intervention	N/A	▪ Extent to which peer supporters carried out their role ▪ Understanding of/opinions about the intervention ▪ Perceived impact of the intervention ▪ Awareness of intervention, contact with peer supporters, opinions regarding intervention	▪ Post-intervention individual interviews* (peer supporters, school staff, other Year 8 students) ▪ Group interviews* (peer supporters) ▪ Post-intervention individual interviews (health promotion trainers ▪ Self complete questionnaires (Year 8 students in intervention schools only)
Second post-intervention (one-year follow-up)	N/A	▪ Peer supporters' longer-term views of the intervention ▪ Understanding of/attitudes towards school smoking policies and practices	▪ Group interviews* (peer supporters) ▪ Self complete questionnaires (Year 9 students, school staff)
Third post-intervention (two-year follow-up)	N/A	▪ Understanding of/attitudes towards school smoking policies and practices	▪ Self complete questionnaires (Year 10 students, school staff)

NB * indicates methods used only in schools where the 'in-depth' process evaluation was conducted

7.1.6.2 Economic evaluation

An economic evaluation to identify costs and effects was conducted alongside other evaluation activities. In the case of ASSIST, a costs and consequences analysis; the most frequently used form of economic evaluation in health care (Pritchard, 1998) was conducted.

The aim of this analysis was to estimate the cost of replicating the intervention elsewhere and excluded all costs associated with evaluation activities. Resources costed into the analysis included peer supporter time, staff time, travel time and distance, equipment, consumables, accommodation and vouchers given to each peer supporter who completed a diary. The amount of each resource used in each school at each phase of the intervention was recorded by ASSIST staff on forms developed by the ASSIST evaluation team.

7.1.7 Additional data collected

7.1.7.1 Evaluation of school social networks

The opportunity and importance of collecting social network data alongside outcome evaluation data was realised following the baseline datasweep. Since this was an additional part of research, this had not been a priority at baseline. These data were collected with the future purpose of examining, for example; the structural properties of teenage friendship groups; the structural properties of the school networks; and the locational properties of the peer supporters which may facilitate diffusion of the smoke-free message; and, in conjunction with ASSIST outcome data to study the role of social networks in the adoption and maintenance of health behaviours.

The ten minutes used to complete the peer nomination questionnaire at the baseline datasweep was allocated to collect social network data at subsequent datasweeps. This allowed the collection of three waves of social network data (as shown in Table 18). Unless they

did not gain parental permission at baseline, refused to do so, or were absent at the time of questionnaire completion, all students in the trial were asked to complete social network questionnaires.

7.1.8 Ethical issues

ASSIST was ethically reviewed in 2001 by the Multi-Centre Research Ethics Committee for Wales. All ASSIST data are stored in a Microsoft® Office Access® database or another appropriate electronic format (in the case of interview data). All paper records and interview tapes are kept in secure storage. Information that would allow identification of schools or individuals involved in the trial is stored separately from all other data.

7.2 Research methods used in this study

As identified in chapter 6 the most useful and appropriate data to address the aims of this research are process data and social network data. These were collected during the evaluation of the ASSIST intervention. The methods used to collect these data include questionnaire surveys, semi-structured individual interviews and group interviews. In addition, data collected through the outcome evaluation will supplement these two datasets where required. A number of specific research questions will be addressed in this study. These research questions are outlined overleaf.

7.2.1 Research questions

1) *Were the peer supporters nominated in ASSIST appropriate to undertake the role?*
   a) Were the peer supporters more influential in terms of their position in social space than students who were not nominated?
   b) Did the peer supporters represent a good cross-section of social groups in the school year, thereby maximising the potential for successful diffusion through informal social networks?
   c) Were those nominated as peer supporters considered suitable to assume the role?

2) *Do young people find this social diffusion approach to reducing the prevalence of smoking acceptable?*
   a) Do young people prefer talking to young people than adults about smoking issues?
   b) Are the peer supporters willing to talk about smoking to fellow students?
   c) Are other Year 8 students willing to talk about smoking with the peer supporters?

7.2.2 Data

Multiple methods have been used to answer these research questions for the reasons identified in section 6.4; to increase the validity of the conclusions, add breadth and depth to quantitative analysis (Brannen, 1992; Holloway, 1997; World Health Organisation, 1998a), and in a number of cases, qualify and explain the quantitative findings.

Questions 1a and 1b will utilise data collected during the social networks element of ASSIST. Questions 1c, and 2a-2c will utilise data collected as part of the ASSIST process evaluation. In all analyses, where self-report behavioural data, for example, the smoking status of respondents is required, these data will be linked to data collected

through the ASSIST outcome evaluation. The data used will be considered in further detail in sections 7.2.3 to 7.2.6.

7.2.3 Social network data

Social network data collected at the first post-intervention datasweep were the main source of data used to answer research questions 1a and 1b shown in Box 4.

Box 4: Research questions utilising social network data

1) *Were the peer supporters nominated in ASSIST appropriate to undertake the role?*
a) Were the peer supporters more influential in terms of their position in social space than students who were not nominated?
b) Did the peer supporters represent a good cross-section of social groups in the school year, thereby maximising the potential for successful diffusion through informal social networks?

7.2.3.1 Questionnaire development

In considering the method to collect data on the social networks of the young people involved in ASSIST, a number of criteria were taken into account. Since the aim of data collection was to gather data on the school social networks it was necessary to obtain as comprehensive a dataset as possible. This involved collecting data from every young person involved in the trial and had implications for the choice of method.

The possibility of using each of the various methods (questionnaires, interviews, observation, archival records, experiments see section 6.1.2) commonly used to collect such data were contemplated. Archival records and experiments were clearly inappropriate whilst the other three methods had varying levels of

suitability. However, observation is ordinarily used on small populations and whilst it could potentially have elicited rich data on social interaction and friendship amongst students, it would not have been feasible amongst this study population. Interviewing would have been a possibility but in the timeframe and resources available, and taking into account that this was an additional part of data collection in ASSIST, would not have been feasible. A questionnaire was therefore considered the most appropriate approach and since datasweeps were already planned for the collection of outcome data, this was the most convenient and resource efficient method.

7.2.3.1.1 Format

The next factor to consider was the format of the questionnaire, which as identified in section 6.1.2 can adopt a number of formats: roster versus free recall; free versus fixed-choice; and rating versus complete rankings.

The aim of the questionnaire was to explore friendships in general and not just friendships within the same year, or the same school. Therefore, a free-recall format which did not restrict responses to a list of friends provided by the researchers was required.

The decision regarding the use of a free- or a fixed-choice questionnaire required more careful thought. Some commentators such as Holland and Leinhardt, (1973) and Campbell and Lee (1991) argue that the fixed format of some sociometric data collection tools may underestimate the total number of links in a social network, providing an inaccurate indication of network structure. However, allowing respondents to identify a limitless number of associations may overestimate the number of affiliations and the importance assigned to these affiliations (Rogers & Kincaid, 1981). Experience from the piloting of the ASSIST peer nomination questionnaire in which students were asked to name people in their year who had certain characteristics showed that young people (in particular young women) were prone to

name long lists of friends for each question. This raises questions as to how meaningful these relationships are to them. Moreover, it is impractical to allow this where the amount of time to collect such data is limited, as was the case in ASSIST. Therefore, a fixed-response questionnaire design was considered the most suitable option.

The need to rate or rank friends was contemplated only briefly, and was regarded as unnecessary as the importance of friends who were named was ascertained through other questions, the responses to which would be used calculate a 'strength of friendship' score. In future analyses this score can therefore be used to weight ties according to importance (see section 6.1.1 and Appendix 6).

7.2.3.1.2 Content

In 2000, a team of researchers at Glasgow University reported findings of a study which used social network analysis to examine how adolescent smoking and drug use is associated with social position in peer groups (Pearson & Michell, 2000). This paper reported the results from two waves of social network data collected in one secondary school in Scotland, and was the first of a number of analyses conducted using data collected in schools involved in the West of Scotland 11 to 16 Study (Sweeting & West, 2000). In addition, another team at the University of Birmingham had collected but not yet reported the results of similar data (Croghan, 2001). These two teams had both successfully developed and used questionnaires which applied the broad criteria considered in section 7.2.3.1.1. The questionnaires previously developed and used by the University of Birmingham and Glasgow University are included in Appendix 9. The experience of, in particular, the research team at Glasgow University was therefore drawn on during the development of the social network questionnaire used in ASSIST. This research team was visited by myself and Professor Laurence Moore in December 2001 and the use of their questionnaire was discussed.

The Glasgow questionnaire was subsequently adapted for use in ASSIST. The questionnaire had utilised a free-recall, fixed-choice design which did not ask students to rank or rate friends in order of importance. This design was retained. A number of aspects of the Glasgow questionnaire were considered for modification, most importantly, the use of the term 'friend' when collecting peer data; how many friends should be allowed; whether students would be able to provide all the required data in the allotted time; what additional questions should be included and what changes to the existing questions were required.

There has been some discussion in the literature regarding the suitability of asking individuals to name their friends when requesting peer data, and the most suitable way to collect peer data (Bernard et al., 1990; Burt, 1984; Fischer, 1982; van der Poel, 1993). The wording of questions used to elicit this kind of data has been the subject of much scrutiny particularly since the term 'friend' is ambiguous and is used in different ways across different cultures (Fischer, 1982) and classes (Allan, 1977). For example, Fischer (1982) asked 1,050 American adults a number of name generator questions and then asked whether the individuals named were friends, acquaintances or related in another way (e.g. relative, co-worker). Whilst he established that the term 'friend' was used regularly, there is little consistency in how the relationship with friends was characterised. Clearly, collecting peer data from teenagers is very different to collecting similar data from adults. Kirke (1996) suggests that the confusion about the term 'friend' is less stark amongst teenagers, and when collecting such data, it is in fact more appropriate to use the word 'friend' in name generator questions rather then asking them to identify peer ties based on supportive social exchanges. The term friend was therefore retained from the Glasgow questionnaire and used in the ASSIST questionnaire.

The limitations of using a fixed format questionnaire have been discussed in 7.2.3.1.1, but since the ASSIST questionnaire aimed to gather as comprehensive a dataset as possible on the social networks of the students involved in ASSIST, the number of friends the young

people were allowed to name was of paramount importance. Previous studies (for example, Aloise-Young et al., 1994; Ennett & Bauman, 1993) have restricted the number of friends who could be named on similar questionnaires to three. The questionnaire upon which the ASSIST tools were based allowed respondents to name six friends to ensure that enough names were generated to produce meaningful peer groups structures, whilst restricting those named to close friends (Pearson & Michell, 2000). The authors reported that qualitative findings had revealed that allowing individuals to name less friends would be restrictive and that most students had between four and six 'good' friends. These findings are consistent with those of Abel and colleagues (2002) who, when placing no restriction on the number of friends young people could name found that most named between three and six friends, and Urberg and colleagues, who found that the average number of friends named was 4.6 (Urberg et al., 2003). Similar results were found by Kirke (1996) in her work on methods to collect peer data. She found that even when adolescents were allowed to name as many friends and pals as they liked (pals were classed as people of around their own age with whom they spend any free time but who are not as close as friends), 90.7 per cent named six friends or less. The mean number of friends named was 3.7. Based upon this discussion, it was justifiable to allow students to name up to six friends when completing the ASSIST questionnaire.

The questionnaire consisted of two parts as shown in Appendix 10. The first part asked students to name six of their friends. These friends could be anyone they knew from inside or outside school and could be any age. Whilst acknowledging that schools are the primary locus of teenage friendships (Blyth et al., 1982), allowing students to name individuals outside the school year, and outside the school firstly recognises the importance of relations external to this environment, and secondly the importance of the external contexts themselves (Kiesner et al., 2004). The questionnaire was designed to have two parts in order to allow those who had problems with literacy or comprehension to name their friends even if they did not have time to provide any further

information. Obtaining information on friendship ties was considered more important than obtaining comprehensive information about fewer friends. The second part therefore asked respondents to provide further information about each of the friends previously named.

Figure 20: Sample page from social network questionnaire

Name of 1st friend (first & surname) _____

Form/tutor group (if at your school) _____

Answer the questions on this page for the friend you have named above.

1a) Is this friend (Please tick one box only)

Your best friend ☐ 1
Just a friend ☐ 2

1b) Is this friend (Please tick one box only)

A boy ☐ 1
A girl ☐ 2

1c) This friend (Please tick one box only)

Is in Year 8 at my school ☐ 1
Is in a year below Year 8 at my school ☐ 2
Is in a year above Year 8 at my school ☐ 3
Is at another school ☐ 4
Has left school ☐ 5

1d) When do you see each other? (Please tick one box only)

In school only ☐ 1
In and out of school ☐ 2
Out of school only ☐ 3

1e) How would you describe your friendship? (You can tick more than one box)

We do activities together (sport, computer games etc.) ☐ 1
We just hang out but don't do activities together ☐ 2
We are close and talk a lot together ☐ 3
We are like each other ☐ 4
We think the same way ☐ 5

As shown in Figure 20, the information requested in the main body of the questionnaire included basic details such as the sex of the friend, and whether they were a best friend or just a friend. We were interested in the possible influences on young people from different age groups, and at the same time, the possible influences the peer supporters might have outside of Year 8 in their school. Respondents were therefore asked whether the friend was in a year above or below at the same school, and the specific form group (if at the same school) was requested as identifying information. Other required information was when they spent time with them and the nature of the friendship. The last question from the Glasgow questionnaire (see Box 5) was amended. The wording of several statements was amended for clarity and the last statement (We are like each other; think the same way) was split into two. This produced the question with five possible responses as shown in Figure 20. The rationale for this was that separately they would apply to different people and would reduce confusion where respondents considered one element applicable to the friend named and not the other.

Box 5: Question used at Glasgow University

- We do activities together (sport, computer games swimming etc.)
- We just hang about together we don't do much
- We are close, talk a lot, share secrets
- We are like each other; think the same way

It would have been valuable to collect data regarding the perceived smoking behaviour of friends named in the questionnaire in order that, for example, comparisons could be made between perceived and actual usage, and the effect this may have on the smoking behaviour of friends. However, concerns were raised regarding trust and whether asking these data of the young people would damage the relationship

built between the research team and respondents, and jeopardise the high response rate to the behavioural questionnaire attained at baseline. It would also be likely to introduce response bias where students were suspicious about why we were collecting these data and were reluctant to reveal their friends' smoking status. Consequently, respondents were not asked to provide this information.

Unlike the approach adopted by Pearson and Michell (2000), who included friendship questions in their behavioural questionnaire, the ASSIST friendship data were collected using a separate questionnaire to the behavioural questionnaire. The aim of this was to reduce the chance of respondents associating the provision of details about their friendships with their own smoking behaviour. It was hoped this would increase the response rate to this questionnaire, and the accuracy of data provided, whilst maintaining the high response to the behavioural questionnaire.

7.2.3.1.3 Piloting

This questionnaire was developed within a short timeframe. Therefore, there was no opportunity to pilot the questionnaire in its new form prior to use at the first post-intervention datasweep. Whilst this would have been preferable, the questionnaire was not wholly dissimilar to that used in Glasgow which had proved unproblematic and acceptable (West, 2001), and was similar to the version used in Birmingham which had also been administered successfully (Croghan, 2001).

7.2.3.2 Data collection

As mentioned in section 7.1.7.1, all students who were present at the first post-intervention datasweep were asked to complete a social network questionnaire in addition to their behavioural questionnaire. This questionnaire was completed prior to the behavioural

questionnaire for the same reasons that the questionnaires were kept separate; to reduce the chance that response bias would be introduced by students associating smoking with the friends they named.

7.2.3.3 Data entry

Following data collection, a list of names of friends from outside of the study cohort was complied. In ASSIST, we wanted this information to be as comprehensive and accurate as possible. Therefore, to ensure that students in the same school as respondents were *bona fide* individuals, schools were asked to verify if students named in other years in the school existed. They were also asked to clarify names of students who were named as friends in the same year at the same school but whom we did not have on our records (either as part of the cohort or as a parental refusal). This process is detailed in Appendix 11. On return of student lists from schools, all questionnaire responses were entered onto a Microsoft® Office Access® database in which the behavioural data were also held. This database provided a facility to allocate existing study identification numbers to students within the cohort, and new unique identification numbers to students outside the study cohort. It also allowed behavioural data from the outcome evaluation to be linked easily with the friendship data. The allocation of unique identification numbers has enabled the data provided about individuals not in the study cohort to be anonymised whilst retaining important information about friendship ties outside of the school year for use in future analysis. Following data entry and cleaning, the questionnaires had the names of friends removed from them in order to maintain the anonymity of the ASSIST data. This was particularly important where friends outside the study cohort had been named.

7.2.3.4 Selection of schools for social network analysis

In this study, social network analysis was conducted using data from ten schools involved in ASSIST. These were purposively selected to allow a range of schools to be included without requiring all schools in the study to be included. Furthermore, data entry of the social network questionnaires is very labour intensive (approximately 15 questionnaires per hour) so it would not have been feasible to use data from more schools. This analysis was concentrated on schools which provided a full dataset of social network data at all three post-intervention datasweeps i.e. schools which had completed the verification process detailed in Appendix 11 at each sweep. These schools included the eight in-depth process evaluation schools identified in Table 19 and a further two schools. This research was focused on in-depth process evaluation schools because a complete dataset of outcome, process and social network data were available for these schools, and they were by default already included in the study in the qualitative element of the research (see section 7.2.5). In addition to having a complete set of social network data, the two additional intervention schools were purposively selected based on a number of criteria. An a-priori theory was that the ASSIST intervention would be more successful in schools in the south Wales valleys where communities are less transient, more homogenous and where there seems to be a stronger sense of community. Therefore, schools had to be in the south Wales valleys. The aim was also to select schools in a different location to the process evaluation schools, of which two were in the upper south Wales valleys. Consequently the selection process aimed to identify schools in the lower south Wales valleys. Therefore schools were excluded if they belonged to the following groups (see also Appendix 12).

- Had an incomplete set of social network data (n=3)
- Not in the south Wales Valleys (n=19)
- In the upper south Wales Valleys (n=4)

Table 21: Characteristics of schools used in social network analysis

School	Trial arm	In-depth process evaluation school	Approximate* year size at first post-intervention datasweep	Number eligible to provide data	Geographical location	Absolute risk difference in weekly smoking prevalence (Mean across all schools 0.081)	Absolute risk difference in daily smoking prevalence (Mean across all schools 0.064)
South Wales							
c20	Control	Yes	258	249	Suburban	0.174	0.101
c28	Control	Yes	113	112	South Wales (upper) valleys	0.067	-0.004
i16	Intervention	No	207	203	South Wales (lower) valleys	0.043	0.050
i17	Intervention	Yes	130	129	South Wales (upper) valleys	0.097	0.097
i19	Intervention	Yes	269	266	Suburban	0.049	0.039
i23	Intervention	No	170	170	South Wales (lower) valleys	0.046	0.047
South west England							
c11	Control	Yes	162	158	Semi-rural	0.086	0.044
c16	Control	Yes	205	194	Urban/suburban	0.020	0.032
i2	Intervention	Yes	159	157	Suburban	0.004	0.018
i13	Intervention	Yes	228	222	Suburban	0.173	0.127

* = approximate year size is given as it is not known how many parental refusals from baseline had left the school and how many students were new to the school at this datasweep

This left three schools remaining for selection. Of these, two were selected on the basis that they had the greatest observed change in smoking prevalence. This ensured that the sample of ten schools included a range of schools in terms of the effectiveness of the intervention. Some basic characteristics of these ten schools are summarised in Table 21.

7.2.3.5 Data used for this study

In this study, the social network questionnaires were only used to ascertain who was named as friends by each respondent. Further details about friends and the nature of the friendship were not required. Therefore, only the identifying information from this questionnaire was required. The fields used were "Name of *X* friend", "Form/tutor group" and part c, "This friend..." (see Figure 21).

Figure 21: Questions used to identify friendship ties

Name of 1st friend (first & surname) _____

Form/tutor group (if at your school) _____

Answer the questions on this page for the friend you have named above.

1c) This friend (Please tick one box only)

Is in Year 8 at my school	☐ 1
Is in a year below Year 8 at my school	☐ 2
Is in a year above Year 8 at my school	☐ 3
Is at another school	☐ 4
Has left school	☐ 5

7.2.4 Outcome evaluation data

Self-reported smoking status was required to answer research questions 1a and 1b, shown in Box 6 to enable an examination of the proximity of peer supporters to the high-risk group, and to enable the analysis of quantitative process evaluation questions (see section 7.2.5) to be reported by smoking status.

Box 6: Research questions utilising outcome data

1) *Were the peer supporters nominated in ASSIST appropriate to undertake the role?*
a) Were the peer supporters more influential in terms of their position in social space than students who were not nominated?
b) Did the peer supporters represent a good cross-section of social groups in the school year, thereby maximising the potential for successful diffusion through informal social networks?

These data were drawn from the ASSIST outcome evaluation. The question used to establish participants' smoking status at each datasweep (see Figure 22 overleaf) was taken from the ONS survey on Drug use, Smoking, and Drinking among Schoolchildren in England. A recent version of this questionnaire is available online (Fuller, 2005).

Figure 22: Smoking status question from baseline behavioural questionnaire

Now read all of these statements carefully and tick the box next to the one which describes you best (Please tick ONE box only).

I have never smoked	☐ 1	**Go to question 7**
I have only ever tried smoking once	☐ 2	**Go to question 7**
I used to smoke sometimes but I never smoke a cigarette now	☐ 3	**Go to question 13**
I sometimes smoke cigarettes now but I don't smoke as many as one a week	☐ 4	**Go to question 9**
I usually smoke between one and six cigarettes a week	☐ 5	**Go to question 8**
I usually smoke more than six cigarettes a week	☐ 6	**Go to question 8**

7.2.5 Process evaluation data

The research questions identified in Box 7 utilised data collected for the ASSIST process evaluation. The quantitative data utilised were obtained from questionnaires completed by all students in intervention schools at the first post-intervention datasweep and by peer supporters at the first and fourth follow-up session. Qualitative data were gathered using individual and group interviews conducted with young people who were peer supporters, those who were nominated but did not adopt the role or who 'dropped out' of the role, and those who reported in their first-post intervention behavioural questionnaire that they had conversations with peer supporters about smoking during the intervention period. Data used concentrated on the experiences of students involved in the trial, therefore all other data such as individual interviews with trainers and teachers were not considered.

Box 7: Research questions utilising process evaluation data

1) *Were the peer supporters nominated in ASSIST appropriate to undertake the role?*
b) Did the peer supporters represent a good cross-section of social groups in the school year, thereby maximising the potential for successful diffusion through informal social networks?
c) Were those nominated as peer supporters considered suitable to assume the role?

2) *Do young people find this social diffusion approach to reducing the prevalence of smoking acceptable?*
a) Do young people prefer talking to young people than adults about smoking issues?
b) Are the peer supporters willing to talk about smoking to fellow students?
c) Are other Year 8 students willing to talk about smoking with the peer supporters?

7.2.5.1 Questionnaires

In addition to collecting outcome evaluation data, the first post-intervention behavioural questionnaire administered to all students in each intervention school included questions and statements which focused, in particular, on the process and acceptability of the intervention. A number of these were used to answer research questions 1b and 1c, and 2a-2c and are detailed in Figure 23. Asking these questions immediately after the intervention had been conducted in their school reduced the opportunity for recall bias.

Figure 23: Peer supporter questions used from first post-intervention behavioural questionnaire

How many people in Year 8 do you know who were asked to be peer supporters?

No-one	☐ 1	**Go to question 17**
One person	☐ 2	**Go to question 17**
Between one and four people	☐ 3	**Go to question 17**
Between five and ten people	☐ 4	**Go to question 17**
More than ten people	☐ 5	**Go to question 17**

In the last few weeks, has anyone who was a peer supporter talked with you about smoking?

Yes	☐ 1	**Go to question 18**
No	☐ 2	**Go to question 19**
I don't know	☐ 3	**Go to question 19**

Below are some statements about peer supporters. Please tick whether you agree or disagree with each statement.

	Agree	**Disagree**
a) It is good that peer supporters can talk with Year 8 pupils about smoking.	☐ 1	☐ 2
b) It is none of the peer supporters' business whether Year 8 pupils smoke or not.	☐ 1	☐ 2
c) Peer supporters put too much pressure on Year 8 pupils about smoking.	☐ 1	☐ 2
d) Most of the peer supporters I know didn't seem to talk much to other pupils about smoking.	☐ 1	☐ 2
e) Having people your own age talking to you about smoking is better than having teachers doing it.	☐ 1	☐ 2
f) The sorts of people chosen to be peer supporters were not the best ones to talk about smoking.	☐ 1	☐ 2

Go to question 20

Questionnaires were used to obtain these data as we wanted to obtain this information from all students in intervention schools who had, in some way been exposed to the intervention, either as a peer supporter or as someone who the peer supporters may have spoken to. Since they could be incorporated easily into the existing behavioural questionnaire, this was the most practical method of achieving this. The wording of these questions was tested on an *ad hoc* basis with a small number of young people of the appropriate age and a version of the questions was piloted in one of the three pilot study schools. They were subsequently amended for use in the main trial. Whilst these questions were not developed for the purpose of the current study, in combination with qualitative process evaluation data (see section 7.2.5.2), they provide the most comprehensive information regarding the acceptability of the intervention and the suitability of peer supporters to undertake their role. They also provide data which can support the social network data regarding the number of peer supporters known by each student.

Data provided by all individuals who were eligible for inclusion in the study at baseline and who completed a questionnaire at the first post-intervention datasweep were used. The questions used to answer each research question are summarised in Table 22.

All peer supporters were asked to complete a short questionnaire at the first and fourth follow-up visit. These questionnaires were concerned with the peer supporters' experiences of the intervention (including nomination, recruitment, training, support, diaries) and the role they undertook. One question from each of these questionnaires was used to address research question 2b. This asked peer supporters *"Have you had a conversation with anyone in Year 8 about smoking since you had the training?"* Therefore, in addition to gathering the opinions of those who would have talked to peer supporters, peer supporters also provided information about their own actions.[1]

[1] It should be acknowledged that peer supporters will have completed the behavioural questionnaire from the point of view of someone who has spoken to a peer supporter as well as providing details of their own actions in the follow-up questionnaires.

Table 22: Questions and statements from behavioural questionnaire used to answer each research question

Research question	Questions and statements used to answer each research question*
1b) Did the peer supporters represent a good cross-section of social groups in the school year, thereby maximising the potential for successful diffusion through informal social networks?	How many people in Year 8 do you know who were asked to be peer supporters?
1c) Were those nominated as peer supporters considered suitable to assume the role?	The sorts of people chosen to be peer supporters were not the best ones to talk about smoking
2a) Do young people prefer talking to young people than adults about smoking issues?	Having people your own age talking to you about smoking is better than having teachers doing it
2b) Are the peer supporters willing to talk about smoking to fellow students?	In the last few weeks, has anyone who was a peer supporter talked with you about smoking? Most of the peer supporters I know didn't seem to talk much to other pupils about smoking
2c) Are other Year 8 students willing to talk about smoking with the peer supporters?	It is good that peer supporters can talk with Year 8 pupils about smoking It is none of the peer supporters' business whether Year 8 pupils smoke or not Peer supporters put too much pressure on Year 8 pupils about smoking

*the questions and possible responses are given in full in Figure 23

7.2.5.2 Interviews

Individual and group interview data collected from young people in the four in-depth process evaluation intervention schools were used to answer the research questions included in Box 8.

Box 8: Research questions utilising interview data

1) *Were the peer supporters nominated in ASSIST appropriate to undertake the role?*
c) Were those nominated as peer supporters considered suitable to assume the role?

2) *Do young people find this social diffusion approach to reducing the prevalence of smoking acceptable?*
a) Do young people prefer talking to young people than adults about smoking issues?
b) Are the peer supporters willing to talk about smoking to fellow students?
c) Are other Year 8 students willing to talk about smoking with the peer supporters?

These interviews were used in the ASSIST process evaluation to examine a number of the issues explored using questionnaires in further depth. The main issues explored are outlined in Figure 24.

All individual and group interviews were semi-structured, lending a degree of flexibility to the discussions, and allowing the researchers to prompt interviewees and probe further where required. The topic list for the individual and group interviews conducted with students are included in Appendix 15. Piloting of interviews was not conducted due to time and staffing constraints.

Figure 24: Main issues explored in individual and group interviews

	Insight into their views about carrying out the role	The peer nomination process *	The training and support received	The perceived impact of the intervention	The value of this approach to smoking prevention	Reason for drop-out/refusal
Post-intervention individual interview with peer supporter						
Post-intervention group interview with peer supporters						
Post-intervention individual interview with non-peer supporter						
Post-intervention individual interview with peer-supporter refusal						
Post-intervention individual interview with peer-supporter drop-out						

* including the suitability of those named and those who acted as peer supporters (peer supporter drop-outs only asked about suitability of people who acted as peer supporters, peer supporter refusals only asked about suitability of people named)

Group *and* individual interviews were conducted with peer supporters for a number of reasons. The main ones were practical, relating to the need to obtain a broad range of views from as many peer supporters as possible within the time and resource constraints of the trial, and within the restrictions applied by schools (such as timetable constraints). Consequently, the use of group interviews in addition to individual interviews enabled access to the views of the majority of students who acted as a peer supporter. As discussed in section 6.2.1.2.2.2 individual and group interviews were used in combination in order to obtain both breadth and depth of information (Crabtree et al., 1993). Furthermore, the individual interviews allowed more probing and clarification than the group interviews and allowed exploration of issues on an individual

basis without feeling pressure or intimidated by others. There was no specific order in which individual and group interviews were conducted, and neither contributed to revisions to topic lists in order to explore emergent issues.

The group interviews with peer supporters were mixed sex as the peer supporters were an 'existing' group and were likely to have felt comfortable talking with each other. A maximum of eight peer supporters were invited to each group interview. No visual aids were used to facilitate the discussions. In terms of the classification identified in section 6.2.1.2.2.2 (Frey & Fontana, 1991) the group interview format did not fall specifically into any one of the categories identified. However, it fitted mainly with "Field, formal" although the setting was not strictly the field. The purpose of group interviews was not to observe interaction between participants. Therefore, notes were not taken regarding interaction and negotiation of ideas and opinions in the group context.

Since it was less likely that non-peer supporters would know each other, they were interviewed on an individual basis. Two main factors guided the decision to conduct individual interviews with peer supporter refusals and drop-outs. Firstly, these young people may have had reasons for not taking part which they would be unhappy about discussing with other students. Secondly, we anticipated there would be insufficient peer supporter refusals and drop-outs in each school to conduct group interviews. In fact, in six of the seven schools in which these students were interviewed, there were three or more peer supporter drop-outs or refusals so this may actually have been possible.

7.2.5.2.1 Selecting interviewees

As discussed in section 7.1.6.1.2, a variety of individuals were selected for interview for the ASSIST in-depth process evaluation (conducted in four intervention schools as described in Table 19). These individuals ranged from teachers to students who had acted as peer supporters.

Within the time and budget constraints, and a desire not to place excessive demands on schools, individuals were sampled to take part in individual and group interviews.

Table 23: Selection strategy adopted for process evaluation interviews

	Selection strategy
Post-intervention individual interview with peer supporter*	30% of peer supporter cohort. Students selected using random number sampling.
Post-intervention group interview with peer supporters*	Two mixed-sex groups of approximately 6-8 participants from each school. Students selected using random number sampling.
Post-intervention individual interview with non-peer supporter *	30% of students who stated (in first post-intervention behavioural questionnaire) that they had spoken to a peer supporter. Students selected using random number sampling.
Post-intervention individual interview with peer-supporter refusal	All refusals.
Post-intervention individual interview with peer-supporter drop-out	All drop-outs.

* Conducted in in-depth process evaluation schools

This research uses the data collected from students (including peer supporters) only. The different groups of individuals determined the criteria used to select them for interview as shown in Table 23. In order to allow all participants an equal chance of being selected for interview, they were selected using a simple random sampling method (Bowling, 1997). Lists of peer supporters were arranged in identification number order and every *nth* name was selected for participation in an individual or group interview. The same procedure was conducted with lists of all

students who reported having spoken with a peer supporter about smoking. Since there were fewer peer supporter 'refusals' and 'drop-outs', all students in this group were invited for interview.

7.2.5.2.2 Conducting interviews

Students selected for interview were asked to attend by a letter which was distributed by a member of school staff. A copy of the letter used is included in Appendix 13. The letter explained that we were interested in what young people thought about the work they had been doing and that we were going to speak to some students who were asked to be peer supporters, and some who were not. It was made clear that students had been chosen randomly so there was no particular reason why they had been invited (for example, because they were a smoker). Students were assured that the interview would not be a test, and we would not tell anyone what they said. The time and location (pre-arranged with the school) of the interview was also indicated.

In general, separate written parental consent was not sought for this aspect of the evaluation as permission had been obtained previously for young people to participate in the trial. However, one of the four in-depth process evaluation schools requested that we formally ask parents and carers for permission for their child to be interviewed. An opt-out consent system was operated, parents indicating only if they *did not* want their child to participate. A copy of the letter used is included in Appendix 14. One parent refused permission for their child to take part. Written assent was not obtained from students although students were asked verbally if they were happy to take part and were given the opportunity to refuse.

All individual and group interviews were conducted by the ASSIST researchers. Group interviews were conducted by one researcher, although in the two schools in Wales, a second member of ASSIST staff was present to take notes which would aid the transcription process. This member of staff did not have any input into

the management of the interviews. All interviews took place on the school site in a classroom or other suitable room such as an office belonging to a member of staff. They were conducted during lesson time although sometimes it was necessary for the interview to cut into a break such as lunchtime because of practical issues such as students turning up late to their interview and overrunning on the interview timetable where students talked for longer than anticipated. However, where this happened, respondents were asked if they were happy to complete the interview and were given the option to terminate it. Before interviews began, students were given a brief reminder of what ASSIST was, reminded of the purpose of the interview, and asked if they were happy to continue. All informants were asked if they were happy for the interview to be tape-recorded. No-one objected to this procedure.

7.2.5.3 Observation

Participant observation of the recruitment meeting, training session and four follow-up visits was conduced in the four in-depth process evaluation schools. This observation explored issues largely related to the delivery of these sessions to the peer supporters including context, fidelity of implementation, receipt, and interaction between peer supporters and trainers. While these observations can provide an indication of whether these sessions were acceptable to the peer supporters, they are not indicative of whether this social diffusion approach was acceptable, and are unable to provide in-depth material regarding the opinions and attitudes of the students involved.

7.2.6 Other relevant data

Other data were used to ascertain whether peer supporters were willing to talk with other Year 8 students about smoking. Peer supporter retention at each stage of the intervention was recorded by trainers who

ran each session with the young people. These 'registers' which show attendance numbers provide an indication of whether peer supporters engaged with the role and found it acceptable.

7.3 Data analysis

1) Were the peer supporters nominated in ASSIST appropriate to undertake the role?

The accuracy or reliability of social network data has been questioned. A way of considering this is by assessing if ties identified by respondents are reciprocated by alters (those identified by a respondent). If the tie is reciprocated, it is assumed that the relationship is genuine and a more accurate indication of peer interaction is provided than when using unreciprocated ties (Gest et al., 2003; Marsden, 1990). In the case of friendship in particular, reciprocal nominations are considered the most reliable indication of presence, reciprocation and quality of friendship (Bukowski & Hoza, 1989). Compared to unreciprocated friendships, reciprocated friendships are characterised by more impartial conflict resolution and higher levels of mutual positive affect (Hartup, 1996). Therefore, some commentators consider reciprocated ties to be more reliable than unreciprocated ties and have concentrated analyses on reciprocated friendships alone (for example, Kandel, 1978; Pearson & Michell, 2000; Pearson & West, 2003). However, it is likely that reciprocated methodologies generate different portrayals of social networks compared with non-reciprocated methodologies (Yugar & Sharpiro, 2001).

Marsden (1990) reports that the proportion of reciprocated ties within networks vary greatly, a finding which is supported by other studies. For example, Kirke (1996) reported a level of reciprocation of 52.1 per cent and Brewer and Webster (1999) found that 71 per cent of recalled friendship choices were reciprocated compared to 47 per cent

of friendship choices identified from a list of other students (recognised friendship choices). Kirke asserts that there are no guidelines on the level of reciprocation one should expect within networks. It is therefore difficult to make bold statements about the accuracy of peer network data on the basis of such measures.

There is however criticism of adopting this approach. It has been argued that unreciprocated ties should not be classed as errors to be corrected, but that they are important aspects of social networks (Carley & Krackhardt, 1996). Furthermore, Gest and colleagues (2003) suggest that the use of solely reciprocated friendships "*do not help to characterize children's larger, informal peer group affiliations*" (p514).

From a more practical point of view, it is recognised that social network data are often incomplete (Kossinets, 2006) as a result of the boundary specification problem (Laumann et al., 1983); respondent inaccuracy (Brewer & Webster, 1999; Marsden, 1990); non-response (Stork & Richards, 1992); or as a result of the study design, for example fixed choice designs (Holland & Leinhardt, 1973) where the restriction placed on the number of ties that can be identified will increase the likelihood that ties will be unreciprocated. Using only reciprocated ties will simply further reduce the number of ties and therefore the likelihood that the data will produce a true representation of the network.

Many studies of adolescent networks utilise fixed-choice designs and reduce the opportunity for respondents to identify all possible ties. However, it should be acknowledged that additional friendship choices may be made where students do not have the maximum allowed number of friends but where they wish to complete the whole questionnaire. Furthermore, where the response rate is less than 100 per cent, there will always be scope for ties to be unreciprocated (Gifford-Smith & Brownell, 2003). Young people are also more likely to forget to name some individuals as friends, and instead name others. This was demonstrated by Brewer and Webster (1999) amongst university students. Both of these eventualities, and in particular, where analysis is restricted to reciprocated ties, will inevitably result in a less than accurate depiction of the true network (including reducing network

size), and influence the measurement of some structural social network properties (Borgatti et al., 2006; Costenbader & Valente, 2003; Kossinets, 2006; Rogers & Kincaid, 1981).

Since these analyses intend to explore the transmission of information, and not friendship *per se*, it is realistic that unreciprocated ties will be relevant (as information exchange need not be between friends). Therefore these analyses used all ties proposed by respondents, an approach adopted by others (Brewer & Webster, 1999). This is sometimes described as the available-case approach and uses both fully described links (reciprocated) and partially described links (unreciprocated) (Stork & Richards, 1992). All ties were also used to compensate, to some extent, for individuals who were absent on the day of the datasweep (to reduce the incidence of missing ties). These analyses also assumed that information can travel in either direction between actors, regardless of whether the tie is reciprocated or not. Therefore, the data were symmetrised and not used in digraph format.

For all analyses using social network data a list of ties between actors in each school year group was exported into UCINET to produce a matrix of ties. Actors who were outside of Year 8 at the respondents' school were excluded from the analyses as it was amongst Year 8 that the peer supporters were asked to disseminate the smoke-free message. Since this research concentrates solely on intervention issues, it was not necessary to include other actors. These data were symmetrised adopting the maximum option (Borgatti et al., 2002) to produce a square binary matrix and removing the direction from all ties. The result was a person-by-person matrix where cell (i, j) is 1 if there is a reciprocated or unreciprocated tie between actors i and j, and 0 otherwise. These symmetrised input matrices were used in all analyses.

Since control school data were used, it was necessary to identify who would have been peer supporters in these schools had they received the intervention. Therefore, peer nomination questionnaires were tallied in these schools. Peer supporters were thus classed as individuals who were nominated as peer supporters in intervention

schools and those who *would have been nominated* in control schools (following tallying of peer nomination questionnaire responses).

a) Were the peer supporters more influential in terms of their position in social space than students who were not nominated?

CHOICE OF COMPUTER SOFTWARE

Social network data were analysed using UCINET 6.0 for Windows (Borgatti et al., 2002). Since only basic network measures were required for the analyses described below, UCINET was considered an appropriate choice to carry out these calculations. UCINET 6.0 (Borgatti et al., 2002) is a programme for the analysis of social networks and other proximity data. Social network analysis methods possible using this software include centrality measures, subgroup identification, elementary graph theory, network hypothesis testing procedures, plus general statistical and multivariate analysis tools. A user's guide and downloadable software is available from http://www.analytictech.com.

ANALYSES

Simple measures of network cohesion were calculated to provide some basic information about whether the fundamental network structure in each school facilitated the peer supporters' ability to diffuse the smoke-free message. These measures were the density and reachability within the networks, and the diameter of the graph. The density of the network is a rough measure of integration and was used to indicate whether actors were likely to know other actors in the network. Reachability matrices were produced to reveal the number of disconnected nodes (nodes who could not receive information from other actors in the network) in each network. The length of the longest geodesic was

calculated to establish the diameter of each graph. Since these measures change according to network size (particularly where fixed-format questionnaires are used), correlation coefficients were calculated to examine the association between these measures and network size,

Measures of individual-level cohesion were used to identify whether the students nominated as peer supporters were in more suitable (more central and prominent) positions in their school social network to diffuse the smoke-free message than students who were not nominated. Measures of normed degree, betweenness and closeness centrality were computed using UCINET. Degree centrality was calculated as a measure of the ability of the peer supporters to exert immediate influence on other actors in the network through interpersonal communication. While outdegree is generally considered a measure of influence, the fixed-format of questionnaires used in this study limits the potential to accurately measure outdegree. Therefore, degree as a composite measure of outdegree and indegree was used in this study. Betweenness centrality was calculated as an indicator of the peer supporters' ability to control the flow of information in the network. Closeness centrality measures were calculated as a measure of a peer supporters' potential to influence others to whom they were not directly tied. The measure of closeness centrality was based on reciprocal distances. This allowed for the disconnected nature of the networks under study by overcoming infinite distances where individuals were not connected to anyone else in the network (i.e. were isolates).

Finally, the average distance of peer supporters to individuals in the 'high-risk' group was calculated to ascertain whether they were more suitable than other students to spread the smoke-free message to the intervention's target group. Therefore, the symmetrised data were used to produce a distance matrix of the length of the shortest path (geodesic distance) between each node in the network. Self-reported smoking behaviour data obtained from the questionnaire completed at baseline (see Figure 22) were recoded in UCINET to create a binary file where individuals who identified themselves as in the 'high-risk' group of experimenters and ex-smokers (responded "I have only ever tried

smoking once"; "I used to smoke sometimes but I never smoke a cigarette now"; and "I sometimes smoke cigarettes now but I don't smoke as many as one a week") were identified by '1' and all other students were identified by '0'. Data for ties from each actor in the network to individuals in the 'high-risk' group were extracted from the distance matrices. The mean geodesic distance (based on reciprocal distance to overcome infinite distances in the matrix where actors were not tied to any others) from each actor to the 'high-risk' group was then calculated.

The calculation of 95% confidence intervals for the difference between two means allowed comparison of measures for individuals who were nominated as peer supporters with those who were not nominated as peer supporters. 95% confidence intervals were used instead of p-values to provide an indication of magnitude of difference rather than a simple indication of a significant difference, or not (Gardner & Altman, 1986), and to overcome the difficulty which can arise because the p-value reflects the size of the sample and not necessarily the effect size (Hennekens & Buring, 1987).

b) Did the peer supporters represent a good cross-section of friendship groups in the school year, thereby maximising the potential for successful diffusion through informal social networks?

The main source of data used to answer this research question was social network data.

CHOICE OF COMPUTER SOFTWARE

Social network data were analysed using Kliquefinder©. It should be noted that the aim of sub-group identification was not to identify friendship groups within the school year group *per se*, but to allocate all individuals into naturally occurring non-overlapping subgroups of the

network. i.e. this will act as a model and not a reproduction of the 'real' friendship groups in the school year. In order to identify such sub-groups within each school year, it was necessary to utilise a method which identified non-overlapping subgroups of a reasonable size, but not so small or large that the grouping would appear meaningless. After discussion with several experts in the field regarding these requirements (Berkowitz, 2004; Borgatti, 2004; Frank, 2004b), Kliquefinder© was identified as a suitable software package to use. Kliquefinder© is a piece of bespoke software based on an algorithm for identifying non-overlapping cohesive subgroups of actors in networks. This software implements Frank's stochastic criterion for identifying cohesive subgroups which uses a reduced form of the p_1 model which has previously been mentioned in section 6.1.5.3.2. The algorithm assumes that all actors are assigned to subgroups, and iteratively reassigns actors to subgroups until the index defining cohesiveness is maximised.

Frank (2002) identifies a number of advantages of Kliquefinder©. Of particular importance to this research was that relative to other cohesion-based algorithms and criteria: it is not necessary to pre-specify the extent of connectedness defining cohesion, or select it post-hoc (as in k-clans and k-plexes); it is not necessary to pre-specify the number of groups; and it allows the definition of non-overlapping subgroups unlike k-plexes, n-cliques and cliques. The use of the software is described by Frank (2002; 2004a), and applications of the software by Frank and others (1995; 1996; 1996).

ANALYSES

The symmetrised binary matrix produced in UCINET was exported in Edgelist format to Kliquefinder®. The routine for identification of clusters was run to delineate discrete clusters of individuals present in each school network. Default setting for the programme were assumed (see Appendix 16 for a detailed description) which identified subgroups on

the basis of connectivity within subgroups and a low degree of connectivity between subgroups.

The presence of peer supporters, ever smokers and individuals at 'high-risk' of smoking uptake within each of these clusters was then established. This allowed an investigation of whether peer supporters were present in each cluster, and whether they were contained in clusters which included individuals in the 'high-risk' group. The number of single sex clusters in each school was also established. Students who knew or who had talked to peer supporters were also identified. This was to examine whether students knew or spoke to peer supporters outside their own social cluster and to ascertain of having a peer supporter in their own social cluster guaranteed that they would know or have talked to a peer supporter.

In addition, the responses provided by young people in intervention schools who at post-intervention were asked how many people they knew who were peer supporters was collated and summarised. Data provided by individuals who were eligible to be included in the study at baseline *and* who completed a questionnaire at the first post-intervention datasweep were included. Data were summarised according to whether students were peer supporters or not. Since data are only reported for intervention schools, peer supporters were classed as individuals who consented to continue in the role following nomination and training. These data were also summarised according to the self-reported smoking behaviour of respondents provided at the first post-intervention datasweep (see Figure 22). Those who answered either "I usually smoke between one and six cigarettes a week" or "I usually smoke more than six cigarettes a week" were classed as regular smokers, and those who responded "I have only ever tried smoking once", "I used to smoke sometimes but I never smoke a cigarette now" or "I sometimes smoke cigarettes now but I don't smoke as many as one a week" were classed as the 'high-risk' group. 95% confidence intervals were calculated using STATA 9.2 using design weighted survey estimators that took account of clustering of responses within schools.

1 c) Were those nominated as peer supporters considered suitable to assume the role?

2) Do young people find this social diffusion approach to reducing the prevalence of smoking acceptable?

a) *Do young people prefer talking to young people than adults about smoking issues?*
b) *Are the peer supporters willing to talk about smoking with fellow students?*
c) *Are other Year 8 students willing to talk about smoking with the peer supporters?*

All four of these questions utilised the same datasets and methods. Responses to questions asked in the post-intervention behavioural questionnaire in intervention schools detailed in Table 22 were summarised as described above and 95% confidence intervals were again calculated using STATA 9.2 using design weighted survey estimators that took account of clustering of responses within schools.

Tape recordings of post-intervention individual and group interviews conducted with individuals who indicated that they had spoken with a peer supporter in their post-intervention questionnaire, peer supporters, individuals who were asked to be peer supporters and either refused to adopt the role, or who dropped out throughout the intervention underwent orthographic transcription, retaining only the words spoken during the interview (Wilkinson, 2003). The majority of transcription was carried out by myself and the other researcher who conducted the process evaluation. However, a number of tapes were transcribed by secretarial support. When this occurred, the transcripts were checked thoroughly for accuracy by the researchers involved.

Interview transcripts were subjected to thematic analysis. This is based on the identification of prominent themes, patterns and issues raised in interviews (Holloway, 1997; Robinson, 1999). "*It involves searching the data for related categories with similar meaning. These are the grouped together and themes inferred and generated from the data*" (Holloway, 1997, p152). Deeper analysis of conversations or

written texts by, for example, discourse analysis would have been inappropriate, as the qualitative methods were only intended to provide descriptive information rather than information about the manner in which people talked (May, 1997).

Each transcript was read several times to find recurrent themes which were assigned codes and noted in the margins of the transcript printout. These codes could apply to short one-sentence responses or to longer sections of conversation, particularly where the transcript was of a group interview. Codes were largely descriptive such as a positive or negative opinion of the peer supporters. As analysis progressed, codes were modified, and new codes were formulated. Once completed, codes were then listed and overarching themes were identified. These themes were descriptive and largely determined by issues addressed in the topic guide and were assigned to each set of interviews (peer supporters and non-peer supporters alike). This allowed the development of a comprehensive picture of the respondents' collective rather than individual experiences and views (Aronson, 1994). The main themes arising from all interview transcripts were:

- Experiences of talking to peer supporters about smoking
- Experiences of talking to Year 8 students about smoking
- Talking to young people about smoking is better than talking to adults
- Suitability of peer supporters
- Did the peer supporters have conversations about smoking?

Microsoft® Office Word® was used to organise the segments of text arising under each code into separate files for each theme (Mason, 1997). The number of occasions on which a sub-theme occurred was documented.

To maximise the reliability (*"the extent to which a technique or procedure will generate the same results regardless of how, when and where the research is carried out or the extent to which the instrument is consistent"* (Holloway, 1997, p136)) of this coding procedure, this

procedure was conducted on more than one occasion using a sample of interview transcripts from each set of interviews to ensure that the same codes were assigned on a second occasion. Another way of increasing the reliability of the results which is considered good practice in qualitative research is to involve more than one researcher in coding interview transcripts. In this study this was not possible, except in the case of results presented by Audrey and colleagues (2006a), where a random selection of interview transcripts were coded by four researchers (including myself), the results of which were fed back to the lead author who finalised the coding framework and analysed all transcripts.

Validity in qualitative research is the extent to which the findings are true and accurate. It is possible to establish internal validity by demonstrating the reality of the participants and settings truthfully, by providing evidence for researcher's descriptions, for example, in the form of quotations from transcripts. Verbatim quotes from respondents were used to describe themes (Ryan & Bernard, 2000). The quotations used have been chosen either because they typify a common view or theme, or because they highlight specific exceptions. On a number of occasions, numerous quotations could be used to illustrate a point. On these occasions, those which best represented the point and provided a representative view of opinions and ideas from the different groups of interviewees and a mixture of both sexes and smoking status have been used. On other occasions it has been necessary to use the only quotations available. All quotations are presented with 'labels' denoting the student identification number, smoking status, sex and whether they acted as a peer supporter or not.

Generalisability (external validity) is more difficult to establish, due to the specificity of most qualitative research (Holloway 1997). However, this was maximised by interviewing a range of young people from a variety of schools in which the in-depth process evaluation was conducted.

Additional analyses completed for question 2b.

Peer supporter retention at each stage of the intervention recorded by the trainers was used to provide an indication of whether they engaged with the role and found it acceptable. Retention was also split by gender to ascertain whether male peer supporters were more or less likely to engage with the role than female peer supporters.

Responses to "Have you had a conversation with anyone in Year 8 about smoking since you had the training?" asked on the questionnaires completed at follow-up visits one and four were collated and summarised.

7.4 Summary

In chapter 6, social network data and process evaluation data were identified as the most appropriate data to address the aims of this study. The ASSIST intervention was evaluated using a pragmatic cluster randomised trial which incorporated elements of process and economic evaluation and the collection of social network data into the trial design. Therefore, the research questions of this study were addressed using social network questionnaire data, quantitative process evaluation data, and individual and group interview data collected from young people involved in ASSIST.

Measures of network and individual cohesion and cohesive subgroup analysis were used to analyse social network data collected in ten schools. Qualitative process evaluation data collected in four intervention schools were subjected to thematic coding which generated themes and patterns of issues raised in the interviews. Quantitative process evaluation data collected from all intervention school students were summarised and 95% confidence intervals calculated. The results of these analyses will be presented in chapter 8.

~ CHAPTER 8 ~

8 RESULTS

This chapter begins by presenting the one-year follow-up results of the ASSIST outcome evaluation. It then presents the results of the analyses undertaken for this study. The first section (8.2) aims to answer the first research question regarding the suitability of the peer supporters selected in ASSIST. Initially, it provides some descriptive statistics comparing characteristics of the peer supporters with other students. Then it presents the results of this study by research question starting with a consideration of whether the peer supporters nominated in ASSIST were appropriate to undertake the role. First, simple descriptive analyses of the response to the social network questionnaires are presented, along with some descriptive information relating to the friendship ties made by respondents. This is followed by the results of the analyses of these social network data which aimed to ascertain whether the peer supporters were more influential in terms of their position in social space than students who were not nominated, and whether they represented a good cross-section of social groups in their school year. Measures of network and individual cohesion are presented, with comparison of individual cohesion measures for peer supporters and non-peer supporters. This is followed by the results of the cohesive subgroup analysis. It then presents largely qualitative process evaluation data which explores whether Year 8 students considered the peer supporters suitable to assume the role.

The following section (8.3) includes the results obtained largely from the process evaluation data. It details the young people's opinions about the acceptability of the approach adopted in the ASSIST intervention. This includes whether they prefer talking with young people than adults about smoking, whether the peer supporters are

willing to talk about smoking with other students, and whether they in turn are willing to talk with peer supporters.

8.1 Results of the ASSIST outcome evaluation

8.1.1 Response rates

Response rates were high, and the retention of students in the trial was excellent. At each datasweep, more than 92 per cent of eligible students provided self-reported outcome data (see Table 24).

Table 24: Summary of student turnover and response rates at each datasweep

	Number of students			
Datasweep	**Into study since previous datasweep**	**Eligible**	**Who provided outcome data (%)**	**Leaving study schools before next datasweep (%)**
Baseline	N/A	10730	10261 (95.6)	113 (1.1)
First post-intervention	14	10631	9897 (93.1)	379 (3.6)
Second post-intervention	370	10622	10043 (94.6)	397 (3.7)
Third post-intervention	352	10577	9747 (92.2)	N/A

8.1.2 Outcome results

Random effects logistic regression models were employed in the primary planned analysis of the one-year follow-up data with stratifying variables[2] and baseline smoking status included as covariates. School was fitted as a random effect to account for school-level clustering.

[2] English school, private school, Welsh-medium school, baseline year size >200 and percentage of students entitled to free-school meal >19 per cent

These models were implemented in STATA 9.0. At one-year follow-up the ASSIST intervention had a positive impact on reducing adolescent smoking (Audrey et al., 2006a; Moore et al., 2004). Amongst the 'high-risk' group, individuals in the intervention group were 25 per cent less likely (p=0.046) to be weekly smokers than individuals in the control group (see Table 25). This promising reduction in self-reported smoking was supported by analysis of salivary cotinine, although these results do show a slightly attenuated intervention effect (p=0.054). Amongst all students in the cohort, individuals in the intervention group were 23 per cent less likely (p=0.043) to be weekly smokers than individuals in the control group. The cotinine-validated data for this group again showed an attenuated intervention effect (p=0.139). These results which demonstrate a significant reduction in smoking rates are promising in terms of public health gain.

Table 25: Self-reported weekly smoking at one-year follow-up

	Intervention (95% CI)	**Control** (95% CI)	**Odds ratio*** (95% CI)	**P-value**
High-risk group				
Self-reported (n=3483)	18.8% (15.4, 22.3)	23.0% (19.6, 26.5)	0.75 (0.57, 1.00)	0.046
Cotinine >3ηg/ml (n=3306)	21.0% (17.0, 25.0)	24.8% (21.9, 27.7)	0.79 (0.62, 1.00)	0.054
All students				
Self-reported (n=9147)	11.6% (9.5, 13.8)	14.5% (12.2, 16.8)	0.77 (0.59, 0.99)	0.043
Cotinine >3ηg/ml (n=8727)	13.4% (10.8, 16.0)	15.6% (13.1, 18.2)	0.84 (0.67, 1.06)	0.139

* Odds ratios (and confidence intervals) from multi-variate random effects logistic regression models adjusted for school-level stratifying variables. Model for all students also adjusts for baseline self-reported smoking.

8.1.3 Response of peer supporters to their role

Analysis conducted and reported elsewhere (Audrey et al., 2006a) used data from the peer supporters and other students in Year 8 to examine the role of peer supporter from the perspective of the young people concerned, and provide some insight into what they actually did in their role.

The results showed that many peer supporters engaged in conversations about smoking with other students by responding to queries about the training course and follow-up sessions rather than initiating conversations. In terms of the content of the conversations, many peer supporters reported that the number of chemicals in a cigarette, which had been graphically illustrated during 'Ready Steady Cook' session (see Table 6), was the main focus of their conversations when they returned to school. And whilst the ASSIST training programme included information about the health, economic, social and environmental risks of smoking, it is unclear how much of this information was remembered by the peer supporters or accurately diffused through the year group. Although the health promotion trainers had attempted not to promote 'scare' tactics, some peer supporters did aim to shock. This approach seemingly contradicts 'best practice' concerning the use of fear-based approaches (Williams & Davidson, 2004).

Whilst it could be argued that these interview data may be biased as a result of young people providing socially desirable answers that they think the researchers may have 'wanted' to hear, it was not possible to obtain more objective data in the form of observation of young people actually carrying out the role of peer supporter. This would have been hugely labour intensive and expensive to explore the activities of peer supporters on a large scale. Furthermore, peer supporter activity was not restricted to the school grounds, and it would not have been possible to observe peer supporters all of the time, thus providing incomplete data. Another potential source of data were the diaries in which peer supporters were asked to document information

regarding the conversations they had with their peers. As reported elsewhere (Audrey et al., 2006b), discussions took place within the ASSIST team about whether these diaries should act as a source of data or remain part of the intervention, to keep the students focused on their peer supporter role and monitor their progress at follow-up sessions. Qualitative data analysis suggests that the decision to use the diaries as part of the intervention was appropriate; the diaries appeared to function well as a prompt for peer supporters, but cannot be relied upon to give an accurate indication of the number or quality of conversations undertaken since some peer supporters admitted during interviews and focus groups that they had made up some diary entries and forgotten to include others (Audrey et al., 2006a).

8.1.4 The response of schools to the ASSIST trial

A paper by Audrey and colleagues (In Press) reports that, in general, the ASSIST intervention was well received by participating schools. The ASSIST team aimed to minimise the burden of the intervention on schools. However, participating schools had a number of responsibilities which were discussed in advance with a member of the school's senior management team and a designated contact teacher. In relation to the intervention, schools were asked to facilitate the opt-out consent procedure used to obtain parental permission for students to be involved in the trial; give access to Year 8 students in order to carry out the peer nomination procedure; inform the selected students and arrange for them to attend the recruitment meeting; facilitate the opt-in consent procedure used for obtaining parental consent to train as peer supporters; provide a member of staff to accompany the students to the off-site training event; arrange for the trained peer supporters to attend four school-based follow-up sessions; and arrange for students to receive their certificates and gift vouchers. The school contact was also responsible for liaison with teachers whose lessons would be disrupted by the withdrawal of the selected students.

To examine the teachers' perceptions of the intervention, data were collected from all intervention schools through self-complete questionnaires completed by the school contact, or by teachers who were present at a given stage of the intervention. In addition, semi-structured interviews were conducted at baseline and immediately post-intervention with at least two members of staff, including the designated school contact in the four in-depth intervention schools selected for the in-depth process evaluation study. While it cannot be presumed that these interview data are representative of all schools involved, data from the self-complete questionnaires administered in all intervention schools do support the more detailed views expressed by those teachers who were interviewed.

The high level of interest from schools approached to take part in the trial has previously been noted in section 7.1.1, with more than 50 per cent indicating that they wanted to participate. Once recruited, no school withdrew from the intervention. Training and follow-up sessions were successfully conducted in all intervention schools. During the trial, tensions emerged in relation to organising activities within the school environment and in ensuring good communication between teachers over disruption to the normal teaching routine. However, the ASSIST team believes that contact staff and classroom teachers are unlikely to have differentiated between the intervention and its evaluation when considering the degree of disruption involved. Outside of the trial context, which would eliminate the need to arrange several outcome data collection sweeps, the levels of disruption would be significantly reduced.

The ASSIST intervention relied on two important features: recruitment of influential students who were nominated by their peers, and implementation by external trainers rather than teachers. Although schools were encouraged to allow all nominees to take part in the training, teachers could exclude students if they had serious concerns. In some cases, teachers suggested that the young people were not suitable to 'represent the school' or that they did not deserve the 'privilege' of participating in the intervention because of a history of

truancy or disruptive behaviour. Approximately three per cent (33 of 978) of nominated students were withdrawn by teachers, but the majority of schools accepted the peer nomination process as an important aspect of the intervention. Some teachers indicated that although they would have chosen different students to undertake peer-led health promotion, they were prepared to allow nominated students to participate. Others had more serious concerns and suggested that, under difference circumstances, they would have made significant changes to the list of nominees.

The ASSIST intervention was implemented by trainers with a variety of backgrounds and skills. Schools were asked to provide a teacher to accompany students to the training event, but to adopt a relatively 'passive' role unless serious disciplinary issues arose. Teacher self-complete questionnaires revealed that the vast majority felt the training was well organised, interesting and appropriate. Some teachers indicated that they felt uncomfortable with their role, particularly in relation to discipline, but many also suggest that they understood the rationale behind their role.

Teachers generally welcomed the training being delivered by external trainers, suggesting that it created additional interest amongst the students and acknowledging that students might experience difficulties in discussing smoking with teachers. They also welcomed the use of external trainers to relieve the burden on teaching staff.

Although there were some concerns, the intervention appeared to be broadly compatible with the ethos and timetable of participating schools. Student smoking was recognised as a difficult issue and, because they were unclear how to address the problem effectively, staff appeared to welcome the opportunity to test a new initiative. Schools also appeared receptive to a peer education model that would complement their attempts to promote confidence and a sense of responsibility in their students. Furthermore, teachers reported that conducting the intervention with Year 8 students was particularly timely, when they did not have significant school commitments such as examinations and coursework.

8.2 Were the peer supporters nominated in ASSIST appropriate to undertake the role?

8.2.1 Response to social network questionnaire and basic descriptive statistics

Students responded well to being asked to provide data about their friends, and response rates at each datasweep were high. Table 26 provides a summary of completion rates and the types of friends named at the first post-intervention datasweep. As shown, completion rates for the social network questionnaire were similar to that of the behavioural questionnaires, showing there was little non-response specific to this questionnaire. At this datasweep there were 1,860 eligible students in the ten schools selected for study. One thousand, seven hundred and seventy nine students (95.6 per cent) provided reliable data. Of the 81 students who did not provide data 67 were absent from school for both the main and absentee data collections, two named only themselves on the questionnaire, eight were present but did not complete the questionnaire and two students completed the behavioural questionnaire as an absentee under the supervision of school staff and did not complete this questionnaire. The reason for this is unknown.

The number of friends named by respondents varied. However, of the 1,779 students who provided data, 1,532 (86.1 per cent) named six friends, the maximum allowed, suggesting that it was appropriate to allow respondents to name up to six friends rather than restricting it to fewer. This is consistent with other research discussed in section 7.2.3.1. However, since the majority did name six friends this suggests that had they been given the opportunity, they may have named more.

Table 26: Summary of questionnaire completion and friends named

School	c11	c16	c20	c28	i2	i13	i16	i17	i19	i23	Total
Eligible students	158	194	249	112	157	222	203	129	266	170	1860
Behavioural questionnaires completed	147	181	247	102	156	210	187	127	263	165	1785
Social network questionnaires completed	147	181	246	102	155	210	188	125	260	165	1779
6 friends named	134	156	221	93	118	175	151	113	227	144	1532
5 friends named	6	10	15	3	10	17	22	5	21	17	126
4 friends named	4	8	9	4	13	11	6	4	8	3	70
3 friends named	3	5	1	2	11	6	8	1	2	1	40
2 friends named	0	2	0	0	2	0	1	2	2	0	9
1 friend named	0	0	0	0	1	1	0	0	0	0	2
Number of friends named	222	356	418	199	249	351	323	208	442	296	3064
Number of friends in Year 8 at same school	152	185	241	105	155	208	198	122	259	163	1788
Number of friends in a year below at same school	10	22	20	8	5	13	15	11	24	8	136
Number of friends in a year above at same school	18	22	43	41	15	19	29	22	39	29	277
Number of friends at a different school	48	118	108	42	70	105	76	44	113	76	800
Number of friends who have left school	3	9	6	3	4	6	5	9	7	20	72

The questionnaire asked respondents to categorise each friend into one of five categories relating to school attendance. These were: "is in Year 8 at my school;" "is in a year below Year 8 at my school;" is in a year above Year 8 at my school;" "is at another school;" and "has left school." One thousand, seven hundred and eighty eight (58 per cent) of the 3,064 friends named were in Year 8 at the same school. Two hundred and seventy seven people were named who were in the year above at the same school as the respondent, and 136 people were named who were in the year below at the same school as the respondent. Seventy two people were named who had left school and 800 people were named who went to a different school to the school the respondent attended.

Table 27 provides a breakdown of the number of ties made to each category of friend. A total of 10,194 ties were made, of which it was possible to assign unique ids to 9,872 ties (97 per cent). Reasons for not allocating a unique id included: the respondent did not provide enough information to be able to identify the friend, for example, only a first name for someone in their school year; the respondent provided only the first name and no surname for individuals outside of the school; only a nickname was provided by the respondent; the student named was in Year 8 at the same school but had not been granted parental permission to be involved in the trial; or the school was unable to identify an individual purportedly in a different year at the same school as the respondent (see Appendix 11). Of the 9,872 ties, 8,442 (86 per cent) were to students in Year 8 at the same school. This is a significantly higher proportion than the 1,788 (58 per cent) of the 3,064 friends named who were in Year 8 which shows that friends in Year 8 were more likely to have been named on more than one occasion than other friends. As stated previously, these analyses focus on friendships in Year 8 (on which the intervention was centred), so will concentrate on these 86 per cent of all ties made. The number of times individuals were named also varied significantly (between zero and sixteen).

Table 27: Summary of ties made in each school

School	c11	c16	c20	c28	i2	i13	i16	i17	i19	i23	Total
Number of ties made	858	1020	1430	591	847	1188	1066	724	1506	964	10194
Number of ties with id numbers allocated	811	946	1375	576	838	1149	1041	716	1478	942	9872
Number of ties with id numbers not allocated	47	74	55	15	9	39	25	8	28	22	322
Number of ties to friends in Year 8 at same school (with id)	726	757	1176	460	735	989	906	624	1273	796	8442
Number of ties to friends in Year 8 at same school (without id)	38	43	44	11	3	27	22	4	17	10	219
Number of ties to friends in a year below at same school (with id)	14	27	22	9	5	16	18	16	28	8	163
Number of ties to friends in a year below at same school (without id)	1	6	1	0	0	2	0	1	1	4	16
Number of ties to friends in a year above at same school (with id)	18	26	54	55	17	26	33	23	46	34	332
Number of ties to friends in a year above at same school (without id)	2	5	7	2	0	0	0	0	4	1	21
Number of ties to friends at a different school (with id)	49	127	117	49	76	112	79	44	124	81	858
Number of ties to friends at a different school (without id)	3	12	2	2	4	8	0	3	5	5	44
Number of ties to friends who have left school (with id)	4	9	6	3	5	6	5	9	7	23	77
Number of ties to friends who have left school (without id)	0	5	1	0	1	2	1	0	1	0	11
Number of indegrees (range)	0-11	0-10	0-11	0-14	0-14	0-14	0-14	0-16	0-14	0-11	0-16

8.2.2 Response to interview

Response to requests for interview in the four process evaluation schools was high (see Table 28). All planned group interviews were conducted, as were individual interviews with peer supporter refusals and drop-outs. The most significant loss of interviewees was in school i19 in which eight non-peer supporters and four peer supporters were not interviewed. Attempts were made to interview these students on more than one occasion but they were either absent from school or failed to turn up to their interview. The reasons for this are unknown. Table 28 shows the number of interviews conducted in in-depth process evaluation intervention schools which this research will use.

Table 28: Interviews conducted in in-depth intervention schools

	Total interviews planned	Number of interviews conducted				
School	**All**	**i2**	**i13**	**i17**	**i19**	**Total (%)**
Post-intervention group interview with peer supporters	8	3	2	2	2	8 (100)
Post-intervention individual interview with peer supporter	37	8	10	5	10	33 (89)
Post-intervention individual interview with non-peer supporter	41	8	7	7	10	32 (78)
Post-intervention individual interview with peer-supporter refusal*	6	0	3	0	3	6 (100)
Post-intervention individual interview with peer-supporter drop-out	7	0	6	1	0	7 (100)
Total individual interviews	91	16	26	13	23	78 (86)

*some additional interviews were conducted in schools not selected for in-depth study.

8.2.3 Were the peer supporters more influential in terms of their position in social space than students who were not nominated?

Three basic measures of network cohesion were considered before more specific measures of individual cohesion were examined.

8.2.3.1 Density

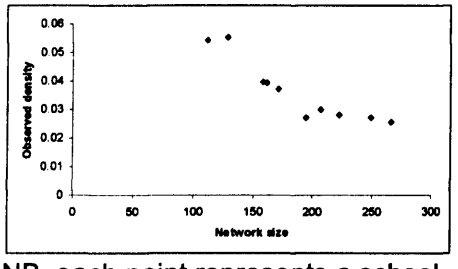
The density of each network was calculated in UCINET using symmetrised input matrices. The density measures produced are reported in Table 29. Compared to the maximum possible density of one, where all lines are present in the graph i.e. where every actor is joined to every other actor, (see section 6.1.5.1), the density of ties in these networks was low. Using these measures alone, this suggests that the young people in these schools were not very likely to know many other young people in their school year. However, these low values are likely to be largely due to the fixed-format of the social network questionnaire which only allowed respondents to name six friends. This is exacerbated where the size of the school year increases (since the denominator but not the numerator increases). Therefore, Table 29 also shows the observed density as a proportion of the maximum possible density (based on the six ties allowed in the social networks questionnaires) in each school.

As expected with this fixed format, and explained in section 6.1.5.1 an inverse relationship is observed between network size and density (correlation coefficient of -0.912). With increasing network size, the density of the network decreases. This is shown in Figure 25. However, when the observed density was examined as a proportion of the maximum possible density, there was little difference across schools with different year sizes (correlation coefficient of 0.128), as shown in Figure 26.

Table 29: Observed network densities

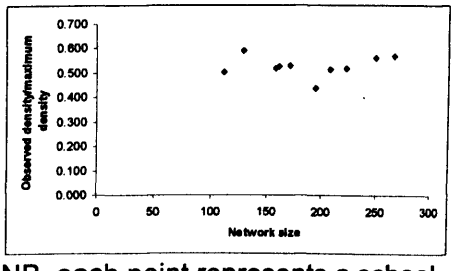
School	Actors (n)	Observed density (matrix average)	Max density based on six ties per actor	Standard deviation	Observed density/ maximum density
c28	112	0.0545	0.108	0.227	0.504
i17	129	0.0554	0.094	0.229	0.591
c11	158	0.0397	0.076	0.195	0.519
i2	161	0.0395	0.075	0.195	0.527
i23	171	0.0372	0.071	0.190	0.527
c16	194	0.0272	0.062	0.163	0.437
i16	207	0.0300	0.058	0.171	0.515
i13	222	0.0281	0.054	0.165	0.518
c20	249	0.0272	0.048	0.163	0.562
i19	266	0.0257	0.045	0.158	0.568

Figure 25: Relationship between density and network size



NB. each point represents a school

Figure 26: Relationship between network density as a proportion of maximum density and network size



NB. each point represents a school

8.2.3.2 Reachability

Reachability matrices produced from symmetrised input matrices using UCINET, revealed the number of disconnected nodes (the number of isolates who could not receive information from other actors in the network) in each network. The percentage of disconnected actors in each network was no more that 6 per cent in any school (see Table 30). Contrary to the suggestion in section 6.1.5.1 that where network size increases, the likelihood that it will be spilt into more than one group increases (i.e. the number of disconnected nodes increases), these results show that the size of school was slightly inversely correlated with the percentage of disconnected nodes (correlation coefficient of -0.289).

Table 30: Number of disconnected actors in each network

School	Actors (n)	Number of nodes that are disconnected	Percentage of nodes that are disconnected
c28	112	6	5.4
i17	129	2	1.6
c11	158	1	0.6
i2	161	4	2.5
i23	171	3	1.8
c16	194	9	4.6
i16	207	7	3.4
i13	222	9	4.1
c20	249	2	0.8
i19	266	3	1.1

8.2.3.3 Diameter

The longest path that information needs to travel from one actor to another i.e. the diameter of each graph (see section 6.1.5.1) was established. Table 31 shows that there is little evidence of a trend between the size of the network and the 'distance' information may

need to travel to reach any one actor (correlation coefficient of -0.033). Therefore, communication in larger networks is likely to be as efficient as that in networks with a smaller number of actors.

Table 31: Diameter of graph by school

School	Actors (n)	Diameter
c28	112	9
i17	129	7
c11	158	9
i2	161	9
i23	171	7
c16	194	9
i16	207	10
i13	222	10
c20	249	8
i19	266	7

8.2.3.4 Students included in analyses of individual-level cohesion

Measures of individual-level cohesion were calculated using data provided by students who were eligible to provide data at both baseline and the first post-intervention datasweep. The total number of students eligible in each of the ten schools, and the number of eligible peer supporters in these schools is detailed in Table 32.

Table 32: Number of students included in analysis of network data

School	Baseline year size (n)	Students nominated as peer supporters* (n)	Peer supporters eligible at baseline and first post-intervention (n)	Non-peer supporters eligible at baseline and first post-intervention (n)	Total students eligible at baseline and first post-intervention (n)
c11	164	31	31	127	158
c16	208	41	39	155	194
c20	264	47	47	202	249
c28	115	23	23	89	112
i2	159	27	27	128	155
i13	232	40	40	182	222
i16	208	39	39	165	204
i17	130	27	27	101	128
i19	270	47	47	217	264
i23	173	35	35	135	170
Total	1923	357	355	1501	1856

*Peer supporters were classed as those nominated in intervention schools and those who would have been nominated in control schools following tallying of the peer questionnaires

8.2.3.5 Degree Centrality

When social network data were analysed using UCINET, lower mean normed degree centrality measures were observed for individuals not nominated as peer supporters compared to individuals who were nominated (see Table 33). This illustrates that individuals nominated as peer supporters had, on average, more ties to other actors in the networks than those who were not nominated as peer supporters. They will therefore have more opportunity to exert immediate influence through conversations compared to others in their networks. This difference was significant in all of the ten schools studied. As with measures of network cohesion, degree centrality measures were related to network size and mean normed degree centrality measures were lower in larger networks (correlation coefficient for peer supporters of -0.915, correlation coefficient for non-peer supporters of -0.909)

Table 33: Mean degree centrality measures for individuals nominated and not nominated as peer supporters

	Normed degree centrality				
School	**Total eligible students (n)**	**Mean (SD_1) Peer supporters***	**Mean (SD_2) Non-peer supporters**	**$SE_{1,2}$**	**Difference (95% CI)**
c28	112	6.737 (2.140)	5.122 (2.380)	0.513	1.61 (0.61, 2.62)
i17	128	7.060 (2.067)	5.136 (1.811)	0.437	1.92 (1.07, 2.78)
i2	155	5.509 (1.605)	3.706 (1.317)	0.330	1.80 (1.16, 2.45)
c11	158	5.013 (1.361)	3.711 (1.352)	0.272	1.30 (0.77, 1.84)
i23	170	4.371 (1.469)	3.516 (1.260)	0.271	1.055 (0.52, 1.59)
c16	194	3.414 (1.201)	2.551 (1.076)	0.211	0.86 (0.45, 1.28)
i16	204	4.108 (1.243)	2.760 (1.157)	0.218	1.35 (0.92, 1.78)
i13	222	3.869 (1.456)	2.576 (0.993)	0.242	1.29 (0.82, 1.77)
c20	249	3.372 (0.920)	2.569 (0.762)	0.145	0.80 (0.52, 1.09)
i19	264	3.228 (0.937)	2.448 (0.851)	0.148	0.78 (0.49, 1.07)

*Peer supporters were classed as those nominated in intervention schools and those who would have been nominated in control schools following tallying of the peer questionnaires

8.2.3.6 Betweenness centrality

Normed betweenness centrality measures calculated in UCINET were higher for individuals nominated as peer supporters than those for individuals not nominated as peer supporters all ten schools studied, and statistically significant in eight (see Table 34). This suggests that individuals nominated as peer supporters were more likely to be located on paths between two actors in the network than those not nominated as peer supporters and were therefore more likely to control the flow of information in the network, increasing their potential to facilitate or impede the diffusion of information.

Table 34: Mean betweenness centrality measures for individuals nominated and not nominated as peer supporters

	Normed betweenness centrality				
School	**Total eligible students (n)**	**Mean (SD_1) Peer supporters***	**Mean (SD_2) Non-peer supporters**	**$SE_{1,2}$**	**Difference (95% CI)**
c28	112	2.576 (2.117)	1.784 (2.311)	0.505	0.79 (-0.20, 1.78)
i17	128	2.482 (2.341)	1.415 (1.255)	0.468	1.07 (0.15, 1.98)
i2	155	3.933 (3.428)	1.322 (1.509)	0.673	2.61 (1.29, 3.93)
c11	158	3.131 (3.217)	1.808 (2.043)	0.606	1.32 (0.14, 2.51)
i23	170	2.170 (2.095)	1.483 (1.802)	0.387	0.69 (-0.07, 1.45)
c16	194	2.930 (2.470)	1.530 (2.304)	0.437	1.40 (0.54, 2.26)
i16	204	2.538 (2.564)	1.274 (1.563)	0.428	1.26 (0.43, 2.10)
i13	222	2.349 (2.399)	1.242 (1.559)	0.397	1.11 (0.33, 1.88)
c20	249	1.502 (1.172)	1.070 (0.993)	0.185	0.43 (0.07, 0.79)
i19	264	1.405 (0.951)	0.962 (1.024)	0.155	0.443 (0.14, 0.75)

*Peer supporters were classed as those nominated in intervention schools and those who would have been nominated in control schools following tallying of the peer questionnaires

8.2.3.7 Closeness centrality

Closeness centrality measures obtained for peer supporters were then compared with measures obtained for individuals not nominated as peer supporters. Mean normed closeness centrality measures were significantly greater for peer supporters in all schools, as shown in Table 35. This demonstrates that individuals nominated as peer supporters were, on average, closer to other actors in the network than individuals not nominated as peer supporters, and had a greater ability to spread the smoke-free message more easily and exert wider influence on others in the network. Therefore, in terms of their location

in the network they were more suitably positioned to disseminate the smoke-free message to their peers.

Table 35: Mean closeness centrality measures for individuals nominated and not nominated as peer supporters

	Normalised closeness centrality#				
School	**Total eligible students (n)**	**Mean (SD_1) Peer supporters***	**Mean (SD_2) Non-peer supporters**	**$SE_{1,2}$**	**Difference (95% CI)**
c28	112	35.513 (4.343)	30.053 (9.737)	1.373	5.46 (2.77, 8.15)
i17	128	38.618 (3.945)	34.915 (6.246)	0.981	3.70 (1.78, 5.63)
i2	155	32.474 (2.846)	28.169 (5.748)	0.747	4.31 (2.84, 5.79)
c11	158	30.637 (3.145)	27.769 (4.253)	0.679	2.87 (1.54, 4.20)
i23	170	32.137 (3.114)	29.104 (5.546)	0.711	3.03 (1.64, 4.43)
c16	194	25.638 (2.839)	22.214 (5.999)	0.662	3.42 (2.13, 4.72)
i16	204	29.219 (3.232)	25.088 (6.220)	0.709	4.13 (2.74, 5.52)
i13	222	27.881 (5.349)	24.254 (6.037)	0.957	3.63 (1.75, 5.50)
c20	249	30.648 (2.781)	28.672 (3.872)	0.489	1.98 (1.02, 2.93)
i19	264	30.753 (2.133)	29.100 (3.198)	0.379	1.65 (0.91, 2.40)

*Peer supporters were classed as those nominated in intervention schools and those who would have been nominated in control schools following tallying of the peer questionnaires
based on reciprocal distances, hence low values

8.2.3.8 Average geodesic distance to 'high-risk group'

Since the primary outcome of the ASSIST evaluation was a reduction in smoking amongst the 'high-risk' group (students who had tried smoking or who were currently smoking less than one cigarette per week), the mean distance of peer supporters from this group was examined.

Individuals nominated as peer supporters were more likely to be closer to individuals in the 'high-risk' group than individuals not nominated as peer supporters. They were therefore more able to disseminate the smoke-free message to this target group. This was statistically significant in nine of the ten schools studied (see Table 36).

Table 36: Mean geodesic distance to 'high-risk' group for individuals nominated and not nominated as peer supporters

	Geodesic distance#				
School	**Total eligible students (n)**	**Mean (SD_1) Peer supporters***	**Mean (SD_2) Non-peer supporters**	**$SE_{1,2}$**	**Difference (95% CI)**
c28	112	0.354 (0.042)	0.309 (0.105)	0.014	0.05 (0.02, 0.07)
i17	128	0.382 (0.053)	0.361 (0.068)	0.012	0.02 (-0.00, 0.05)
i2	155	0.343 (0.046)	0.285 (0.065)	0.011	0.06 (0.04, 0.08)
c11	158	0.297 (0.040)	0.279 (0.043)	0.008	0.02 (0.00, 0.03)
i23	170	0.336 (0.033)	0.295 (0.061)	0.008	0.04 (0.3, 0.06)
c16	194	0.262 (0.032)	0.224 (0.062)	0.007	0.04 (0.02, 0.05)
i16	204	0.296 (0.042)	0.255 (0.067)	0.009	0.04 (0.02, 0.06)
i13	222	0.299 (0.062)	0.251 (0.065)	0.011	0.05 (0.03, 0.07)
c20	249	0.328 (0.062)	0.290 (0.054)	0.010	0.04 (0.02, 0.06)
i19	264	0.325 (0.042)	0.294 (0.044)	0.007	0.03 (0.02, 0.04)

*Peer supporters were classed as those nominated in intervention schools and those who would have been nominated in control schools following tallying of the peer questionnaires

based on reciprocal distances, hence low values

8.2.4 Did the peer supporters represent a good cross-section of friendship groups in the school year, thereby maximising the potential for successful diffusion through informal social networks?

Whilst it was not a specific aim of individual and group interviews, a number of students acknowledged the need for different friendship groups within the school year to contain peer supporters, and talked about whether they had the potential to '*spread*' the information throughout the year. This raised questions about whether the young people who were peer supporters were contained in a range of social groups in the school year and whether they had the potential to diffuse the anti-smoking message across these social groups. This research utilised social network data, and behavioural data collected at the first post-intervention datasweep to explore these issues.

In the post-intervention behavioural questionnaires all Year 8 students in all 30 of the intervention schools were asked if they knew any peer supporters. Of the 5,066 students (811 of whom were peer supporters) who completed the first-post intervention questionnaire in intervention schools, 4,991 answered this question. Table 37 and Table 38 provide a summary of responses from individuals who acted as peer supporters and those who did not (labelled non-peer supporters). Peer supporters were statistically significantly more likely than other students in the year to have known other peer supporters within the school. Almost 100 per cent (95% CI: 99.0-100.0) of this group indicated that they knew at least one peer supporter. However, it is encouraging that eighty six per cent (3585 of 4188, 95% CI: 82.6-88.2) of young people who did not act as peer supporters indicated that they knew at least one peer supporter.

Table 37: Year 8 students' responses to the question: How many people in Year 8 do you know who were asked to be peer supporters?

Response	Number of peer supporters* (%)	Number of non-peer supporters (%)	Total
No-one	1 (0.1)	603 (14.4)	604
Between one and four people	25 (3.1)	1629 (38.9)	1654
Between five and ten people	94 (11.7)	1161 (27.7)	1255
More then ten people	683 (85.1)	795 (19.0)	1478
Total	803 (100)	4188 (100)	4991

* Peer supporters are those who consented to continue to be a peer supporter following the peer supporter training.

Table 38: Number of students who said they knew one or more peer supporters

Number of peer supporters known	Number of peer supporters* (%)	Number of non-peer supporters (%)	Total
No-one	1 (0.1)	603 (14.4)	604
One or more	802 (99.9)	3585 (85.6)	4387
Total	803 (100)	4188 (100)	4991

* Peer supporters are those who consented to continue to be a peer supporter following the peer supporter training.

Table 39 shows the responses provided by peer supporters and non-peer supporters who reported that they were regular smokers, in the 'high-risk' group, or who had never smoked at the first post-intervention datasweep. As previously stated, peer supporters were more likely to know other peer supporters than those who were not peer supporters. However, amongst non-peer supporters, 21.3 per cent (58 of 273, 95% CI: 15.3-28.8) of regular smokers reported knowing no peer supporters compared to 14.8 per cent (248 of 1675, 95% CI: 11.8-18.4) of students in the 'high-risk' group and 13.2 per cent (293 of 2227, 95% CI: 10.7-16.1) of students who had never smoked.

Table 39: Year 8 students' responses to the question "How many people in Year 8 do you know who were asked to be peer supporters?" by smoking status

Peer supporters*							
Smoking status#	**Regular smokers**		**High-risk group**		**Never smokers**		
	(n)	**(%)**	**(n)**	**(%)**	**(n)**	**(%)**	**Total**
No-one	0	0.0	0	0.0	1	0.3	1
One or more	48	100	380	100	372	99.7	800
Total	48	100	380	100	373	100	801
Non-peer supporters*							
Smoking status#	**Regular smokers**		**High-risk group**		**Never smokers**		
	(n)	**(%)**	**(n)**	**(%)**	**(n)**	**(%)**	**Total**
No-one	58	21.3	248	14.8	293	13.2	599
One or more	215	79.8	1427	85.2	1934	86.8	3576
Total	273	100	1675	100	2227	100	4175

* Peer supporters are those who consented to continue to be a peer supporter following the peer supporter training.
# Self-reported smoking status at first post-intervention datasweep.

8.2.4.1 Cluster analysis

When data gathered from the social network questionnaires completed at the first post-intervention datasweep were analysed using Kliquefinder©, clusters were identified in all ten schools studied as shown in Table 40. Full details of cluster characteristics are provided in Appendix 17. Understandably, with increasing year size, the number of clusters tended to increase. However, within a school the number of actors in a cluster varied greatly, as did the mean number of actors per cluster. In all schools, the majority of clusters were single sex (range 61-100 per cent), and between 48 and 65 per cent of clusters contained at least one peer supporter.

Table 40: Number of clusters by school

School	Actors (n)	Clusters (n)	Actors per cluster (mean)	Size of clusters (range)	Number of single sex clusters (%)	Number of clusters containing PS (%)
c11	158	23	15	5-10	14 (60.8)	13 (56.5)
c16	194	32	16	3-12	27 (87.5)	19 (59.4)
c20	249	52	21	3-7	44 (84.6)	28 (53.8)
c28	112	24	21	3-7	20 (83.3)	14 (58.3)
i2	161	25	16	4-10	23 (92.0)	15 (60.0)
i13	222	33	15	4-10	29 (90.6)	18 (54.6)
i16	207	38	18	2-9	36 (94.7)	19 (50.0)
i17	129	21	16	4-9	17 (81.0)	11 (52.4)
i19	266	50	19	3-9	42 (84.0)	24 (48.0)
i23	170	31	18	3-8	31 (100)	20 (64.5)

*PS = peer supporters

Since the target group of individuals for this intervention were the 'high-risk' group of occasional and experimenting smokers, it was particularly important for peer supporters to be members of clusters containing individuals from this group. Table 41 shows these results.

Table 41: 'High-risk' clusters containing peer supporters

School	Clusters (n)	Number of clusters containing 'high-risk' group (%)	Number of 'high-risk' clusters containing peer supporters (%)
c11	23	21 (91.3)	13 (61.9)
C16	32	26 (81.3)	15 (57.7)
C20	52	44 (84.6)	19 (43.2)
C28	24	18 (75.0)	12 (66.7)
i2	25	19 (76.0)	13 (68.4)
I13	33	29 (87.9)	17 (58.6)
I16	38	30 (78.9)	15 (50.0)
I17	21	20 (95.2)	10 (50.0)
I19	50	37 (74.0)	18 (48.6)
I23	31	30 (96.8)	20 (66.7)

Table 42 shows that in almost every cluster there was at least one student who knew a peer supporter. Furthermore, in four out of the six schools, more clusters contained students who had spoken to peer

supporters than there were clusters containing peer supporters. This shows that students were likely to know or talk to peer supporters outside of their own social cluster, demonstrating that the activities of peer supporters were not confined to their own clusters. This provides evidence that they had the potential to affect the behaviour of students to whom they were not necessarily closely tied or friends with. This table also shows that if a peer supporter was in their social cluster, students were likely to know a peer supporter but that this did not guarantee that they would have talked to a peer supporter.

Table 42: Clusters containing peer supporters and students who reported that they know are that they have talked to at least one peer supporter

School	Clusters (n)	Clusters containing PS* (%)	Clusters containing students who know a PS* (%)	Clusters containing PS* and students who know PS* (%)	Clusters containing students who have talked to a PS* (%)	Clusters containing PS* and people who talk to PS* (%)
I2	25	15 (60.0)	25 (100)	15 (60.0)	17 (68.0)	14 (56.0)
i13	33	18 (54.6)	33 (100)	18 (54.6)	19 (57.6)	13 (39.4)
i16	38	19 (50.0)	35 (92.1)	19 (50.0)	23 (60.5)	14 (36.8)
i17	21	11 (52.4)	20 (95.2)	11 (52.4)	17 (81.0)	10 (47.6)
i19	50	36 (72.0)	50 (100)	24 (48.0)	34 (68.0)	21 (42.0)
i23	31	20 (64.5)	30 (96.7)	20 (64.5)	18 (58.1)	15 (48.4)

* PS = peer supporters

8.2.5 Were those nominated as peer supporters considered suitable to assume the role?

8.2.5.1 Characteristics of peer supporters

It has been suggested that in order to increase the persuasiveness of the health promotion message, the peer supporters should be relatively

homophilous with the target population. Data collected from self-report behavioural questionnaires provided descriptive information about the characteristics of peer supporters compared to other students in intervention schools. Table 43 presents these details at baseline. This table shows that the nomination process successfully identified individuals who were broadly representative of the study cohort in terms of gender, ethnicity, self-reported smoking and their intentions at age 16.

Table 43: Peer supporter characteristics at baseline

	Peer supporters % [n]	Non-peer supporters % [n]
Gender		
Male	50 [417]	51.5 [2331]
Female	50 [418]	48.5 [2195]
Total	100 [835]	100 [4526]
Ethnicity		
White	92.1 [750]	93.7 [4013]
Mixed	6.0 [49]	2.9 [125]
Asian/Asian British	0.5 [4]	1.4 [61]
Black/Black British	0.5 [4]	0.5 [23]
Chinese	0.0 [0]	0.4 [16]
Other	0.9 [7]	1.1 [46]
Total	100 [814]	100 [4284]
Self reported smoking behaviour		
Never smokers	51.4 [414]	57.6 [2466]
High-risk group*	43.9 [354]	37.6 [1610]
Weekly smokers#	4.7 [38]	4.8 [205]
Total	100 [806]	100 [4281]
Intentions at aged 16		
Stay on at school	48.6 [408]	45.1 [2005]
Training/apprenticeship/college	29.8 [250]	28.4 [1262]
Get a job	10.7 [90]	14.4 [640]
Other/unemployed/don't know	11.0 [92]	12.1 [540]
Note: some students provided more than one response		

* Tried once/Used to but don't now/<1 cigarette per week
\# ≥1 cigarette per week

The most marked difference was seen in terms of self-reported smoking behaviour. A significantly lower proportion of peer supporters were

never smokers compared to non-peer supporters (p=0.03) as shown in Table 44.

Table 44: Difference in smoking habits by peer supporter status

	Peer supporters % (95% CI)	Non-peer supporters % (95% CI)
Never smokers	51.4 (45.1, 57.6)	57.6 (53.9, 61.3)
Ever smokers (ex- and current smokers)	48.6 (42.4, 54.9)	42.4 (38.7, 46.1)
Total	100	100

However, these analyses do not provide any indication of whether the young people involved considered the peer supporters suitable to adopt the role. Data regarding the importance of selecting peer supporters whom young people were willing to talk with about smoking were collected through the self-report behavioural questionnaires, individual and group interviews with peer supporters and individual interviews with non-peer supporters.

The young people interviewed were specifically asked about their perceptions of the suitability of the individuals they had named on their peer nomination questionnaire, and the suitability of the young people who went on to undertake the peer supporter role (see Appendix 15). The suitability of these two groups will be discussed separately.

8.2.5.2 Suitability of individuals named on peer nomination questionnaires

Just under half of all interviewees said that the people they named on their peer questionnaire would have been suitable to be peer supporters. A further third said that some of those named would have been suitable. There were only three reports of the students named not being at all suitable to undertake the role.

Several themes arose regarding the suitability of individuals respondents named. The most frequently cited reasons for people

named being the appropriate kinds of people to act as peer supporters included that they were non-smokers, they were popular, people listen to them, they talk to people and they are mature/sensible. The most frequently cited reasons for being unsuitable included being a smoker, and being immature or not taking the role seriously.

8.2.5.2.1 Smokers

A number of people named smokers on their peer nomination questionnaires. Six respondents, including one student in a group interview considered that it was either inappropriate that they should have the opportunity to act as peer supporters as it would be hypocritical for smokers to deliver a message of being smoke-free to their peers, or that the individuals they had named would have been suitable because they were non-smokers.

> *Interviewer: Yeah, you named some people here. Do you think the people that you named for these three questions would have made good peer supporters for our project?*
> *i17124, male non-smoker: Some of 'em would have.*
> *Interviewer: Okay. Can you tell me why some of them would have been good and some of them wouldn't?*
> *i17124, male non-smoker: Some who smoke and some don't.*
> *Interviewer: Right, so does that mean that you think that the peer supporters should have been non-smokers or not?*
> *i17124, male non-smoker: Yeah.*
> *Interviewer: Okay. Why's that?*
> *i17124, male non-smoker: Cos you are trying to stop people smoking.*
>
> (Non-peer supporter interview)

> *Interviewer: Um, do you think that the people whose names you put down on this form...*
> *i2107, male smoker: Yeah.*
> *Interviewer: Would be suitable actually to do what you did, which was to become a peer supporter. Did you think, you know, now you've had time to think about it all, all of those names...*
> *i2107, male smoker: No. (Laughs)*
> *Interviewer: No?*
> *i2107, male smoker: No.*
> *Interviewer: Why not?*

i2107, male smoker: [i2039], he smokes all the time and he don't care.
Interviewer: Right.
Laughter.
i2107, male smoker: So he don't care anyway.
Interviewer: OK.
i2107, male smoker: Everyone else I mentioned don't smoke, so...

(Individual peer supporter interview)

However, two respondents thought that smokers may have benefited from attending the training and learning about smoking issues.

i19191, female non-smoker: Erm, I think yes definitely for like the first one and the third one. I mean some of the people who I put down for the second one I do know that they do smoke and things like that so. I suppose that would be good because it would maybe help them not smoke, being a peer supporter because it had taught them about doing it.

(Non-peer supporter interview)

Interviewer: I don't know if you can remember the names of the people that you put down but do you think that the people that you did name would have been suitable to be peer supporters for our trial?
i19251, male non-smoker: Probably 'cos they, well 90 per cent of them don't smoke. One which is rather good at sports like, he smokes. So...
Interviewer: So you think it was important that peer supporters were non-smokers then?
i19251, male non-smoker: It depends doesn't it 'cos if you do smoke it could help you to quit yourself that's, knowing all the stuff in a fag or something like that.

(Individual peer supporter interview)

8.2.5.2.2 Popularity

Being popular was seen as an advantageous attribute by three peer supporters and three non-peer supporters, as it could increase the opportunities the peer supporters had to talk to people, and would increase the influence they had over others.

i19057, female non-smoker: Probably because normally you respect people who people will listen to and talk to easily and who like have got lots of friends and stuff like that, so yeah, I think they would have been.

(Individual peer supporter interview)

i19153, male non-smoker: Because they can help people and the other people can listen to them cos they're more popular.

(Individual peer supporter interview)

i19162, male smoker: Because they're well known and friendly to everyone. They give really good advice as well of you are stuck on something.

(Non-peer supporter interview)

People who are listened to by others were considered suitable people to act as peer supporters by four students in individual peer supporter interviews, and by one non-peer supporter.

i17016, male non-smoker: 'Cos they are good leaders and that are people that look up to and listen.

(Individual peer supporter interview)

i17072, female non-smoker: Because the people I put down were like, people like them and they'd listen to them and they look up to them.

(Individual peer supporter interview)

It was also a subject which arose with three students in two group interviews.

i19137, male non-smoker: Um, well some of my friends...
Interviewer: Some of your friends?
i19137, male non-smoker: Well, they aren't sort of very well known. I mean, if they said something not many people would sort of take notice to what they are saying.
Interviewer: So whilst you respect and you look up to them, you don't think that other people necessarily would of done?
i19137, male non-smoker: No.

(Peer supporter group interview)

i2124, female non-smoker: I thought most of them would be, but some of them wouldn't because some of them, just some people don't like get on with them, so they wouldn't listen to what they said anyway.
i2031, male smoker. Yeah, they might be like your friends but not to other people.

(Peer supporter group interview)

8.2.5.2.3 Ability to talk to people

The ability to talk to people was also recognised as a valuable attribute by six students across all three groups of interviewees. Both peer supporters and those not nominated as peer supporters felt that the majority of individuals they had named were able to talk freely to people, and would be good in the peer supporter role.

i19187, male non-smoker: Umm, well one of my friends, he's quite good at, he's not afraid to, not speak to people. May not be popular but he's got, he good at talking to people anyway. He's funny, he's a laugh, yeah, he's quite clever at taking in loads of different information and just giving it in a different sort of way than. I'll say to someone, someone say facts but he'll say it in a conversation, just brings it up really.

(Individual peer supporter interview)

i17068, female non-smoker: Cos they talk a lot (laughs). Erm, they discuss things and stuff like that.

(Individual peer supporter interview)

i19019, female non-smoker: Because some of them like would get on with people, some of them don't.
Interviewer: Okay. In what way?
i19019, female non-smoker: Well, some of the people I put down are really quiet and like keep themselves to themselves but the other people are like open and they talk.

(Non-peer supporter interview)

8.2.5.2.4 Maturity and adopting the role seriously

Both peer supporters and other students commented on a related issue; the level of maturity of the people they named on their peer nomination questionnaires. The following two students identified those they had named as being too immature to take on the peer supporter role.

> *i19231, female smoker: Because they are not very, some of them aren't that mature and I don't find, like I don't know why I'm saying this but they are not that mature to be doing something like this.*
>
> (Individual peer supporter interview)

> *i19147, male non-smoker: Yeah. Some of them yeah they really would but some of them just are really silly, stupid and immature.*
>
> (Peer supporter group interview)

However, four other interviewees considered the people they had named sensible and mature, and more suitable to take on the peer supporter role.

> *i2020, female non-smoker. Because they're responsible and they're, um, they listen well and they just, I think they take on things pretty well.*
>
> (Non-peer supporter interview)

> *i19026, female non-smoker: Cos they were sensible and... like things like this I think.*
>
> (Non-peer supporter interview)

> *i2035, male non-smoker: Yeah 'cos they're like mature people and you had people who are like a whole range of people kind of thing, so sensible....*
>
> (Individual peer supporter interview)

The need to take the role seriously was raised by several interviewees who felt that the people they named would not take on a role of a peer supporter seriously. This was also raised by one student in a group interview.

Interviewer: Okay. Do you think that the people that you actually named on this questionnaire were actually um, would have been suitable to be peer supporters for our project?
i19232, female non-smoker: No.
i19242, male, non-smoker: Some of them yeah.
i19147, male, non-smoker: Some of them might of yeah.
Interviewer: Okay do you want to kind of go around and say why you are saying that? [i19232] you said no.
i19232, female non-smoker: Because my friends are just mad. They just wouldn't take it seriously at all.

(Peer supporter group interview)

8.2.5.3 Suitability of those who acted as peer supporters

Data collected regarding the suitability of those who *acted* as peer supporters also revealed some consistent themes. The results of quantitative data gathered from 4,719 of the 5,066 students who completed the first post-intervention questionnaire are presented in Table 45 and Table 46. Table 45 indicates that students were unconvinced that the students chosen to be peer supporters were appropriate to assume the role. However, only 17 per cent (130 of 770, 95% CI: 14.1-20.1) of peer supporters believed their fellow students to be unsuitable to undertake the role compared to 48 per cent (1908 of 3949, 95% CI: 45.9-50.7) of young people who were not peer supporters.

Table 45: Year 8 students' responses to the statement "The sorts of people chosen to be peer supporters were not the best ones to talk about smoking"

	Number of peer Supporters* (%)	Number of non-peer supporters (%)	Total
Agree	130 (16.9)	1908 (48.3)	2038
Disagree	640 (83.1)	2041 (51.7)	2681
Total	770 (100)	3949 (100)	4719

* Peer supporters are those who consented to continue to be a peer supporter following the peer supporter training.

Higher proportions of both regular-smoking peer supporters and regular-smoking non-peer supporters considered peer supporters unsuitable for the role compared to those in the 'high-risk' group and their non-smoking equivalents (see Table 46). The difference observed between peer supporters who had never smoked and those who were regular smokers was statistically significant (p=0.02) as was the difference between non-peer supporters who had never smoked and those who were regular smokers (p<0.01). However, amongst both peer supporters and non-peer supporters, the difference seen between those in the 'high-risk' group and those who were regular smokers was not statistically significant.

Table 46: Year 8 students' responses to the statement "The sorts of people chosen to be peer supporters were not the best ones to talk about smoking" by smoking status

Peer supporters*							
Smoking status#	**Regular smokers**		**High-risk group**		**Never smokers**		
	(n)	**(%)**	**(n)**	**(%)**	**(n)**	**(%)**	**Total**
Agree	12	26.7	67	18.6	50	13.8	129
Disagree	33	73.3	293	81.4	313	86.2	639
Total	45	100	360	100	363	100	768
Non-peer supporters*							
Smoking status#	**Regular smokers**		**High-risk group**		**Never smokers**		
	(n)	**(%)**	**(n)**	**(%)**	**(n)**	**(%)**	**Total**
Agree	143	57.7	804	51.0	954	45.2	1901
Disagree	105	42.3	773	49.0	1158	54.8	2036
Total	248	100	1577	100	2112	100	3937

* Peer supporters are those who consented to continue to be a peer supporter following the peer supporter training.
# Self-reported smoking status at first post-intervention datasweep.

This uncertainty over the suitability of the peer supporters is largely supported by qualitative data. However, the qualitative data does not reflect the discordant views of peer supporter and non-peer supporters revealed by the quantitative data.

Approximately one fifth of all interviewees said that the peer supporters were suitable to assume the role. A further third of peer

supporter interviewees, and non-peer supporter interviewees said that some of those named were suitable. The majority of respondents in over half of group interviews reported that some students were suitable peer supporters. Three peer supporter drop outs, three non-peer supporters, three peer supporters and students in one peer supporter discussion said that the peer supporters were not suitable to undertake the role.

A variety of reasons were provided for people being appropriate to undertake the role. A number of these mirror those provided regarding the suitability of those named on the peer nomination questionnaire. The main reasons included: people listen to them, they are good at talking and are confident; they are easy to talk to and they talked lots. The main reasons given for being unsuitable were: they were smokers, they didn't take the role seriously (messed about, went for fun and to get time off school), and they didn't talk to anyone about smoking.

8.2.5.3.1 Smokers

Three peer supporters interviewed on an individual basis, and one who did not continue as a peer supporter considered individuals who were current smokers inappropriate to undertake the peer supporter role. They also reported that despite being asked to make attempts to give up the habit, some had not.

> *i19187, male non-smoker: I think a few of them were not suitable.*
> *Interviewer: Why weren't they suitable?*
> *i19187, male non-smoker: Well a few of them smoke, I know that.*
> *Interviewer: And you don't think that that was appropriate?*
> *i19187, male non-smoker: I think it had to be people who didn't smoke and I know for a fact that none of 'em stopped. They say, they said they had but they hadn't.*
>
> (Individual peer supporter interview)

Interviewer: Okay. Do you think that the other people who were peer supporters were suitable to talk to other people about smoking?
i19266, female smoker: Some of them
Interviewer: Why do you say some of them?
i19266, female smoker: Because some of the people smoke.
Interviewer: Right and you don't think that's appropriate?
i19266, female smoker: No.
Interviewer: Why do you, why's that not right?
i19266, female smoker: Because they are telling people not to smoke and all the while they are doing it.

(Peer supporter drop-out interview)

A number of peer supporters in five group interviews also identified one reason that some of the peer supporters were unsuitable was that some of them smoked. Examples of the discussions are illustrated here.

i17028, female non-smoker: But some people it's a bit um... I always forget this word... oh no! I forgot the word but it'll come to me like after but never mind. Because they come back and tell you, smoke themselves it's a bit, that's the word, they were a bit hypocritical because they smoked and they were telling other people not to. But that person that they were talking to knew that they smoked anyway so they was like why are you telling me for because you smoke.
i17067, female, non-smoker: So what's the point in me stopping.
Interviewer: Right okay, so they didn't really make an attempt to stop then?
i17077, male, non-smoker: No. (laughs)

(Peer supporter group interview)

Interviewer: Um, so I wanted to know whether you think that the people that we picked were suitable to talk to other pupils in Year 8 about smoking?
i13152, male non-smoker: Not really 'cos most of them do it theirselves.
Interviewer: Is that what you think [i13152], most of them we got were smokers, were they? And you think they weren't really suitable to do the training?
i13152, male non-smoker: No, I know [i13137] wasn't.
Interviewer: And what about you [i13201]? What do you think about the people we picked out?
i13201, female non-smoker: I don't know but I don't think any of them stopped afterwards.
Interviewer: No?
i13201, female non-smoker: No, some of them tried but some of them carried on.

(Peer supporter group interview)

This opinion was also held by four students who had talked to peer supporters about smoking.

> *i19093, female non-smoker: Some of them were but some of them weren't 'cos you wouldn't 'cos like if, 'cos if the ones that were, that smoke that were peer supporters no-one would really take them seriously because they know that they smoke.*
> (Non-peer supporter interview)

> *i17032, female non-smoker: Well, some people I know that were peer supporters I think that they are smoking themselves and I think that they don't really mean what they say to other people.*
> (Non-peer supporter interview)

8.2.5.3.2 Adopting the role seriously

Not only did interviewees consider that some of the people they named *would not* take the role of a peer supporter seriously, but it was also thought that some of those actually undertaking the role *did not* take it very seriously and or/messed around. This was reported by three non-peer supporters and eight peer supporters.

> *i2032, female smoker: Um, I dunno. Like [i2039] he's like, he didn't really speak to no-one and he was just like really loud and didn't take it as serious as other people did.*
> (Individual peer supporter interview)

> *i19057, female non-smoker: I'd say most of us are because 99 per cent of us took it seriously. There was just a handful of boys who were messing around and didn't take it seriously but I think most of us were.*
> (Individual peer supporter interview)

> *i19191, female non-smoker: Some of them didn't really take it seriously. They had a bit of a laugh.*
> (Non-peer supporter interview)

The following quotation demonstrates how this subject was discussed in one group interview. It was also mentioned by one student in each of a further three group interviews.

Interviewer: So, from those questions we pulled out some people to be peer supporters and what I want to know is do you think those people whose names you put down, did you think they were suitable to be peer supporters now that you know what the project was all about?
All. Some, some of them, some.
i2113, male, non-smoker: Some didn't take it seriously.
i2079, male, non-smoker: [i2130] wouldn't.
i2114, female, non-smoker: Some of them I thought wouldn't like get on with it if they went to the ASSIST, but then they did in the end, so it was all right.
i2113, male, non-smoker: Some of them weren't listening to what was like going on.

(Peer supporter group interview)

A number were identified as participating for the incentives, namely time out of school and the monetary reward at the end of the ten-week intervention. This was reported by one non-peer supporter and a peer supporter in one individual interview and by several students in a group interview as shown below.

i17006, male non-smoker: Yeah. Well, not mostly the boys cos they mess about and talk quite a bit, but the girls yeah. I think they were.
Interviewer: Do you want to say a bit more about that?... Why they were good and why they were bad.
i17006, male non-smoker: The boys, they don't listen and they'll just fill in your diary cos you've got to. You know, some of 'em done it for fun and, like the boys done it cos they get a £10 voucher.
Interviewer: But the girls you think were...
i17006, male non-smoker: Enjoying it, yeah.

(Individual peer supporter interview)

i19243, male non-smoker: I think some of them would just take it as a joke to get out of school but others would take it seriously. Erm, cos I think like after the first one some people would speak to you but others would just, oh we are doing this, get to miss a bit of school.

(Non-peer supporter interview)

i13162, female smoker: Some didn't really bother doing it.
i13184, female non-smoker: I think it was 'cos it was like two days off school.
i13189, male non-smoker: Yeah, that's why.
i13111, female non-smoker: Some people just did it to get out of school.

(Peer supporter group interview)

Interviewees in one group interview even admitted that time off school was an incentive for them to be involved.

i17028, female non-smoker: Because most of them can be like stupid and childish.
i17067, female non-smoker: Yeah, I think some of them just like to get off because everyone thought oh great it's a day off school. I think that's what like other people thought it's a day off school but...
i17053, male non-smoker: Some people really wanted to go and get off school for two days.
i17028, female non-smoker: I wanted to go to get off school for two days.
i17067, female non-smoker: I did.

(Peer supporter group interview)

8.2.5.3.3 Personality

Interviewees provided divided opinions about whether those nominated had the personality to talk to others in their school year about smoking issues. Three non-peer supporters and three peer supporters interviewed individually and a student in one group interview reported that some peer supporters were either shy, or didn't really talk to people very much so would not be very successful at spreading the smoke-free message to other students in their year.

i19081, male smoker: 'Cos erm, some of them would see things and keep it to themselves and others would go round telling other people, oh he says this.

(Individual peer supporter interview)

i2144, female smoker: Um, well [i2145] is very shy and she's not really gonna go up to anyone and say "Do you smoke?" or anything. And, um, [i2130] doesn't really speak to anyone that much, he's off with all his other mates in other tutors.

(Non-peer supporter interview)

Others were considered much more suitable to carry out this role because they showed a willingness to talk to people as previously discussed. This was reported by one peer supporter, one drop-out and four non-peer supporters.

i17068, female non-smoker: Cos they er, they, most of em are talkative like and they discuss things more and actually talk to people. Like some people are really quiet and don't speak to many people. So that's good.

(Individual peer supporter interview)

i19019, female non-smoker: Erm, because they would really like try and speak to you and stuff and they would try and get into the conversation and like try and talk to you about it.

(Non-peer supporter interview)

8.2.5.3.4 Good at talking or easy to talk to

A number of interviewees reported that the peer supporters were good to talk to and good talkers. A variety of reasons were given for this. The main reason was that they were confident (reported by one peer supporter, one drop-out and two non-peer supporters).

i19231, female smoker: Because they can actually they're the ones that like speak up and like give you their opinion and everything and they are the ones that are confident but some of them weren't. The rest of them, like the ones I really know are the ones that I think were good peer supporters.

(Individual peer supporter interview)

i19026, female non-smoker: Cos they like weren't, they were confident, they'd listen to the things and then like pass it on to people.

(Non-peer supporter interview)

Other reasons identified by two non-peer supporters, one drop-out, one peer supporter and participants of one group interview was that the peer supporters were well known, or friendly, making them easier to talk to. The issue of being well known was also seen to facilitate the diffusion of the smoke-free message.

> *i13156, female: Well they were quite popular so they've got lots of people they can talk to…*
>
> *(Individual peer supporter interview)*

> *i19229, female smoker: Because they're all people that everybody knows well and they can talk to so it was, it was easier for people to talk to them.*
>
> (Peer supporter drop-out interview)

> *i17076, female non-smoker: They were friendly and nice to talk to and it was comfortable.*
>
> (Non-peer supporter interview)

However, the following respondents thought that being considered popular had enabled some people to be nominated as knowing lots of people, and lots of people knowing them gave them more 'nomination potential'. This however did not necessarily mean that they were suitable individuals to be named in response to the questions on the peer nomination questionnaire, or suitable to adopt the peer supporter role. Others thought that some people had simply named their friends on their peer nomination questionnaire.

> *i13180, female non-smoker: Mmm, but some people just writ the popular people.*
> *Interviewer: Yeah.*
> *i13810, female non-smoker: Like just their friends, and there's like some people who's everyone's friend and they got put down a lot even if they were quite, you know, not that good.*
> *Interviewer: Mmm.*
> *i13810, female non-smoker: Like [i13137] and everyone got picked and that was just because they're friends to everyone, so everyone just writ his name on everything.*
>
> (Individual peer supporter interview)

i19166, female non-smoker: Erm, I think well they were named because they were popular and I don't think they were suitable, well all of them.
Interviewer: Why's that?
i19166, female non-smoker: They. I don't know, they are just popular people and I've got views about popular people and what they, I don't know... (laughs)
Interviewer: Do you want to tell me about that?
i19166, female non-smoker: Well most of the popular people are, they are people who for example swear a lot, erm or don't take school seriously, well very seriously anyway. I don't know, the people who hang around with people who smoke and stuff like that so...

(Non-peer supporter interview)

8.2.5.3.5 People listen to them

The following students thought that some of those nominated were individuals who people listened to, and it was thought that they would easily influence others around them.

i2058, male smoker: Yeah, it was most of the people that like everyone listens to and does what they say and stuff like that.
Interviewer: Right, OK. You felt that was a reasonable group of people to ask to be peer supporters?
i2058, male smoker: Yeah.
Interviewer: Why do you think everyone does what they say?
i2058, male smoker: Well not everyone does what they say, but like in the groups of friends they are like the leaders of it or the people that, when you're like walking around, they stand in the middle of them walking around and stuff like that.
Interviewer: Oh, right.
i2058, male smoker: Those sorts of people.

(Individual peer supporter interview)

i17016, male non-smoker: Because most people who were picked. They were like people who people who listen to and they are good talkers. And people like, like they get one with everyone.

(Individual peer supporter interview)

i2114, female non-smoker: Some of them were bossy so everyone listens to them.
Interviewer: Some of them were bossy? How do you think that came about? How did we end up with some bossy ones?
i2114, female non-smoker: Because they are most popular. Everyone does what they do
i2079, male, non-smoker: They like the people with patter like [i2107].
i2034, female, non-smoker: Yeah.
Interviewer: So they are popular?
i2034, female, non-smoker: Mmm. Yeah.

(Peer supporter group interview)

8.3 Do young people find this social diffusion approach to reducing the prevalence of smoking acceptable?

For the successful diffusion of the smoke-free message, it was important that students found this approach acceptable and were willing to talk with each other about smoking. This included both those nominated as peer supporters and other young people with whom they would talk about smoking. A number of issues were raised in interviews with these students including: whether young people prefer talking to other young people than adults about smoking; whether peer supporters are willing to talk with fellow students about smoking; how peer supporters felt about having conversations; and whether other students are willing to talk with peer supporters about smoking.

8.3.1 Do young people prefer talking to young people than adults about smoking issues?

One important area to consider regarding the acceptability of this intervention is whether young people of this age are comfortable talking to people of the same age about smoking. The first post-intervention behavioural questionnaire asked students whether they thought that it was better to talk to people their age, or teachers about smoking. The responses to this question which were provided by 4849 of the 5066 students who completed this questionnaire are detailed in Table 47.

Eighty two per cent (3965 of 4849) of students agreed that it is better having individuals your own age to talk to about smoking rather than teachers. Almost 95 per cent (752 of 794, 95% CI: 92.3-96.4) of peer supporters agreed with this statement compared with just over 79 per cent (3213 of 4055, 95% CI: 76.9-81.4) of non-peer supporters.

Table 47: Year 8 students' responses to the statement "Having people your own age talking to you about smoking is better than having teachers doing it"

Response	Number of peer Supporters* (%)	Number of non-peer supporters (%)	Total
Agree	752 (94.7)	3213 (79.2)	3965
Disagree	42 (5.3)	842 (20.7)	884
Total	794 (100)	4055 (100)	4849

* Peer supporters are those who consented to continue to be a peer supporter following the peer supporter training.

Table 48: Year 8 students' responses to the statement "Having people your own age talking to you about smoking is better than having teachers doing it" by smoking status

Peer supporters*							
Smoking status#	Regular smokers		High-risk group		Never smokers		
	(n)	(%)	(n)	(%)	(n)	(%)	Total
Agree	45	95.7	343	92.2	362	97.1	750
Disagree	2	4.3	29	7.8	11	3.0	42
Total	47	100	372	100	373	100	792
Non-peer supporters*							
Smoking status#	Regular smokers		High-risk group		Never smokers		
	(n)	(%)	(n)	(%)	(n)	(%)	Total
Agree	209	80.4	1285	79.3	1713	79.2	3207
Disagree	51	19.6	335	20.7	450	20.8	836
Total	260	100	1620	100	2163	100	4043

* Peer supporters are those who consented to continue to be a peer supporter following the peer supporter training.
# Self-reported smoking status at first post-intervention datasweep.

When these data were considered in terms of smoking status, no significant differences were observed between the proportions of

students from each group. The majority in each category agreed that young people were better to talk with than adults (Table 48).

8.3.1.1 Better to talk to young people than adults

These quantitative data are supported by qualitative data collected through individual and group interviews with students involved in the trial. Approximately 70 per cent of interviewees (both peer supporters and non-peer supporters) and students in seven of the eight group interviews reported that they would prefer to talk about smoking-related issues with friends or other people their own age than adults. A number of reasons were provided for this preference. The main reasons were: friends are easier to talk to; young people take more notice of what their friends say rather than what adults say; friends can be trusted more than adults; people the same age understand them more and can empathise because they are the same age; and that young people/peer supporters adopt a different approach to adults. These reasons were reported by peer supporters and non-peer supporters alike.

8.3.1.1.1 Easier to talk to friends than adults

Ten respondents reported that they would rather speak to other young people because it is generally easier to talk to friends than to adults.

> *i19057, female non-smoker: Yeah, I think it will because erm it's easier to talk to your friends and people your own age about things like that...*
>
> (Individual peer supporter interview)

> *i2020, female non-smoker: Um, I think it probably would make a difference because people of their, people of other people's age, they can talk to each other more openly than they probably could to an adult.*
>
> (Non-peer supporter interview)

i13163, female non-smoker: Yeah. I think it's easier to talk to people your own age. So I mean if it was to older people they most probably tell them like different stuff. So it is much easier. I found it easier to chat to people my age.

(Peer supporter drop-out interview)

8.3.1.1.2 Listen to what friends say

Almost a fifth of interviews with peer supporters and non-peer supporters reported that young people listen to what their friends and other people of their age say, and don't take as much notice of what adults say to them. This was discussed both in relation to adults generally, and more specifically in relation to teachers.

i13156, female non-smoker: Yeah, I think it's good because they are not going to listen to older people. They're more likely to listen to people their own age and take advice. If it's older people then they are not going to listen.

(Individual peer supporter interview)

i19231, female smoker: Yes because they are more likely to listen to someone their own age 'cos when like teachers tell them off they don't really listen but their own age they'd probably listen more than they would to older people so they take in more than they do from older people.

(Individual peer supporter interview)

i13193, female non-smoker: Well if it was like your friends and they're telling you, you'd listen to your friends but, if it's like a teacher you'd think 'Oh, God, shut up' sort of thing.

(Non-peer supporter interview)

This was also reported in over half of group interviews in which the majority of young people agreed that they were more likely to listen to their friends than teachers.

Interviewer: Do you think peer education can work?
All: Yeah.
i2029, female non-smoker: Yeah, I do because you're more likely to listen to someone your own age, than to like a teacher who is stricter and that.
i2113, male non-smoker: Or if it was like all videos, because we will watch a video. But if it's a teacher, you just don't take any notice.
Interviewer (to [i2009]): What do you think about this idea of talking to your peers?
i2009, male non-smoker: It's better than having a teacher 'cos no-one really listens to the teacher.
i2079, male, non-smoker: You get sent out if you do something naughty.
i2009, male, non-smoker: Yeah.

(Peer supporter group interview)

However, in one group, there was disagreement, with one student reporting that they did not think that young people would listen to what their friends say whilst another later reported that they thought that young people were likely to do what their best friend did.

8.3.1.1.3 Trust friends more than adults

Concerns about getting into trouble by talking to adults about smoking, and being able to trust friends more than adults were also seen as an important reason for talking to friends. This was reported by twelve interviewees and by one student in a group interview. They also thought that adults are more likely to be judgemental than friends. These views may have been affected by the age of respondents, who, at 12 to 13 years old may have felt that people would have viewed them engaging in smoking negatively because they are too young to buy cigarettes. Had they been older, these views may have been different.

i19168, female smoker: ...to an adult like you don't know if they will like say it to somebody else or something and it might get you in trouble or something so I think it's a lot easier us approaching and providing information to others.

(Individual peer supporter interview)

i2020, female non-smoker: ...Because they would think that an adult would be angry with them, or upset with them, and I don't think they think it would really matter with people their own age. So I think it would be, it would probably be a good idea to use peer education so you could make them discuss things at their own level and not kind of have to hide anything from people.

(Non-peer supporter interview)

i19177, male non-smoker: Because it's not like telling a teacher where they might get other teachers involved so they might be scared, some people. So really it's just better having children telling people of the same age.

(Non-peer supporter interview)

Interviewees (not group interview participants) also reported that friends are more trustworthy than adults, and that adults might be more inclined to divulge information discussed to a third party. Discussions about smoking with teachers may also be less honest.

i13180, female non-smoker: Yeah 'cos like if someone did smoke they wouldn't want to go up to a teacher and tell them 'cos they feel that, well some people might feel that the teacher might tell other teachers and stuff, and like it wouldn't be all private. But when you talk to your own friends they trust you and they know you won't tell anyone. It's better 'cos they feel like more easy to talk to one of your friends and someone in your year that, you know, than the teacher, 'cos you don't really trust them.

(Individual peer supporter interview)

13061, female non-smoker: But if it's your friends then I think you can trust them a little bit more than the teachers 'cos they go off and chat about things in the staff room. But you can like trust your friends a bit more.

(Non-peer supporter interview)

8.3.1.1.4 Young people are more empathetic

Another reason for preferring to talk to people of a similar age was the perception that young people are more able to empathise with other young people than are adults. Since young people are the same age

and are growing up at the same time it was thought that they can empathise more because they may be experiencing similar things. This was reported by ten interviewees (peer supporters and non-peer supporters alike) and by one student in a group interview.

> *i19168, female smoker: Yeah, because I think that people my age would listen more, no if like me go up to somebody my age would listen more to like an adult than because we are all like the same age and we are all going through the same things and like so the like the other, like an adult that has been there and done it but like it may not have been the same then, when they were a child, like when it was their childhood so I think that you just like...*
>
> (Individual peer supporter interview)

> *i19191, female non-smoker: Yeah. And it's sometimes nice to have somebody of your age, to talking to you about the smoking thing because some people I've talked to about it, I know they smoke anyway. But it's good to have somebody because you don't want to talk about it to teachers really or parents or anything like that. And it's nice to have somebody to talk to of your own age and who understands it a bit more because sometimes teachers and like parents and stuff don't really understand where you are coming from when you talk about it. And it was good to have somebody, you know your own age to talk to.*
>
> (Non-peer supporter interview)

8.3.1.1.5 Young people have better approach

Approximately ten per cent of interviewees identified adults as having a different approach to that used by young people with their peers. Adults were viewed as being more authoritarian when they talk about issues such as smoking, and young people sometimes felt that they were being lectured. Adults were seen as placing too much pressure on young people whereas friends were less likely to be viewed in this way.

> *i2058, male smoker: Yeah, it's probably quite good because if it's a teacher at the front of the class after a bit people get bored and stop listening but if you're just talking with someone else, it's OK.*
>
> (Individual peer supporter interview)

i19121, female smoker: Yeah, because it's better talking to someone like my age than someone older. And it's like they could like tell you like their experiences and stuff whereas an adult who is older than you will just tell you to stop.
(Non-peer supporter interview)

i2151, male non-smoker: I think it's like a good idea 'cos the teachers are just like "stop, stop" but your mates, you'll have a good conversation. And with your mates anything goes into the conversation so it's quite easy just to talk about it and get it over, bouncing back and forth in your mind, so I think it's a great idea.
(Non-peer supporter interview)

This was also reported by two students involved in two group interviews as demonstrated by the following example.

i17067, female non-smoker: ...if you have a teacher talking to you or like a parent you sometimes feel that they are really preaching to you and they are forcing you to do something but having a friend to do it is different. It is different to having like people the same age as you or like older, or just a bit older or younger than having people like adults talking to you.
(Peer supporter group interview)

8.3.1.2 Better to talk to adults than young people

Despite this overwhelming preference for talking to young people about smoking, twelve peer supporter and non-peer supporter interviewees, and three students in group interviews indicated that they either don't mind who they talk to, or that they would prefer to talk with individuals who were older than them (for example, teachers and parents) about smoking. Whilst there was little support for teachers to adopt this role, some students said that they would prefer to discuss smoking issues with family members such as parents, particularly if it were a choice between talking to parents or young people who were not their friends.

Interviewer: Do you think it's better that you as a young person are talking to your friends rather than, you have already spoken about your teachers talking to you about things and being...
i19082, male, non-smoker: Boring!
Interviewer:...or your parents talking do you think it's better if your friends are talking?
i19159, female smoker: No I think it is better if my mother talks to me.
i19137, male non-smoker: I don't talk to my mum that much.
i19159, female smoker: I do. My mum, my mum is like my best friend. I told her before that I smoked right and she said nothing...
[conversation topic changed for a short time, but returned to consider the same issue]
i19159, female smoker: She just said just quit because I had a stroke and things like that so I did.

(Peer supporter group interview)

i17096, female non-smoker: I would prefer my parents talking to me about it.
Interviewer: Would you. Why's that?
i17096, female non-smoker: If it was someone I knew a lot then yeah, I'd prefer them but if it was someone I didn't know then I'd prefer to talk to my parents. Feel more comfortable around them.

(Peer supporter drop-out interview)

8.3.1.2.1 Adults more experienced

The main reason for this preference, provided by four respondents was that adults are thought to have more experience and knowledge than friends so would be more able to provide information about smoking.

Interviewer: Which way would you prefer to learn something, say, about smoking? Would you rather the teacher did it?
i13217, female non-smoker: Yeah.
Interviewer: Yeah?
i13217, female non-smoker: 'Cos I know that they've had more, they're just like, they know more things than what children do 'cos the children are like learning still.

(Peer supporter refusal interview)

i13028, female non-smoker: But teachers like know what they're talking about but some children don't know what they're talking about and have got their own opinions so it works with both.

(Individual peer supporter interview)

8.3.1.2.2 Take more notice of adults

In comparison to the view taken by most, two interviewees thought that talking to young people was inappropriate as they were unlikely to take notice of other young people.

> *i76251, male non-smoker: I don't know. I think adults would do it better because kids like are just like kids and you'd be like "shut up" and all that but if an adult said it. They'd believe them because they know more about it.*
>
> (Individual peer supporter interview)

> *i13137, male non-smoker: Not if like a kid my age is telling them about it.*
> *Interviewer: No?*
> *i13137, male non-smoker: 'Cos they're just like, ignore me. Won't ignore be but they won't listen to me about it.*
>
> (Peer supporter drop out interview)

As previously noted in section 8.3.1.1.2, one student in a group interview said that they didn't think that young people would take any notice of what their friends said.

> *Interviewer: ... Do you reckon you've made a difference to whether anyone would smoke or not?*
> *i13124, female non-smoker: No, 'cos you're not exactly gonna listen to the same age as them are you?*
>
> (Peer supporter group interview)

8.3.2 Are the peer supporters willing to talk about smoking to fellow students?

The success of this intervention was dependent upon the peer supporters being prepared to engage with the intervention and be willing to talk with students in their year about smoking issues. It appears that young people of both genders did engage with the role, attending the follow-up sessions and handing in a diary containing information about conversations they had undertaken with other Year 8

students. Attrition rates for peer supporters were low, and no less than 84 per cent of peer supporters who completed training attended the subsequent follow-up sessions. Attendance was similar for males and females throughout, although there was a noticeable difference between genders in the proportions handing in a diary (p=0.02). This is shown in Table 49.

Table 49: Peer supporter retention by sex

	Number of males (%)	Number of females (%)	Total (%)
Attended training	426 (100)	422 (100)	848 (100)
Consented to continue as a peer supporter	417 (97.9)	418 (99.0)	835 (98.5)
Attended follow-up session 1	380 (89.2)	379 (89.8)	759 (89.5)
Attended follow-up session 2	368 (86.4)	382 (90.5)	750 (88.4)
Attended follow-up session 3	361 (84.7)	357 (84.6)	718 (84.7)
Attended follow-up session 4	365 (85.7)	368 (87.2)	733 (86.4)
Handed in a diary	320 (75.1)	367 (87.0)	687 (81.0)

One hundred and forty students were nominated as peer supporters but did not continue in the role following the training (see Table 50). The majority of these students did not receive permission to be trained as a peer supporter, either because they, or their parents/carers refused permission, or because a permission form was not received back from parents/carers. Nineteen students did not attend the training, mainly due to absence from school. The remaining thirteen did not consent to continue (of these, six were excluded from the training by the school or by the trainers). These students were not significantly different to students who did continue as peer supporters except in relation to self-reported smoking behaviour (p=0.03) as shown in Table 51.

Table 50: Characteristics of students who did and did not engage with the peer supporter role

	Did not continue as a peer supporter % [n]	Did continue as a peer supporter % [n]
Gender		
Male	59.3 [83]	50 [418]
Female	40.7 [57]	50 [417]
Total	100 [140]	100 [835]
Ethnicity		
White	94.0 [125]	92.1 [750]
Mixed	4.5 [6]	6.0 [49]
Asian/Asian British	1.5 [2]	0.5 [4]
Black/Black British	0 [0]	0.5 [4]
Chinese	0 [0]	0 [0]
Other	0 [0]	0.9 [7]
Total	100 [133]	100 [814]
Self reported smoking behaviour		
Never smokers	43.7[59]	51.4 [414]
High-risk group*	45.9 [62]	43.9 [354]
Regular smokers#	10.4 [14]	4.7 [38]
Total	100 [135]	100 [806]
Intentions at aged 16		
Stay on at school	42.3 [58]	48.6 [408]
Training/apprenticeship/college	32.1 [44]	29.8 [250]
Get a job	13.1 [18]	10.7 [90]
Other/unemployed/don't know	12.4 [17]	11.0 [92]
Note: some students provided more than one response		

* Tried once/Used to but don't now/<1 cigarette per week

≥1 cigarette per week

Table 51: Difference in smoking habits by peer supporter status

	Did not continue as a peer supporter (95% CI)	Did continue as a peer supporter (95% CI)
Never smokers	43.7 (34.7, 53.1)	51.4 (45.1, 57.6)
High-risk group	45.9 (37.2, 54.9)	43.9 (38.9, 49.1)
Regular smokers	10.4 (5.7, 18.1)	4.7 (30.5, 72.2)
Total	100	100

8.3.2.1 Did peer supporters have conversations?

The positive results from the trial clearly demonstrate that having peer supporters in the school had an effect on smoking rates amongst their peers suggesting that they did talk to them about being smoke-free.

Results reported by Audrey and colleagues (2006a) utilised quantitative and qualitative data from the ASSIST process evaluation to ascertain if peer supporters did have conversations with other Year 8 students. Quantitative data collected from questionnaires completed by all students who attended the first and fourth follow-up session revealed that peer supporters reported having conversations about smoking with other Year 8 students (see Table 52).

Table 52: Peer supporters' responses to the question "Have you had a conversation with anyone in Year 8 about smoking since you had the training?"

Response	Follow-up session 1 (%)	Follow-up session 4 (%)
Yes	719 (86.1)	718 (86.0)
No	30 (3.6)	11 (1.3)
No response/other/absent	86 (10.3)	106 (12.7)
Total peer supporters	835 (100)	835 (100)

Adapted from Audrey and colleagues (2006a, p328)

Whilst peer supporters reported having conversations about smoking with other Year 8 students, many of these conversations took place soon after the peer supporter training event, with fewer taking place towards the end of the ten-week intervention period. It was thought that the training acted as a topic of conversation which facilitated conversations in this early stage. This was supported by interview data from both peer supporters and non-peer supporters. For example:

> *i17076, female non-smoker: It was like loads of conversations at first and then it sort of died down.*
>
> (Non-peer supporter interview)

i19137, male non-smoker: Like we had two days off school and then the first week there was loads of people saying 'Oh, what did they teach you?' and you had loads more conversations then.
i19159, female non-smoker: Then it just stopped then.
i19082, male non-smoker: That actually made the conversation for you.
i19060, female non-smoker: Nobody wanted to know about it then.

(Peer supporter group interview)

i17067, female non-smoker: Some of them are like people who ask 'How did the training go?' and everything. And you start telling them, Because it's like my first two conversations were like that. Like I went back to school and people were saying to me 'Oh, did you really enjoy the training? What happened? And everything.

(Peer supporter group interview)

Despite this apparent willingness of peer supporters have conversations about smoking with other students, quantitative data from the post-intervention behavioural questionnaire in intervention schools shows that, as might be expected, peer supporters were more likely to have conversations with other peer supporters. Table 53 shows that whilst more conversations took place with non-peer supporters, a higher proportion took place between peer supporters. Forty seven per cent (376 of 798, 95% CI: 40.2-54.2) reported talking with another peer supporter, whereas only 21.5 per cent (904 of 4208, 95% CI: 18.9-24.4) of non-peer supporters reported having spoken with a peer supporter.

Table 53: Year 8 students' responses to the question "In the last few weeks, has anyone who was a peer supporter talked with you about smoking?"

Response	Number of peer supporters* (%)	Number of non-peer supporters (%)	Total
Yes	376 (47.1)	904 (21.5)	1280
No	374 (46.9)	3036 (72.2)	3410
I don't know	48 (6.0)	268 (6.4)	316
Total	798 (100)	4208 (100)	5006

* Peer supporters are those who consented to continue to be a peer supporter following the peer supporter training.

When these data are further broken down by self-reported smoking status (Table 54), a lower percentage of peer supporters from the 'high-risk' group (44.3 per cent, 95% CI: 36.4-52.5) reported having spoken to a peer supporter than those in either the regular smoking (54.2 per cent, 95% CI: 40.1-67.6) or the never smoking group (49.3 per cent, 95% CI: 41.9-56.7). Among non-peer supporters, a greater percentage of regular smokers reported having spoken to a peer supporter (27.6 per cent, 95% CI: 20.9-35.5) compared to individuals from the 'high-risk' group (22.8 per cent, 95% CI: 19.8-26.1) or never smokers (19.8 per cent, 95% CI: 16.4-23.6). These differences were not statistically significant except for non-peer supporters who were regular smokers and non-peer supporters who had never smoked ($p<0.01$).

Table 54: Year 8 students' responses to the question "In the last few weeks, has anyone who was a peer supporter talked with you about smoking?" by smoking status

Peer supporters*							
Smoking status#	**Regular smokers**		**High-risk group**		**Never smokers**		
	(n)	**(%)**	**(n)**	**(%)**	**(n)**	**(%)**	**Total**
Yes	26	54.2	167	44.3	183	49.3	376
No	17	35.4	182	48.3	173	46.6	372
Don't know	5	10.4	28	7.0	15	4.0	48
Total	48	100	377	100	371	100	796
Non-peer supporters*							
Smoking status#	**Regular smokers**		**High-risk group**		**Never smokers**		
	(n)	**(%)**	**(n)**	**(%)**	**(n)**	**(%)**	**Total**
Yes	77	27.6	384	22.8	442	19.8	903
No	176	63.1	1182	70.2	16.7	74.8	3028
Don't know	26	9.3	117	7.00	121	5.4	264
Total	279	100	1683	100	2233	100	4195

* Peer supporters are those who consented to continue to be a peer supporter following the peer supporter training.
# Self-reported smoking status at first post-intervention datasweep.

These quantitative data are supported by qualitative data, some of which is reported by Audrey and colleagues (2006a). A number of

students agreed that it was easier to have conversations within friendship groups and within the group of peer supporters.

> *i13216, male, non-smoker: I wouldn't really go up to people like I didn't know. 'Cos the people I talked to were people I knew, or kind of knew, not like hang around with all the time.*
> (Individual peer supporter interview)

> *i2034, female, non- smoker: It was easier to talk to people that you knew before than go up to strangers and talk to them about it because they won't take any notice of you, whereas your friends respect you more and would listen to what you were saying.*
> (Peer supporter group interview)

> *i17077, male non- smoker: [I spoke to] closest friends first and then you move on*
> *i17107, female non- smoker: Yeah, because I was like talking to peer supporters first.*
> *i17100, female non- smoker: And me.*
> (Peer supporter group interview)

The qualitative data indicate that peer supporters mainly spoke with non-smokers, and that they were reluctant to approach smokers, particularly if they were not friends with them. Whilst it could be considered that this qualitative evidence does not support the quantitative results provided in Table 54, it should be noted that there are substantially fewer smokers in the cohort than students from other groups. Therefore, examining the proportions of students in each group who spoke to peer supporters is potentially misleading. It is more appropriate to look at the number of students who reported having spoken to a peer supporter which shows that amongst both peer supporters and non-peer supporters the majority of conversations took place with never smokers and those in the 'high-risk' group. Reasons for talking mainly to non-smokers included the potential for ridicule and the barriers they would face if they tried to encourage addicted smokers to quit. Therefore, peer supporters generally felt more able to reinforce non-smoking behaviour.

i13137, male non-smoker: Uh, I was a bit scared because they came up to me and it was like, beat me up, but they didn't.
(Peer supporter drop-out interview)

i2058, male, smoker: [I was] a bit worried about what they'd think of you, like, think you're a vicar or something! Going up and talking to them about, like, 'Don't do this, and don't do that'.
(Individual peer supporter interview)

i13156, female non- smoker: Well the people that didn't smoke, I don't think they're gonna smoke. But the people that do, they're not gonna give it up. It might put them off a bit but they're addicted and they like it and they're not gonna stop.
(Individual peer supporter interview)

Whilst outcome data and this qualitative data suggest that peer supporters were willing to talk to their peers about smoking, and in fact they did, when directly asked whether they thought peer supporters spoke to other students about smoking, respondents (4806 of 5006 who completed the post-intervention questionnaire) indicated that they did not think that peer supporters were particularly active in their role. This is summarised in Table 55. Almost 63 per cent (3026 of 4806) of all students who completed a questionnaire thought that peer supporters had not talked to other students much about smoking. However, nearly twice as many non-peer supporters (68.6 per cent, 95% CI: 66.3-70.8) held this view compared to those who were peer supporters (34.2 per cent, 95% CI: 29.2-39.5).

Table 55: Year 8 students' responses to the statement "Most of the peer supporters I know didn't seem to talk much to other pupils about smoking"

Response	Number of peer supporters* (%)	Number of non-peer supporters (%)	Total
Agree	269 (34.2)	2757 (68.6)	3026
Disagree	518 (65.8)	1262 (31.4)	1780
Total	787 (100)	4019 (100)	4806

* Peer supporters are those who consented to continue to be a peer supporter following the peer supporter training.

Again, these data were broken down by smoking status as shown in Table 56. Amongst peer supporters, a higher proportion of regular smokers (44.7 per cent, 95% CI: 27.6-63.1) thought that peer supporters were inactive in their school year compared to peer supporters who were never smokers (29.9 per cent, 95% CI: 24.8-35.6) or in the 'high-risk' group (37.1 per cent, 95% CI: 30.8-43.8). Conversely, a higher proportion of non-peer supporters who were never smokers (69.5 per cent, 95% CI: 66.4-72.4) reported that they thought that peer supporters were inactive in their school year when compared to non-peer supporters who were in the 'high-risk' group (68.2per cent, 95% CI: 64.9-71.3) and regular smokers (64.3 per cent, 95% CI: 66.3-70.9). These differences were only statistically significant for regular versus never smoking non-peer supporters ($p<0.01$).

Table 56: Year 8 students' responses to the statement "Most of the peer supporters I know didn't seem to talk much to other pupils about smoking" by smoking status

Peer supporters*							
Smoking status#	**Regular smokers**		**High-risk group**		**Never smokers**		
	(n)	**(%)**	**(n)**	**(%)**	**(n)**	**(%)**	**Total**
Agree	21	44.7	136	37.1	111	29.9	268
Disagree	26	55.3	231	62.9	260	70.1	517
Total	47	100	367	100	371	100	785
Non-peer supporters*							
Smoking status#	**Regular smokers**		**High-risk group**		**Never smokers**		
	(n)	**(%)**	**(n)**	**(%)**	**(n)**	**(%)**	**Total**
Agree	162	64.3	1092	68.2	1496	69.5	2750
Disagree	90	35.7	510	31.8	657	30.5	1257
Total	252	100	1602	100	2153	100	4007

* Peer supporters are those who consented to continue to be a peer supporter following the peer supporter training.
# Self-reported smoking status at first post-intervention datasweep.

These data raise questions about the visibility of students nominated through the peer nomination process to non-peer supporters. It should, however be recognised that peer supporters were not expected to carry out their role in an overt fashion. It was quite acceptable, and indeed

appropriate for them to adopt a subtle approach. And whilst 14 per cent (599 of 4175) of students who did not act as peer supporters indicated that they did not know anyone who acted as a peer supporter (see Table 39), and 71 per cent (3036 of 4255) indicated that they had not spoken to a peer supporter about smoking (see Table 53), this may have been due to a lack of awareness of peer supporters acting within their school rather than an inactivity of peer supporters. This was suggested by Audrey and colleagues (2006a) who showed that peer supporters didn't necessarily make themselves visible to fellow Year 8 students. Therefore, they may well have been talking with them about smoking without them realising that they were a peer supporter, as shown in these interview data.

> *i13163, female non-smoker: They didn't exactly know I was a peer supporter and I was going to write them down in the book [diary].*
>
> (Peer supporter drop-out interview)

> *i19251, male non-smoker: Some probably thought what am I on about, like, 'cos they obviously didn't know I've been a peer supporter.*
>
> (Individual peer supporter interview)

This was perhaps more apparent in some schools than others. Several students in both individual and group interviews conducted in one school reported that due to the way the school timetable was organised, where the entire year was split into two 'sides' and individuals only had lessons with half of the year group, meant their activity was largely restricted to their 'side' of the year group. They were therefore 'forced' to converse with some students and not others.

> *Interviewer: So did you have conversations?*
> *All: Yeah. Yeah.*
> *i13140, male non-smoker: Only with people that I knew.*
> *Interviewer: So, [i13140], only with people that you knew?*
> *i13184, female non-smoker: I didn't exactly get a chance to do it, chat to people who I don't know, because I know most of the people on the left side and I don't know people on the right side*

and they're on a different timetable down there so I couldn't exactly go up to them.

(Peer supporter group interview)

Depending on the distribution of peer supporters between 'sides', this may have resulted in a large amount of activity in one 'side' which was invisible to others. However, in general, the qualitative data supports the idea that peer supporters did talk to others about smoking. Seventy per cent of interviewees (Peer supporters and non-peer supporters), and all group interviews reflected this. However, these data may be biased since peer supporters may be more likely to report having conversations even if they did not have any, and the non-peer supporters were selected for individual interview on the basis that they reported having had conversations with peer supporters about smoking.

Whilst this shows that peer supporters did have conversations which may have resulted in the effect observed in ASSIST, it is possible that they exerted influence through being *seen* as a peer supporter and an opponent of smoking rather than by having conversations about smoking i.e. by other students modelling their non-smoking behaviour, or the values they held as a result of being a peer supporter.

8.3.3 Response of peer supporters to having conversations

The results reported in section 8.3.2 do not show how the peer supporters felt about having conversations about smoking with their peers. This is clearly an important issue which may affect the success of this intervention. Individual and group interview data collected from peer supporters show that almost half of students who acted as peer supporters viewed the peer supporter role positively. A number of these respondents reported mixed views, but only four said that their experience had been entirely negative.

8.3.3.1 Positive views about being a peer supporter

When asked how they felt about having conversations with other Year 8 students, the main reason peer supporters gave for feeling positive about their role was that they were pleased that they could talk to others about smoking, and felt helpful. This was considered on nine occasions in individual interviews and by three students in one group interview.

> *i19231, female smoker: Happy to be giving them the information so the like, the smokers I know they didn't really care but they did listen but they didn't really care. They know more now so I was happy for giving them the information and like and the people who don't smoke as well. I felt, I don't know, just happy for giving them the information and they know not to do it. They try and the smokers try not to quit. There was one of them who quit but she was in the peer supporters and she did quit.*
>
> (Individual peer supporter interview)

> *i17068, female non-smoker: Quite pleased to just spread the information about smoking around. Erm, tell more people.*
>
> (Individual peer supporter interview)

> *i13213, female non-smoker: I felt good because I could, people could then trust me to talk to them about things and I could find out things, more things about them, how they feel about smoking and why they do it.*
>
> (Individual peer supporter interview)

Five peer supporters interviewed individually who were all from the same school reported relative ambivalence about undertaking their role.

> *Interviewer: How did you feel about having these, you know, did you feel good about it or did you think it was a bit stupid having to go to school and do it, or...*
> *i13079, male non-smoker: No, it was all right, it wasn't stupid or nothing.*
> *Interviewer: No? So you felt quite ok about doing it?*
> *i13079, male non-smoker: Yeah.*
>
> (Individual peer supporter interview)

i13216, male non-smoker: I didn't really mind actually 'cos I knew the people that I spoke to I knew and everything.
Interviewer: Mmm.
i13216, male non-smoker: I knew what they were like so they didn't really mind.
Interviewer: And you didn't mind doing it?
i13216, male non-smoker: No.

(Individual peer supporter interview)

The ability of peer supporters to successfully have conversations about smoking with other students may have been facilitated by smoking being an issue which comes up in conversation amongst young people of this age. This perhaps helped the peer supporters to start and have conversations. This was mentioned in a number of interviews.

i19191, female non-smoker: I felt fine. It's something that me and my friends talk about anyway sometimes. I mean, I've got friends who have been offered cigarettes and stuff but haven't done it or have but yeah, so we talk, it's a conversation point which comes up quite a bit.
Interviewer: Do you think it comes up quite a bit anyway with young people of your age?
i19191, female non-smoker: Yeah. It's like at our age when you start to get, you start to get involved with it anyway or sometimes younger. But it's sort of at this teenage point that you start to hear about smoking and stuff like that whereas you wouldn't have heard about it so much in primary.

(Non-peer supporter interview)

i13061, female non-smoker: It didn't really bother me because it just comes up really in every day.

(Non-peer supporter interview)

8.3.3.2 Negative views about being a peer supporter

Despite this largely positive response to having conversations about smoking, some respondents described how they had concerns about having conversations with others about smoking. Several felt worried, scared and nervous about having conversations, although many of these concerns were prior to having conversations and these feelings

subsided once they became accustomed to talking about smoking with their peers. For example, three students in individual interviews and one group interview reported initial nerves about talking about smoking.

> *i2020, female non-smoker: When I first like, when I first done it, and when we first put it in our diaries I was like quite nervous, but then I like sort of got used to it.*
>
> (Individual peer supporter interview)

> *i13180, female non-smoker: First of all I thought they might think it's none of our business if we asked them, but they were all right about it. 'Cos I felt a bit nervous first.*
>
> (Individual peer supporter interview)

This latter quote also shows that peer supporters had concerns about whether it was their place to try and prevent/stop their friends from smoking. Peer supporters involved in a group interview also shared this view.

> *i19037, male non-smoker: Yeah sometimes it felt like it was none of your business coming up to them and telling them what to do and stuff. Well not telling them what to do but finding out personal facts like.*
> *Interviewer: Did anyone else feel like [i19037] did about you know some people thought it was none of your business?*
> *i19159, female smoker: Yeah I felt like that. I thought that it wasn't my business see because like if they are smoking they are smoking and really it is none of your business to get involved with their kind of life and what they do and that.*
> *i19052, male non-smoker: Apart from just help them out and give good advice.*
> *i19159, female smoker: You can give them advice and if they don't listen, they don't listen because they chose not to.*
>
> (Peer supporter group interview)

Peer supporters involved in seven individual interviews and group interviews reported negative feelings about having conversations about smoking with other students. For example, two respondents in this group interview and this drop-out interviewee reported feeling uncomfortable with the role.

Interviewer: Right. Can you say how you felt about being asked to have these conversations? I mean I've got a sort of list, about whether you were pleased to be doing it, or you didn't care, or you felt stupid or...
i13201, female non-smoker: This conversation?
Interviewer. Not this one here with me, but being asked to go and...
i13201, female non-smoker: [i13201], female non-smoker: Oh right.
i13152, male smoker: I felt stupid 'cos no-one would listen.
Interviewer: Did you?
i13152, male smoker: Mmm.
Interviewer: So you felt a bit silly going up and trying to do it?
i13152, male smoker: Mmm.
Interviewer: What about you [i13201]?
i13201, female non-smoker: Probably the same, 'cos half of them, not half of them, but some of them were like didn't care. But others said they wouldn't never stick a cigarette in their mouth but they didn't actually go on the course so they didn't actually realise how bad it was.

(Peer supporter group interview)

i13163, female non-smoker: It was weird because I've never really done that before. And I hardly ever like chat to any people. Well I chat to a lot of people but not about smoking or anything.

(Peer supporter drop out interview)

8.3.4 Are other Year 8 students willing to talk about smoking with the peer supporters?

Another issue regarding the acceptability of the intervention is whether young people endorse the idea of having peer supporters working within their school. Students in intervention schools were questioned about whether they thought it was good that peer supporters can talk with Year 8 students about smoking. Four thousand nine hundred and forty six of the students who completed questionnaires at the first post-intervention datasweep provided data on this issue.

Table 57 shows that ninety two per cent (4561 of 4946) of young people agreed that having students acting as peer supporters in their school was a good thing. However, a higher proportion of peer supporters held this view than non-peer supporters (97.9 per cent, 95% CI: 96.7-98.7 compared to 91.1 per cent, 95% CI: 89.8-92.3). This is an

expected finding since, as previously shown, many were happy about undertaking the role they had been asked to carry out.

Table 57: Year 8 students' responses to the statement "It's good that peer supporters can talk with Year 8 pupils about smoking"

Response	Number of peer supporters* (%)	Number of non-peer supporters (%)	Total
Agree	788 (97.9)	3773 (91.1)	4561
Disagree	17 (2.1)	368 (8.9)	385
Total	805 (100)	4141 (100)	4946

* Peer supporters are those who consented to continue to be a peer supporter following the peer supporter training.

Table 58: Year 8 students' responses to the statement "It's good that peer supporters can talk with Year 8 pupils about smoking" by smoking status

Peer supporters*							
Smoking status#	Regular smokers		High-risk group		Never smokers		
	(n)	(%)	(n)	(%)	(n)	(%)	Total
Agree	44	93.6	370	97.4	372	98.9	786
Disagree	3	6.4	10	2.6	4	1.1	17
Total	47	100	380	100	376	100	803
Non-peer supporters*							
Smoking status#	Regular smokers		High-risk group		Never smokers		
	(n)	(%)	(n)	(%)	(n)	(%)	Total
Agree	202	75.9	1495	90.2	2068	93.8	3765
Disagree	64	24.1	162	9.8	137	6.2	363
Total	266	100	1657	100	2205	100	4128

* Peer supporters are those who consented to continue to be a peer supporter following the peer supporter training.
# Self-reported smoking status at first post-intervention datasweep.

Table 58 shows that whilst both peer supporters and non-peer supporters who had never smoked were more likely than their smoking counterparts to agree that peer supporters were a good thing, this difference was not statistically significant amongst peer supporters. Amongst non-peer supporters, a significantly higher proportion (24.1 per cent, 95% CI: 20.0-28.6) of regular smoking non-peer supporters

disagreed with this statement compared with comparatively few individuals from the 'high-risk' group (9.8 per cent, 95% CI: 7.8-12.1) and never smokers (6.2 per cent, 95% CI: 5.2-7.4).

Varied reactions to peer supporters were reported in the qualitative interview data. However, the more negative views of non-peer supporters, particularly those who were regular smokers are not reflected in these results and are likely to be due to the methodological issues.

8.3.4.1 Positive views of peer supporters

Over half of peer supporters interviewed individually and all peer supporter group interviews described at least some, if not all, individuals they spoke to about smoking had positive reactions to them. The majority of respondents reported mixed experiences. However, only a third of non-peer supporters reported that they were pleased that peer supporters were working in their school and that they were receptive to them which does not support the quantitative results.

> *i2020, female non-smoker: I think they were actually quite pleased 'cos I know a few of them were actually going to start smoking and when I spoke to them they are like "Oh no, I ain't touching them!"*
>
> (Individual peer supporter interview)

> *i19113, male non-smoker: ... One said he was actually happy talking to me and he said he tried to cut down on cigarettes and buying them.*
>
> (Individual peer supporter interview)

> *i17019, male non-smoker: ...I was fairly pleased that he was making an effort, effort about it and I, and I didn't feel bad at all about it cos I'm a non-smoker so he was just passing on information to me so that if I see one of my friends smoking, I can just pass onto them and say to one of my friends like that these, these cigarettes can really harm you and it can make your life a bit shorter I believe. Yeah, so I didn't feel bad about having the conversation about it and he enjoyed it as well. So, it was good, good.*
>
> (Non-peer supporter interview)

Five peer supporters, including one in a group interview reported that other students didn't seem to mind them talking to them about smoking. This was supported by four non-peer supporters.

> *i19001, male non-smoker: They didn't mind. They were glad to have someone to talk to.*
>
> (Peer supporter group interview)

> *Interviewer: ... So how do you think they felt about you going up and having a chat with them about smoking?*
> *i13156, female non-smoker: They didn't mind, they read it and my one friend [unknown female], she didn't like it at all. She read it and she felt really sick. She didn't like what was in it.*
>
> (Individual peer supporter interview)

> *i2144, female smoker: I didn't mind but I think she's scared that other people will, that's why she isn't doing it.*
>
> (Non-peer supporter interview)

> *i17032, female non-smoker: I didn't mind because I had nothing to hide anyway, so... (laughs).*
>
> (Non-peer supporter interview)

8.3.4.2 Negative views of peer supporters

However, some interviewees suggested that peer supporters were unwelcome in their school, or that the approach they adopted was inappropriate. These reactions to peer supporters may well be related to the negative feelings some peer supporters reported about talking to other Year 8 students about smoking, and may be reasons why some peer supporters were not that active within their year group. Eight peer supporters believed that the response they received from smokers was more negative than that from non-smokers.

> *i19231, female smoker: The people who didn't smoke kind of got it, yeah. The people who smoke they don't really care most of them. But I've tried but most of them don't really care.*
> *Interviewer: Why do you think that they don't really care?*
> *i19231, female smoker: Because they think it looks cools but it doesn't. And then they just said no and they didn't want to listen.*
>
> (Individual peer supporter interview)

i17006, male non-smoker: Well, again, it's like, the non-smokers were alright. The smokers they say that you can't stop and er, so yeah the non-smokers agree and that and the smokers just don't agree.

(Individual peer supporter interview)

i19153, male non- smoker: The non-smokers were fine about it but the smokers were just, well, just didn't want to know what they are doing to themselves. They just didn't want to listen.

(Individual peer supporter interview)

This was the general consensus of respondents in three peer supporter group interviews. For example:

Interviewer: And how do you think that people felt? It's always quite difficult to say how someone feels, but how do you think they felt when you got on the topic of smoking?
i2113, male non-smoker: Some of them were like awkward.
i2029, female non-smoker: If they smoked, they looked embarrassed, didn't they?
i2034, female non-smoker: Yeah.
i2114, female non-smoker: The people that didn't smoke, they were like, they were just interested in what was in the cigarettes and all that.
i2113, male non-smoker: All the chemicals.
i2029, female non-smoker: Yeah.

(Peer supporter group interview)

Interviewer: ...what about the non-smokers that you spoke to, were they pleased that you were talking to them?
All: Yeah.
i17053, male non-smoker: They listened more.
i17063, male non-smoker: They didn't really care because they haven't got nothing to hide or nothing...
i17107, female non-smoker: They didn't care in a good way and the smokers didn't care in a bad way, didn't care in a bad way so.. they didn't care that they were killing themselves slowly.
i17063, male non-smoker: The people who do smoke, um... they knew all the stuff was true but they didn't want to know because they are addicted ain't they.

(Peer supporter group interview)

It was thought that some of these negative responses from smokers may have been due to concerns over confidentiality, and reluctance to divulge information which may be passed onto others. This was raised by four students in individual interviews and a group interview.

> *Interviewer: ... How do you think that the people you spoke to, how do you think they were feeling when you were talking about smoking? Any ideas?*
> *i2132, male non-smoker: Um, well if they didn't smoke they'd be pretty calm I guess. And if they smoked, they'll be a little bit worried about, oh, if I knew they smoked that I could have ratted on someone. But no I think that the people who were smoking felt a bit uneasy about it.*
> *Interviewer: Do you think they did think you would rat on them?*
> *i2132, male non-smoker: I don't know really. Um, they probably would, yeah, but most of the people I, the people I knew who smoke, they knew me anyway so they knew I wouldn't.*
> (Individual peer supporter interview)

> *i17076, female non-smoker: I didn't mind. As long as nobody, not everybody knew what I was saying, I was okay.*
> (Non-peer supporter interview)

The most frequently reported negative response peer supporters received when they were talking about smoking was that people were either not interested or that they did not listen to what they were saying. This was discussed in all of the group interviews (although this was not always the sole opinion in group interviews), and by three peer supporters and four peer supporter drop-outs/refusals.

> *i19255, female non-smoker: Some of them just like didn't want to listen.*
> *i19232, female non-smoker: Some of them like started to walk away when you were speaking to them.*
> (Peer supporter group interview)

> *i13152, male smoker: ... but no-one, people what I know did listen but I don't think they stopped doing it, and I tried it with some I don't know and they just didn't listen.*
> (Peer supporter group interview)

i19239, male non-smoker: I have only really had one bad experience with it that was when I said I was speaking to one girl and she smokes and I was saying some stuff and she just laughed. I was like, I was speaking to her, she was alright but you could tell that she was not listening kind of thing, you could tell that she didn't really listen to what I was saying.

(Peer supporter drop-out interview)

Peer supporters reported that some of the students they spoke to said that it was not the peer supporters' business whether people smoked. This was discussed in six individual interviews, and echoes the opinion of a peer supporter who said that they were unsure that it was the peer supporters' business whether other people smoke (see section 8.3.3.1). This may have affected whether they approached individuals who were currently smoking and is demonstrated by the following quotations.

i19057, female non-smoker: Well, erm. I spoke to one boy and we were just having a conversation, I can't remember what it was and smoking came up and he was asking me what we did on the thing and I told him he really should stop smoking and I gave him some reasons why and he told me that it was his business whether he smoked or not and it was nothing to do with me so I just left.

(Individual peer supporter interview)

i17068, female non-smoker: I think the non-smokers were pleased that I told 'em but smokers thought I was interfering with them cos they smoke.

(Individual peer supporter interview)

i19168, female smoker: I think some of them were pleased that I gave them information about smoking so they could actually like realise what it was like because I don't think that like half of them knew actually what was in a cigarette but others I think like, just didn't really care. They wanted to rule their own life and stuff and you like shouldn't interfere with how they do it like...

(Individual peer supporter interview)

It was also reported by a number of participants in three group interviews as shown here.

> *i13111, female non-smoker: I spoke to them and then they said that they don't really care, it's up to them what they do.*
> (Peer supporter group interview)

> *i17028, female non-smoker: People who really like, didn't want to be smoking they were sort of happy that we were there but others were like horrible, so, I know all of that.*
> *i17028, female non-smoker: They just didn't want to be there. It was just like, right go now.*
> *Interviewer: Did they think you were interfering?*
> *i17067, female non-smoker: Some of them.*
> *Interviewer: Or did they just not want to know?*
> *i17028, female non-smoker: Some of them didn't want to know. I only had one person told me that I was interfering.*
> (Peer supporter group interview)

These qualitative results are supported by quantitative responses to the statement "It is none of the peer supporters' business whether Year 8 pupils smoke or not" from the behavioural questionnaire completed at the first post-intervention datasweep.

Table 59: Year 8 students' responses to the statement "It is none of the peer supporters' business whether Year 8 pupils smoke or not"

Response	Number of peer Supporters* (%)	Number of non-peer supporters (%)	Total
Agree	271 (35.1)	1720 (42.7)	1991
Disagree	504 (64.9)	2307 (57.2)	2808
Total	775 (100)	4024 (100)	4799

* Peer supporters are those who consented to continue to be a peer supporter following the peer supporter training.

Table 59 indicates that students were divided about whether it was the peer supporters' business whether young people should smoke or not. Whilst over half of all students disagreed with this statement (2815 of

4814), peer supporters were significantly more likely to disagree with this statement than individuals who weren't peer supporters ($p<0.01$). Again this is likely to be related to the positive view they held about the role they had undertaken.

When these results were split into according to smoking status, a statistically significant higher proportion of peer supporters who smoked reported that it was not the peer supporters' business that young people smoke compared with peer supporters in the 'high-risk' group and never smokers (62.2 per cent, 95% CI: 45.2-76.7, compared to 38.3 per cent, 95% CI: 33.2-43.6, and 28.3 per cent respectively, 95% CI: 22.5-35.0). Amongst non-peer supporters, 37.4 per cent (812 of 2172, 95% CI: 34.1-40.9) of never-smokers agreed with this statement compared to 47 per cent (749 of 1597, 95% CI: 42.0-51.9) of individuals in the 'high-risk' group and 62 per cent of regular smokers (159 of 255, 95% CI: 56.8-67.6) (see Table 60). These results are again statistically significant and support the qualitative data, which suggests that smokers are likely to have more negative views of peer supporters.

Table 60: Year 8 students' responses to the statement "It is none of the peer supporters' business whether Year 8 pupils smoke or not" by smoking status

Peer supporters*							
Smoking status#	**Regular smokers**		**High-risk group**		**Never smokers**		
	(n)	**(%)**	**(n)**	**(%)**	**(n)**	**(%)**	**Total**
Agree	28	62.2	139	38.3	104	28.3	271
Disagree	17	37.8	224	61.7	263	71.7	504
Total	45	100	363	100	367	100	775
Non-peer supporters*							
Smoking status#	**Regular smokers**		**High-risk group**		**Never smokers**		
	(n)	**(%)**	**(n)**	**(%)**	**(n)**	**(%)**	**Total**
Agree	159	62.4	749	46.9	812	37.4	1720
Disagree	96	37.7	848	53.1	1360	62.6	2304
Total	255	100	1597	100	2172	100	4024

* Peer supporters are those who consented to continue to be a peer supporter following the peer supporter training.
# Self-reported smoking status at first post-intervention datasweep.

In this questionnaire, the young people were also asked if they felt that peer supporters placed too much pressure on Year 8 students about smoking. The majority of students felt that they did not (see Table 61). However, 89.4 per cent (703 of 786, 95% CI: 86.9-91.5) of peer supporters reported that peer supporters didn't pressurise Year 8 students about smoking, compared with 82.1 per cent (3318 of 4040, 95% CI: 80.6-83.6) of those who were not peer supporters, a finding, again likely to be associated with direct involvement in the intervention.

Regular smokers were more likely to report that peer supporters *did* place too much pressure on other students when compared to students in the 'high-risk' group and never-smokers (see Table 62). However, the differences observed were only statistically significant among individuals who did not act as peer supporters, amongst whom 32.8 per cent (95% CI: 27.3-38.8) of regular smokers agreed with this statement compared to 20.1 per cent (95% CI: 17.8-22.6) of individuals in the 'high-risk' group and 14.5 per cent (95% CI: 12.8-16.3) of never smokers. This supports the view that smokers had less positive views of peer supporters than non-smokers. However, a relatively small number of students reported this to be an issue.

Table 61: Year 8 students' responses to the statement "Peer supporters put too much pressure on Year 8 pupils about smoking"

Response	Number of peer Supporters* (%)	Number of non-peer supporters (%)	Total
Agree	83 (10.6)	722 (17.9)	805
Disagree	703 (89.4)	3318 (82.1)	4021
Total	786 (100)	4040 (100)	4826

* Peer supporters are those who consented to continue to be a peer supporter following the peer supporter training.

Table 62: Year 8 students' responses to the statement "Peer supporters put too much pressure on Year 8 pupils about smoking" by smoking status

Peer supporters*							
Smoking status#	**Regular smokers**		**High-risk group**		**Never smokers**		
	(n)	**(%)**	**(n)**	**(%)**	**(n)**	**(%)**	**Total**
Agree	8	10.5	47	12.9	27	7.2	82
Disagree	35	89.5	318	87.1	349	92.8	702
Total	43	100	365	100	376	100	784
Non-peer supporters*							
Smoking status#	**Regular smokers**		**High-risk group**		**Never smokers**		
	(n)	**(%)**	**(n)**	**(%)**	**(n)**	**(%)**	**Total**
Agree	83	32.8	322	20.1	314	14.5	719
Disagree	170	67.2	1281	79.9	1858	85.5	3309
Total	253	100	1603	100	2172	100	4028

* Peer supporters are those who consented to continue to be a peer supporter following the peer supporter training.
# Self-reported smoking status at first post-intervention datasweep.

These findings were only reflected in the qualitative interview data on one occasion when peer supporters identified occasions when other Year 8 students may have thought they were pressurising them too much. This suggests that this was not an important issue in the ASSIST intervention. This was previously acknowledged in section 8.3.1.1.5.

> *i17033, male non-smoker: There are some people in our year, that, that I know, friends that started smoking, smoking and... some of them are no longer my friends because they think I pressurised them about it. They thought I was pressurising them.*
> *Interviewer: The smokers?*
> *i17033, male non-smoker: Yeah, they thought I was pressurising them too much.*
> *Interviewer: Okay. Anyone else got anything else to say about how they felt having conversations? i17033 says that he felt like he was pressurising people, what about any, the rest of you?*
> *i17077, male, non-smoker: Not really.*
> *i17015, female, non-smoker: No, because at the age that they are, they shouldn't be smoking anyway.*
> *i17067, female, non-smoker: Yeah.*
> *i17015, female, non-smoker: So like...*
> *i17085, female, non-smoker: So you are just telling them for their own benefit.*

i17028, female, non-smoker: You shouldn't think you are pressurised because... well actually should be you are pressurising them but...
i17067, female, non-smoker: You shouldn't be smoking so it's, it's not like as if you are pressurising them you are just telling them what...
i17028, female, non-smoker: You shouldn't go too far with the pressurising thing.

(Peer supporter group interview)

However, peer supporters in another group interview in the same school were conscious of this (this had been an element of the training they had undertaken to be peer supporters), and recognised the need for sensitivity when talking with people about smoking.

i17120, female non-smoker: You are talking to them but you don't want to put too much pressure on them.
i17100, female non-smoker: Yeah.
i17120, female non-smoker: You don't want to like force them to listen and...
i17107, female non-smoker: Just give them free will, if they want to listen then, listen if they don't want to then go away.

(Peer supporter group interview)

8.4 Summary

The ASSIST intervention was successful in reducing the prevalence of smoking at one-year follow-up. Therefore, it is clear that having peer supporters in schools in some way had an influence on the smoking behaviour of students in intervention schools.

In considering social network issues relating to the success of the intervention, measures of network cohesion showed that there was no dramatic difference in network structure across schools, although the fixed format of the social network questionnaire used is likely to limit the conclusions that can be drawn from these results.

In terms of the suitability of the peer supporters, they were significantly more influential in terms of their social position (assessed by measures of degree, closeness and betweenness centrality) than

other students in their year. Furthermore, their average geodesic distance to the 'high-risk' group was significantly less than other students. These results suggest that the peer supporters were more suitable opinion leaders in terms of their position in their social networks than the average student in the year. Furthermore, qualitative and quantitative process evaluation data demonstrate that the majority of students knew at least one peer supporter. This supports the results of the cohesive subgroup analysis which found that 48-65 per cent of social groups in each school year contained at least one peer supporter. The results also show that students knew peer supporters outside of their social groups but did not necessarily speak to peer supporters with whom they were closely linked in their social networks.

The peer nomination process successfully identified students who were representative of the rest of the year group increasing the persuasiveness of the smoke-free message. However, a higher proportion of smokers were nominated than existed amongst the rest of the cohort. This may have been related to the higher degree centrality measures (popularity) of these students. In general, those named and those who acted as peer supporters were considered suitable to carry out the role although quantitative data demonstrated more positive appraisals from peer supporters. The qualitative data provided reasons for this but these data did not reflect the discordant views by peer supporter status shown by the quantitative data. The main reason for students being unsuitable was that they were smokers, and since a number of smokers were nominated, this has implications for future implementation of this model. Appropriate students were non-smokers and those who had characteristics which would facilitate diffusion such as popularity and the ability and willingness to talk about smoking.

The approach adopted in ASSIST where young people were asked to talk with their friends about smoking was generally positively received. The results show that young people are, in general happier talking with their peers than adults about smoking. Attendance data showed that peer supporters engaged with the peer supporter role and

a high proportion attended the training and subsequent follow-up sessions.

Peer supporters were generally willing to talk about smoking and viewed the role positively. However, a disproportionate proportion of conversations took place between peer supporters, and may be one reason why a substantial number of non-peer supporters viewed them as inactive. Where conversations did occur, they were likely to be with non-smokers whom peer supporters knew.

In terms of how other students viewed the peer supporter role, the majority of students responded positively about the peer supporter model. The majority of students reported that it was good that peer supporters can talk with other Year 8 students about smoking, but this was not endorsed by smokers so much as by non-smokers. Peer supporters were also more likely to hold positive views about the approach compared to non-peer supporters. This was supported by the qualitative data. The quantitative data showed in that almost 40 per cent of students (and in particular regular smokers) thought that it was not the peer supporters business whether Year 8 students smoked. This issue was also raised in interviews. On the other hand, quantitative data showed that few students thought that peer supporters placed pressure on other students about smoking. The lack of consideration of this issue in interviews suggests it was not seen as important.

~ CHAPTER 9 ~

9 DISCUSSION

This final chapter identifies a number of methodological issues associated with this study and highlights some areas for future research. It also summarises the findings of the analyses conducted on the social network and process evaluation data. These will be interpreted in light of discussions in the literature relating to the successful diffusion of innovations in communities, and a number of the rationales for peer education relevant, in particular, to informal peer education (credibility, role modelling, acceptability, reinforcement, information sharing). It will conclude with a number of implications for future practice, including the need to adhere closely to the ASSIST nomination process and the need to encourage non-peer supporters to engage more positively with the intervention.

The ASSIST intervention was effective at one-year follow-up at which students in intervention schools were 23 per cent less likely to be weekly smokers than students in control schools. Furthermore, the intervention was effective amongst the trial's primary target group of young people who were at highest risk of becoming regular smokers. These results were supported by cotinine-validated data. Unlike the unsuccessful sexual health trials conducted in the UK (Elford et al., 2002a; Flowers et al., 2002; Williamson et al., 2001) which were also based on the 'Gay Hero' model (Kelly et al., 1997; Kelly et al., 1991), the social diffusion process worked in this intervention.

The primary outcome for the ASSIST evaluation was weekly smoking prevalence in the 'high-risk' group, defined as those who had experimented with cigarettes, were ex-smokers or occasional smokers at baseline. A secondary outcome measure was weekly smoking prevalence across the whole year. The reasons for concentrating on the high-risk group was largely driven by the success seen in the feasibility

study amongst this group (section 5.1.2). Whilst the feasibility study showed no significant effect of the intervention on the propensity of baseline non-smokers to start smoking at follow-up, as discussed in section 2.3.2, smoking uptake, and progression to regular smoking in adolescence involves a series of stages starting with non-smokers becoming experimenters. It may therefore have been an oversight in the ASSIST analysis to concentrate solely on progression from experimentation ('high-risk') to regular smoking, and overlook this first stage. This is particularly pertinent given that many of the peer supporters concentrated their efforts on non-smokers, and not on those who were already smoking, and suggests that these analyses should be conducted to examine the effect of peer supporter activity on this group.

While it could be considered that the effect seen in ASSIST was due to school effects and not as a consequence of the intervention, this is unlikely. It should be acknowledged that it is possible that the effect seen was due to differences in the schools themselves, in terms of their characteristics, enthusiasm to be involved in the trial, school attitude and approach towards student smoking, or due to differences in student smoking behaviour. However, as indicated in section 7.1.1, 223 schools were approached to participate in the trial, of which 127 expressed an interest to take part (significantly more than the number required for the evaluation). Of these 127 schools, those already involved in intensive tobacco initiatives such as Tobacco Action Groups and Smoke-free class with the target group (and which as a school might also have a more anti-smoking attitude than those not involved in these initiatives) were excluded and 59 of the remaining schools were selected to participate. These schools were subsequently randomised to each arm of the trial, eliminating the possibility of systematic differences between those schools who received the intervention and those who did not. While there was some school-level variation in smoking rates at follow-up, this was largely accounted for by adjustment for smoking rates at baseline. Remaining school-level variation in smoking rates at follow-up suggest some variation in intervention effectiveness across schools, but these school effects were also evident among the control group. The

randomised design and appropriate statistical analysis that allowed for random variation at school level allow us to be confident that the observed intervention effect is unlikely to have occurred due to chance.

Schools who participated in the trial may have had particular vested interests to be involved, but these were not explicitly investigated and are not known. However, a large number of schools who did not express an interest to be involved reported lack of time, or involvement in other initiatives rather than lack of enthusiasm to engage with the intervention or address smoking issues more generally. Only ten schools reported that they did not require the intervention (smoking not an issue in their school or smoking adequately covered in the curriculum) (see Appendix 7).

As shown in section 8.1.4., once engaged in the trial, schools and contact teachers generally acknowledged the importance of core elements of the ASSIST intervention, co-operating with the ASSIST team, and ensuring the each stage of the intervention was successfully conducted. Teachers also acknowledged that peer education approach adopted in the ASSIST intervention was largely compatible with the ethos and timetabling in schools, and that the target age group was appropriate. This largely positive attitude across schools suggests minimal variation in the manner in which schools hosted the intervention and thus the variable impact of this on the effectiveness of the intervention across schools.

It is also possible that the effect was due to schools changing their coverage of smoking in the curriculum, or the emphasis they placed on anti-smoking activity outside of the curriculum. This potential differential 'usual' smoking education is the main threat to internal validity. However, intervention schools would have had to increase their smoking activities and control schools reduced theirs in order to produce the effect observed in ASSIST. This is unlikely to have happened. Furthermore, at the beginning of the trial when schools were asked to participate, it was made clear that they should not change in any way the content of their smoking education curriculum, nor place any emphasis on addressing student smoking in their school as a

consequence of being involved in the trial. This was equally important in both control and intervention schools since the aim of the evaluation was to assess the effectiveness of the ASSIST intervention compared to 'usual' practice.

Another possibility is that the effect seen in ASSIST was due to an increased awareness of smoking issues amongst students and teachers as a result of being involved in the trial and through students completing questionnaires on smoking on four occasions throughout the trial.

The extent to which these eventualities may have impacted on the results observed in ASSIST was assessed through the process evaluation. Data were collected to ascertain what smoking initiatives and smoking education the young people involved in the trial were being exposed to. This was collected through a variety of sources in both control and intervention schools. This included: pre- and post-intervention teacher interviews, teacher questionnaires completed at outcome evaluation data sweeps, questionnaires completed by the health promotion trainers at each stage of intervention delivery in each school, and information on general external influences collected by research staff. Teacher interviews (particularly in control schools) were also used to collect data regarding the impact of conducting data collections in schools. Analyses of these data have not yet been conducted, and are outside of the scope of the current study but it is intended that a thorough examination of these issues will take place in the near future.

Using the ASSIST intervention as an example, this study adopted a multi-method approach to identify the potential of informal peer-led interventions. Although Kelly's nine core elements of the popular opinion leader model were applied in the ASSIST intervention, one issue in particular which warranted further exploration was the process by which opinion leaders were identified. While ASSIST did not adopt the ethnographic approach proposed by Kelly it acknowledged the importance of nominating the right kinds of people to be opinion leaders i.e. those who were credible, popular, well-liked and trusted in

different segments of the population. The ASSIST peer nomination approach which allowed every Year 8 student to nominate other students in their year on the basis of measures of prestige used a questionnaire which was unique in terms of the combination of questions included and the whole-community approach adopted, which is relatively infrequently used due to cost and complexity issues (see section 4.6). It aimed to identify influential opinion leaders whom others 'respected', 'looked up to' and considered 'good leaders', to talk with their peers about smoking. The first aspect of this research examined the structure of the social networks and the importance of the social position of the peer supporters being appropriate to enable them to diffuse the smoke-free message to their peers. And despite the use of a whole-community nomination approach to enhance the chance that the peer supporters were appropriate providers of smoking-related information, further information was required about whether their peers considered them suitable opinion leaders.

Finally, this study acknowledged that if this social diffusion approach is not acceptable to those delivering and in receipt of the health promotion message, no matter how influential and suitable the peer supporters are, they will not be successful in effecting change. It therefore examined the acceptability of this approach in terms of whether the peer supporters and non-peer supporters considered it more suitable than adult-led interventions, and whether they were willing to engage with an intervention of this type.

9.1 Methodological issues and implications for future research

There are a number of methodological issues relating to this study which should be acknowledged. A number of these are positive, and demonstrate the strengths of this study. A number are limitations, the majority of which can be resolved through further work. These relate to: response rates; sampling; the methods used, including the format of the

data collection tools and the timing of the data collection; piloting; using multiple methods; data analysis; and problems relating to conducting a multi-site study.

9.1.1 Response rates

There was a high response to the behavioural questionnaire (94.6 per cent; 5066 of 5355 who were eligible at baseline and the first post-intervention datasweep), the social network questionnaire (95.6 per cent), and invitation to interview (85.7 per cent for individual interviews and 100 per cent for group interviews). This was facilitated by returning to the school to follow up students who had been absent at the outcome evaluation data collection and by inviting absent interviewees to attend on another day. Thus, the datasets used for this study were comprehensive and reduced the likelihood of response bias. It also helped to ensure completeness of social network coverage.

9.1.2 Sampling

The social network analysis considered data from six intervention and four control schools from the 59 schools involved in ASSIST. Four of these were in England and the remainder were in Wales (see Table 21). While it is possible that contextual differences may affect the structure of the social networks in these schools, largely similar results were observed from the analyses conducted. Exploration of this in greater depth and on a larger scale (using data from every school involved in ASSIST) would provide more generalisable results and further illumination into the issues considered in this study.

Due to limited resources in-depth process evaluation data were only collected in four intervention schools and within these schools, students were sampled for interview. While these schools were purposively selected to represent a variety of schools, it should not be

assumed that the views of the students interviewed are generalisable to other schools. However, the quantitative data which corroborates the findings provides evidence to be optimistic that other students in other schools may have reported similar results.

9.1.3 Methods used

9.1.3.1 Social network data

On the whole the social network questionnaire was received well by students and there were few minor problems with completion. However, when data entry was carried out it was sometimes difficult to identify the friends named and it became apparent that it would be valuable to obtain further information about friends to facilitate this process. As a result, the social network questionnaire was refined for use at subsequent datasweeps. Instead of providing just the name and form/tutor group as identifying information, respondents were asked to provide the details given in Figure 27.

Figure 27: Identifying information asked at second and third post-intervention datasweeps

Name of friend 1 (first name & surname) _____

If at school, which school?_____

If at YOUR school, which form/tutor group? __ or form tutor's name?_____

If at a DIFFERENT school, which year group? _____ or their age? _____

The questionnaire successfully obtained information about the friendship ties of almost every student in the ASSIST cohort. The free-recall approach allowed students to name friends other than those in the school year which will enable their use in future research. However,

this strategy resulted in less ties being made to students in Year 8 than would have been made had responses been limited to this group alone (14 per cent of ties were made to students outside of Year 8 at the same school). However, if responses had been restricted to Year 8, it is not known if respondents would have named other Year 8 students or if they would have simply named less friends. The use of a fixed-format questionnaire also limited the number of ties that could be made between individuals in Year 8. The majority of respondents named the maximum possible number of friends, and given further opportunity may have named more. However, other research discussed in section 7.2.3.1.2 provides evidence that it was appropriate to ask students to name six friends, suggesting that the importance of additional ties may be questionable (Abel et al., 2002; Kirke, 1996; Urberg et al., 2003). The limited time available to complete this questionnaire may have resulted in some students rushing to complete it, causing them to forget friends, or to name friends they would not have if they had been given the opportunity for more considered thought (Brewer & Webster, 1999). These issues have the potential to introduce error and may have resulted in the data producing an inaccurate depiction of the school social networks.

The social network questionnaire used for this study asked students to report current peer ties (immediately post-intervention) to reduce the likelihood of recall bias. However, given that group stability is limited, and relationships amongst school friends are relatively fluid, both in terms of strength and membership (Cairns et al., 1995) it is unlikely that they were a precise reflection of the social networks at time of the intervention. The ideal scenario would have been to collect these data at baseline but this was not possible.

This research raised a number of questions relating to the way in which adolescent friendship data are collected. Kirke (1996) suggested that it is suitable to ask young people to identify peer ties by naming friends. However, the meaning of the term 'friend' to young people in this context is not clear and warrants further exploration.

9.1.3.2 Interviews

Individual and group interviews proved useful methods to obtain in-depth information about the acceptability of the ASSIST intervention from the perspective of the peer supporters and the non-peer supporters. No significant problems were encountered in conducting any interviews.

The use of similar interview schedules for both individual and group interviews with peer supporters ensured that the data obtained were relatively comparable. The semi-structured interview schedule used allowed free conversation about issues relating to the ASSIST intervention whilst maintaining a degree of control over the 'direction' of the discussion. It also allowed the interviewer to probe and question interviewees to obtain clarification and further information where required (Berg, 2004). This was particularly relevant and useful as it allowed the interviewer to encourage students who were less willing to engage with the interview to share their experiences and views, and to try and overcome problems of monosyllabic responses (Mauthner, 1997).

Non-peer supporters were generally less willing to talk freely in the individual interview situation than peer supporters and as a consequence these data tended to be less 'rich'. One possible reason for this is that the peer supporters were more familiar with the interviewers as they had conducted observation of the training and follow-up sessions as well as the outcome data collections. In contrast, non-peer supporters will only have encountered these researchers at outcome data collections. Therefore, rapport was more easily developed between interviewers and peer supporters than with other students. Students interviewed individually also tended to be less forthcoming than those interviewed in groups. This may have been because they were generally shy or nervous, or because they were inexperienced in talking with adults on a one-to-one basis (Punch, 2002). It may also have been because the peer supporters who were interviewed in groups had received the peer supporter training which

had aimed to give them conversational skills and boost their confidence. A suggested by Laws and Mann (2004), students might also have been more comfortable being interviewed in an existing group of students who they knew rather than on their own. The reluctance of some young people to engage with the interview situation may also have been due to the quite formal format of these interviews. While it is recognised that several of the data collection methods discussed in section 6.3 (Alderson, 2004; Fraser, 2004; Laws & Mann, 2004) would have been unsuitable for this age group, the use of visual aids or stimuli relating to the intervention may usefully have acted as prompts and reminders and encouraged conversation. Furthermore, interviews were often conducted in 'adult' settings such as offices. As recommended by Punch (2002), less formal settings could have made students more comfortable and encouraged discussion. However, the reality of conducting research in schools is that this may not have been possible given the limited available space.

Conducting interviews immediately after the intervention was complete reduced the likelihood of recall bias. Nevertheless, the timing of these interviews in individual schools varied according to timetabling and when schools (the gatekeepers) were able to provide access to the relevant young people. Again this is an inherent problem of conducting school-based research.

It was rare for students interviewed in groups to disagree with each other, whereas more discordant views were obtained from individual interviews. This may well have been because strong characters in the group discouraged others from sharing theirs views and opinions (Reed & Payton, 1997). Despite interviewers making attempts to encourage 'quieter' participants to engage with discussion, there were students who tended to dominate the conversations in some groups.

It would be naïve to think that the interviews obtained a complete picture of the opinions of every student involved in ASSIST. However, there are reasons to be confident that many of the young people provided open and honest accounts. As suggested in section 6.3,

confidentiality was stressed from the outset of the trial and students were continually reminded that the researchers would not divulge any information to a third party. This included during interviews, and appeared to encourage a degree of honesty.

A number of problems were encountered as a result of two research teams collecting the data used in this study. This was particularly relevant during interviews. Each interviewer had their own style, and whilst both were white females, one was significantly older than the other and may have been considered more of an authority figure. This may have affected the dynamics of the interview situation (see section 6.2.1.2.2.2). Furthermore, one researcher did not always ask every question on the interview schedule, and of particular relevance to this study, the questions regarding the suitability of those named and nominated as peer supporters. Where the results report that a particular proportion of students said something, it should be acknowledged that this is a proportion of the total number of interviewees in that particular group and this is not necessarily the same as the number who were asked the question.

9.1.3.3 Behavioural questionnaires

The incorporation of process questions into the behavioural questionnaire ensured that the majority of the ASSIST cohort in intervention schools provided their opinions about the intervention. This was a convenient method of data collection given that access was provided to these students through the outcome evaluation.

The questions used to examine issues relating, in particular, to the acceptability of this approach were forced-choice questions limiting the data which could be collected using this method. However, these data were largely supported by qualitative data, increasing the validity of findings. Since these data were collected post-intervention in each school, and that the timing of data collection varied across schools, it is possible that answers may have suffered from recall bias. Whilst it

cannot be guaranteed that responses provided by the young people were honest or a true reflection of their views, (see section 6.3), face-to-face administration by ASSIST researchers who had already had prior contact with the young people is likely to have encouraged more candid answers (see also section 9.1.3.2).

The behavioural questionnaire also asked non- peer supporters how they felt about not being selected. This question was asked prior to the questions relating to the acceptability of the intervention. It is possible that highlighting that they had not been nominated immediately before asking them how they felt about peer supporters and the intervention in general may have increased any existing feelings of resentment and resulted in overly negative responses. This suggests that more consideration should have been given to the order in which these questions were asked (Dillman, 2000).

9.1.4 Piloting

The process questions included in the behavioural questionnaire underwent piloting and refinement before use in the main study. While piloting is considered good practice in research, neither the social network questionnaire nor the interview schedules were piloted. However, as mentioned in section 7.2.3.1.3, the social network questionnaire had been used in a similar form elsewhere and had proved unproblematic (Croghan, 2001; West, 2001). It is reassuring that in ASSIST few problems were encountered with administration and completion. Time constraints prevented any piloting of interview schedules prior to the main trial, or any subsequent refinement during the main trial. This would have been preferable, particularly given that a number of young people were reluctant to talk openly about the ASSIST intervention in the interview context.

9.1.5 Triangulation

A number of data sources were used in this study. This methodological 'triangulation' ensured that the limitations of one method were overcome through the use of another (Miles & Huberman, 1983). While the quantitative methods provided descriptive data from large numbers of students, the qualitative methods provided illumination into the reasons for the responses provided. The results obtained from these different sources generally corroborated each other, enhancing the validity and generalisability of the findings. However, there were a number of occasions where they were conflicting which suggests that these results should be treated carefully. Gaining the opinions of both peer supporters and non-peer supporters allowed the same issue to be explored from the perspective of different participants. This is sometimes known as 'fair dealing' (Mays & Pope, 2000) and is a recognised method of increasing the validity of findings.

9.1.6 Data analysis

9.1.6.1 Social networks

The current analyses assumed that information could travel either way between individuals who had at least one tie between them (i.e. it used non-reciprocated data in a symmetrised format). The degree to which ties were reported accurately and the extent to which the fixed-format of the social network questionnaire was restrictive will determine how appropriate this approach was. However, as acknowledged in section 7.3, transmission of information need not have been between close friends, so unreciprocated ties are likely to be relevant to this intervention. In reality, however, the peer supporters were more likely to talk with friends about smoking (section 9.2.2.2) questioning whether this approach was appropriate. Different methodological approaches could be used to confirm or refute assertions made in chapter 7

regarding the most appropriate way to analyse data on adolescent friendship networks. In particular it is important to establish whether non-reciprocated friendship ties are relevant to young people and if, as Yugar and Sharpiro (2001) suggested, reciprocated methodologies generate different portrayals of social networks compared with non-reciprocated methodologies. This would involve qualitative exploration of friendship nominations with the young people. Furthermore, these analyses used dichotomous data and did not account for the importance of the friendship ties. In future analyses this could be incorporated where relevant using the strength of friendship data gathered through ASSIST.

With regard to the social network measures presented here, it is acknowledged that these are basic measures and more sophisticated analyses are possible. While betweenness and closeness centrality measures provide an indication of the peer supporters' potential to diffuse the smoke-free message, it has recently been argued that they make assumptions about the manner in which information flows in networks (Borgatti, 2005). As information does not necessarily follow the shortest paths these measures may not be the most suitable indicators of a node's importance for the transmission of information. Instead, other measures such as information centrality which does not make this assumption might be more suitable and should be explored. A number of further analyses would shed light on the potential of this approach to effect behavioural change amongst this and other populations, for example, using different measures of prestige such as eigenvector centrality (Bonacich, 1972) or reach centrality that counts the number of nodes within a given distance of a node (for example, the number of students who are two steps in their social network away from a peer supporter (Valente, 1995), i.e. who they might know well enough to have conversations about smoking with). Furthermore, Mizruchi and Potts (1998) argued that the degree to which centrality determines power depends on the network structure. It is therefore important to examine this more closely. The importance of cutpoints and bridges ('weak ties') (Granovetter, 1973) between subgroups should be

recognised in the context of this intervention. Cutpoints are likely to have high betweeness centrality measures and are important for connecting otherwise distant parts of networks. Whilst they are by definition weak connections, they are vital for information diffusion.

This study did not provide any indication of *how* the peer supporters effected behavioural change amongst their peers. Using more sophisticated social network methods, it is necessary to explore this. Other important issues include: if the network position of peer supporters modifies the extent to which they influence the smoking behaviour of other students; if personal characteristics affect the effectiveness of peer supporters; if smokers were effective at inducing changes in smoking behaviour; and if the influence of the peer supporters was dependent on network or personal characteristics of their peers.

When identifying individuals as peer supporters for the purposes of the social network analyses, individuals nominated by their fellow students were classed as peer supporters. This was to ensure that both control and intervention school data were comparable. However, of the 215 students nominated as peer supporters in the intervention schools included in this study, only 183 consented to continue the role following training (85.1per cent). Given that not every student nominated as a peer supporter went on to carry out the role it is likely that these results may not be wholly reliable, particularly the results of whether peer supporters were contained in social clusters. To overcome this, future work should use just intervention school data and classify peer supporters as those who consented to continue in the peer supporter role following the training.

The subgroup analysis conducted in this study produced non-overlapping groups and used these as a 'model' of the social groups present in each school year. In choosing this analysis method it was acknowledged that this is not necessarily a true representation of the friendship groups in the school year (section 7.3). 'Real' friendship groups are likely to be overlapping, increasing the potential for subgroups to contain peer supporters. The default settings for subgroup

analysis in Kliquefinder© were also assumed. Changing these settings or adopting different methods of subgroup analysis will produce different and potentially more accurate depictions of the friendship groups but exploration of this was outside of the scope of this study. This is an issue for future research and would involve collecting new social network data and talking with respondents about the results of subgroup analysis in order to ascertain which methods produce the truest representation of reality.

Finally, given that peer supporters were more likely to have ever smoked than other students in their school year, and that there is an association between smoking and popularity, and therefore potential influence, it is important that future analysis more specifically considers the social networks of smokers versus non-smokers within the current contex.

9.1.6.2 Qualitative analysis

The group interviews were not 'typical' focus groups (Fontana & Frey, 1994). Thus, the analysis methods paid little attention to the dynamics of the discussions and the manner in which opinions were negotiated. In future work relating to the ASSIST intervention it would be pertinent to examine this and would involve conducting focus groups which paid attention to group dynamics during both data collection and analysis.

In coding the interview schedules, effort was taken to maximise reliability by coding a selection of interview schedules on more than one occasion. This was done because it was not possible to engage another researcher in coding data used specifically for this study. It was not possible to feed interpretations of the data back to respondents in order to improve the validity of findings (Mays & Pope, 1995b). However, a description of the data collection procedure and analysis is provided in chapter 6 and extensive data are provided in chapter 7 so that the reader can judge whether the interpretation is supported by the data (Mays & Pope, 2000). Furthermore, in addition to explaining common

themes, a number of negative cases were highlighted (Mays & Pope, 2000).

9.1.6.3 Behavioural questionnaire analysis

Where respondents' smoking status was required in this study, this was only self-reported data not cotinine validated data. However, an independent statistician employed by the research team conducted analyses to establish the degree to which young people accurately reported their own smoking status. Using a cut off of 15ng/ml, above which students were classed as smokers, a sensitivity (the percentage of students who said that they smoked among those who were smokers according to the cotinine results) and specificity (the percentage of students who said they did not smoke among those who were non-smokers according to the cotinine results) analysis revealed that there was not a high level of deception amongst respondents. Thus there is no suggestion of a differential response bias between groups and therefore the observed intervention effect based on self-reported data can be expected to be unbiased.

Furthermore, the analysis of these data, and the quantitative process evaluation data utilised the svyset routine in STATA, taking into account school level clustering.

9.1.7 General methodological issues

Despite support for the incorporation of process evaluation into evaluation design, a number of methodological problems have been identified (see Lytle et al., 1994; Wight & Osabi, 2003 for examples), some of which may have affected this study. Although process evaluation may reveal secondary gains or other results of interventions left uncovered by outcome evaluations (Macintyre & Petticrew, 2000), they may also provide conflicting views regarding the success of an intervention (Harden et al., 1999). In large health promotion

programmes comprehensive integral process evaluations are complex and costly (Parry-Langdon et al., 2003; Strange et al., 2001) and as a consequence are often conducted by the implementation team who may have a vested interest in demonstrating effectiveness. This can result in reporting bias when they are asked to provide process data. A further problem is the impact of undertaking the research on the outcome (the 'Hawthorne effect') (Mayo, 1977) which is particularly relevant when undertaking detailed process evaluation during which some participants receive more 'attention' than others. However, a number of these acknowledged challenges (Hawthorne effects, the manner in which roles can overlap where participants/intervention staff also provide process data, and the problem of distinguishing between elements of the intervention and it's evaluation) were addressed within ASSIST and are discussed elsewhere (Audrey et al., 2006b).

This study did not consider gender in any of the analyses. In the light of the high smoking rates amongst young women, this would have been valuable and should be considered in future research. Furthermore, bearing in mind issues relating to homophily and diffusion of innovations within populations, this should also be considered.

Future research should examine whether some identification methods can identify more socially influential individuals than others. This could usefully be achieved using the measures of prestige (such as leadership and respect) obtained for students during the peer nomination process individually, or by using the friendship nominations. Comparing the names provided on these two questionnaires would also provide insight into whether students just named their friends on the peer nomination questionnaire. This would provide an indication of whether asking young people to name their friends could be used instead of the peer nomination questions used in the ASSIST intervention.

9.2 Summary and interpretation of results

9.2.1 Appropriateness of opinion leaders

9.2.1.1 Nature of the social system

Given that diffusion is dependent on interpersonal contacts, social networks are of paramount importance for the communication of ideas and practices in communities. These networks accelerate or impede the spread of ideas and the adoption of new practices (Valente, 2003) as networks with particular structures may be conducive to faster rates of adoption (Valente, 1995).

This element of the research aimed only to provide some background information about the school social networks prior to examining measures of individual-level cohesion. Despite the schools involved being different in size, location, and level of social deprivation, they had similar basic measures of network cohesion. The majority of actors were reachable, suggesting that the smoke-free message had the ability to reach most students which is a promising finding for this intervention approach. However, the distance between the source and the destination of the message is likely to have varied considerably in each network. Some actors were able to receive the message directly from the peer supporters, but the diameter of the graphs show that others were much further away from them. This did not vary substantially across schools. Thus the basic structure of the school social networks as a whole had little impact on how the smoke-free message might differentially diffuse in different schools. Therefore, all other things aside, regardless of the behaviour targeted this social diffusion approach can potentially have a similar impact in all schools.

9.2.1.2 Position of opinion leaders in social networks

The literature is clear that in order to be maximally effective in their role, opinion leaders (peer supporters) should be in good social positions within their social networks i.e. they should be accessible to others, highly central, have extensive interpersonal networks and greater social participation than other members of the community (Katz, 1957; Rogers, 1995; Rogers & Cartano, 1962). This is related to the idea that they should also be popular (Kelly, 2004). It has also been proposed that opinion leaders should represent a diversity of social groups to facilitate diffusion (Katz, 1957; Kelly, 2004). The social position and accessibility of the peer supporters was examined directly using social network analysis, and was supplemented with quantitative process evaluation data.

9.2.1.2.1 Centrality

Centrality measures show that the ASSIST peer nomination process successfully identified individuals who were in more strategic positions in their school social networks to fulfil their role of peer supporter compared to non- peer supporters. They also support the assertion that opinion leaders should be in influential positions in their social networks.

Peer supporters had higher degree centrality measures than non-peer supporters. Degree is a measure of popularity and influence (Borgatti, 2005), and an indicator of potential communication activity (Freeman, 1979). This therefore demonstrates that they had more potential to exert immediate influence (through conversations) on the smoking behaviour of others students compared to non-peer supporters. A similar finding was observed by Bell and colleagues (1999) in relation to disease transmission. These authors reported that degree centrality was positively correlated with the probability that an actor will infect others. However, it should be acknowledged that popularity and influence is often linked with concerns about image and

has been associated with behaviours such as smoking (Abel et al., 2002; Amos et al., 1997; Cillessen & Rose, 2005; Michell & Amos, 1997; Plumridge et al., 2002; Ransom, 1992; Valente et al., 2005) (see section 9.2.1.3).

Measures of betweenness centrality showed the extent to which an actor linked unlinked pairs of friends and the potential they had to control the flow of information in the network (Freeman, 1979; Friedkin, 1991). These measures indicated that peer supporters were more likely to be intermediaries in relations between other actors than non-peer supporters suggesting that they could facilitate diffusion. This is consistent with results reported by Valente (1995) who re-analysed a number of well-known data sets (Brazilian farmers, medical innovation and Korean family planning), and reported that in two of the three datasets high betweenness centrality measures were associated with innovativeness, and therefore the potential to undertake the opinion leader role.

Actors with high closeness centrality measures have short communication paths to others in the networks and are therefore good at communicating information to others in the network (Beauchamp, 1965). Thus, closeness centrality measures provide an indication of the extent to which the message would diffuse from the peer supporters to others in the network. Peer supporters had higher normalised closeness centrality measures compared to non-peer supporters and therefore had a greater ability to exert influence through indirect communication. Again, Valente (1995) examined closeness centrality and innovativeness but reported that only one of the three analyses showed any correlation between closeness centrality and innovativeness. When the average geodesic distance length to those in the 'high-risk' group was examined, peer supporters were closer to those at high-risk of smoking than non-peer supporters. They therefore had more potential to facilitate diffusion of the smoke-free message to the intervention's primary target group.

9.2.1.2.2 Location across social groups

The quantitative process evaluation data showed that the majority of students (87.9 per cent) knew at least one peer supporter which suggests that they had the potential to induce behavioural change amongst the whole year group. More peer supporters (99.9 per cent) than non-peer supporters (85.6 per cent) reported this which is not surprising given that the peer supporters spent a substantial amount of time together during the training and follow-up sessions. They were also more likely to be aware of the peer supporter concept than their peers and it is possible that when asked this question (and other questions which used the term peer supporter) in their behavioural questionnaire, non-peer supporters may have been unsure of its meaning. Another reason is that the peer supporters did not necessarily carry out their role in an overt manner. Consequently, people may have known these students, but not realised that they were peer supporters. Non-peer supporters who smoked were less likely to know peer supporters than those in the high-risk or non-smoking groups. Whilst this might be considered an issue for reducing prevalence, regular smokers were not the main target group for this intervention.

Subgroup analysis showed that the peer nomination approach not only identified peer supporters who the majority of students knew but also identified students who were members of a range of social groups, including those containing individuals at high-risk of smoking. This supports Katz's (1957) and Kelly's (2004) proposition that opinion leaders should represent a diversity of social groups to facilitate diffusion. It also showed that the activities of peer supporters were not confined to their own clusters. Students not only knew or talked to peer supporters outside of their own cluster but they did not necessarily talk to peer supporters who were in their own cluster. This provides evidence that the peer supporters had the potential to affect the behaviour of students with whom they were not close friends.

Whist it appears that the peer supporters did have an effect on the smoking behaviour of other Year 8 students, it should be

acknowledged that that these results do not confirm whether the effect seen in ASSIST was due to the intended verbal transfer of information between the peer supporters and other students, the subsequent transfer of this information to others whereby adopters influence non-adopters, or through modelling of the peer supporters' behaviour or values held as a result of carrying out the peer supporter role. Instead it provides evidence of the peer supporters' potential to facilitate behavioural change through interpersonal communication.

9.2.1.3 Characteristics of the peer supporters

It is recognised that homophily (the extent to which a pair of individuals who communicate are similar) affects the rate of diffusion (Rogers, 1995; Rogers & Shoemaker, 1971; Tones, 2002). However, while some argue that peer educators should be demographically similar to their target group in order to increase the persuasiveness of the message (Milburn, 1995; Wolf & Bond, 2002), Rogers (1995) proposes that heterophilous interpersonal links are important for information flow as they may connect socially dissimilar groups, facilitating diffusion. He also suggests that homophily amongst opinion leaders can be a barrier to diffusion as they will tend to interact with each other (ideas spread vertically rather than horizontally), limiting diffusion to the rest of the population.

A number of studies have shown that school-based peer educators have tended to be female 'high achievers' whom teaching staff regard as appropriate to undertake responsible roles (Harden et al., 2001; Harden et al., 1999) or who self-select to undertake the role. These young people are likely to be viewed as different to the target population and may not be considered credible or trustworthy by their peers. Furthermore, young people tend to talk with those of the same sex (Naylor & Cowie, 1999). This raises questions about the ability of these peer educators to effect change amongst males and disaffected youth. In the ASSIST intervention, the nomination process aimed to

identify a diverse group of students who were representative of the rest of the school year. This included ensuring that boys and challenging students were recruited as peer supporters. Therefore, the gender balance of the school year was invited to participate[3] and schools were encouraged to allow all students to take part unless they had serious concerns over their involvement, for example if students had been excluded from school (Audrey et al., submitted).

This study ascertained that the ASSIST whole-community nomination approach successfully identified students who were largely representative of other students in their school year. However, they were more likely than non-peer supporters to have ever smoked which is consistent with the notion that smoking behaviour is related to popularity (see section 9.2.1.2). This has implications for the conduct and outcomes of this approach. The method by which peer nominations were translated into a list of students to invite to take part ensured that boys as well as girls were included as peer supporters, overcoming problems encountered in other peer-led interventions and potentially increasing the effectiveness of the intervention amongst males. The similarity of the peer supporters compared to the rest of the school year suggests that challenging students were recruited, increasing the potential that a range of students could be accessed by the intervention. However, the results presented here cannot provide any evidence that they discouraged fellow students from smoking. Nevertheless, these students are likely to be best placed to approach other challenging students, and it may be unreasonable to expect other students to undertake this role (Audrey et al., 2006a).

Peer supporters spoke with a higher proportion of peer supporters than non-peer supporters demonstrating that vertical diffusion (Rogers, 1995) did occur. However, they also spoke with a substantial number of other students indicating that homophily amongst the peer supporters did not act as a barrier to diffusion. Instead, the conversations which occurred between peer supporters are likely to be

[3] 17.5 per cent of boys and 17.5 per cent of girls with the most nominations in each school were invited to be peer supporters

a result of the significant amount of time they spent with each other throughout the intervention.

9.2.1.4 Suitability of those who were named and who acted as peer supporters

Kelly (2004) proposed that opinion leaders should be well-liked and trusted by the target group. Furthermore, as identified in section 4.12.1.1, opinion leaders who are credible and reliable sources of information are likely to be more successful in their role. In the context of peer education, the notion of credibility is also considered important (McGuire, 1984; McGuire, 1985; McGuire, 1989), and the idea that peers are a more credible source of information than other individuals is one of the rationales for this approach (Turner & Shepherd, 1999). This is because they are good at communicating with their peers (Frankham, 1998) and are similar and empathetic (Forrest et al., 2002; Milburn, 1995). Shiner and Newburn (1996) identified three types of credibility: person-based, experience-based and message-based credibility. While the importance of person-based credibility has been recognised, emphasising the need for peer educators to be similar to their target group (see section 9.2.1.3), some (Elder et al., 1994; Frankham, 1998; Ozer et al., 1997) suggest that these similarities may be less important than the personal characteristics of the peer educators. Therefore this study also examined whether these students were considered suitable to adopt the peer supporter role.

9.2.1.4.1 Named

Almost all respondents said that at least some of the people they named on their peer nomination questionnaire would have made suitable peer supporters. It was thought that peer supporters should be non-smokers (smokers were classed as inappropriate and hypocritical)

but it was acknowledged that they may be able to benefit from the training. Other attributes were recognised as having the potential to facilitate the diffusion process. Popular students who could talk to lots of people and who would have lots of influence, people who others listen to, and people who talk to others were identified as appropriate. These findings are consistent with the characteristics of opinion leaders identified in sections 9.2.1.2 and 9.2.1.4. The need to be mature and take the role seriously was also identified as valuable.

It is important to remember that the students who completed the peer nomination questionnaire did not know its purpose. It is therefore reassuring that the majority of students named were considered appropriate to adopt the peer supporter role. It is possible that smokers and challenging students may not have been identified had they known the purpose, limiting the scope for diffusion. Furthermore, since this nomination process was not related to smoking, it is transferable to other health behaviours.

9.2.1.4.2 Acted

The quantitative data demonstrated that over half of students thought that the peer supporters were suitable. However, peer supporters were significantly more likely to report this than non-peer supporters. Regular smokers were also less likely to report that the peer supporters were suitable. There are a number of possible reasons for this. The peer supporters were more likely to have known other peer supporters and may consequently have held more positive views of each other. It may also have been due to resentment on the part of non-peer supporters because they had not been selected to undertake the role. The negative view reported by smokers may have been related to the general negative attitude towards the peer supporters reported in relation to the acceptability of this approach (see section 9.2.2).

These quantitative data were generally supported by the qualitative data, although the discordant views according to smoking

and peer supporter status were not evident. This is likely to be because the students selected for interview were not selected by smoking status, so they were not necessarily a representative sample of students by smoking status. It may more generally have been related to the fixed-choice response allowed to the statement "The sorts of people chosen to be peer supporters were not the best ones to talk about smoking" which 'forced' respondents to say whether the peer supporters were suitable or not. Conversely, interviews allowed students to provide a range of responses including identifying that *some* of the peer supporters were good, whilst others were not. These qualitative data revealed that over two thirds of respondents believed at least some peer supporters were suitable to adopt the role. Appropriate peer supporters were identified as people to whom others listen, and those who were willing and able to talk about smoking. Some were identified as good at talking because they were confident. Others were well known and popular so they would be good at spreading the smoke-free message while others were considered friendly so they were easy to talk to about smoking. This is again consistent with the characteristics of opinion leaders identified previously.

While the majority of peer supporters were considered suitable to adopt the role, and held acknowledged characteristics of effective opinion leaders, there were a number of exceptions. Although peer supporters who were smokers at the start of the intervention were asked to quit, some did not, and this was viewed as hypocritical by both peer supporters and non-peer supporters. However, as acknowledged in section 4.7.6, role-modelling may not have been an essential factor in the success of the ASSIST intervention, as was demonstrated in the 'Gay Hero' intervention (Kelly et al., 1991). However, safe sexual practice is less visible than cigarette smoking, so it is possible that Kelly's peer educators were engaging in unsafe sexual practice whilst endorsing the opposite without others knowing. This is less likely to be possible in the case of cigarette smoking and may have affected the credibility of the peer supporters and therefore the effectiveness of the ASSIST intervention. Respondents also held negative views about peer

supporters who did not take the role seriously by messing about in sessions and taking part for the incentives such as money and time off school. Several students were also considered to have the wrong kind of personality to undertake the role, either because they were shy, or were just unwilling to talk about smoking. This latter point supports the findings of Ozer (1997). Furthermore, although as Kelly (2004) proposed, popularity was seen to facilitate the diffusion process, some students suggested that this enabled unsuitable peer supporters to be nominated.

The ASSIST nomination process identified students on the grounds of influence (leadership, respect, and whether people look up to them) and not whether they would have been good at talking to other students about smoking. Therefore, it is not surprising that some students were considered unsuitable to carry out this role. However, the suggestion that the effect seen in ASSIST may have been due to modelling and not conversations questions whether the peer supporters needed these skills.

In the ASSIST intervention, peer supporters were most likely to talk to their friends about smoking. It is likely that friends will be trusted and more credible than other students. So while some respondents considered that the peer supporters in general lacked credibility, they are likely to have considered those with whom they conversed credible. This supports Katz's (1957) notion that opinion leaders from one sector of the population will not necessarily act as opinion leaders for other sectors of the population. Therefore, it is not unacceptable that some peer supporters were considered unsuitable by some students. This stresses the need to use the whole-community nomination approach to ensure that peer supporters are nominated from across the year group. This also relates to the more positive review of the individuals named versus those who acted as peer supporters. This is probably because they are more likely to be friends with and talk to the people they named compared to other students who were peer supporters.

9.2.2 Acceptability

Formal peer education contradicts assertions that peer education harnesses naturally occurring interaction and information sharing between young people (Turner & Shepherd, 1999). It also leaves little scope for peer educators to choose the most appropriate communication methods (Frankham, 1998; Harden et al., 1999) and may result in them losing the credibility afforded because they are 'good' at talking with their peers. Difficulties encountered in relation to classroom-based sessions include teachers finding it hard to hand control of formal sessions to peer educators (Backett-Milburn & Wilson, 2000; Mellanby et al., 2000); and problems in the provision of suitable accommodation (Naylor & Cowie, 1999; Strange et al., 2002b). Peer educators have also encountered problems such as giving up their free-time or taking on extra work (Strange et al., 2002b) and being unable to address their own problems or ask for help (Frankham, 1998). This suggests that more informal approaches which provide support to the peer educators may be more appropriate. Informal approaches recognise the importance of informal contacts (Orme & Starkey, 1999) and capitalise on delivery through everyday social interaction (Backett-Milburn & Wilson, 2000). It is suggested that this approach retains the credibility of the peer educators (Green, 2001) and allows the peer educators to take control of how and when they communicate the message they are asked to deliver. This study aimed to examine the acceptability of the informal peer education approach adopted in the ASSIST intervention.

Despite barriers in the implementation of the 'Gay Hero' approach in the UK (Elford et al., 2002c; Hart, 1998) and initial problems in transferring this model to adolescent smoking (Bloor et al., 1997; Bloor et al., 1999), this novel approach was largely considered acceptable and appropriate.

9.2.2.1 Young people versus adults

The use of young people over adults was hugely favoured confirming the findings of other research which has shown that young people hold positive views of peer education (Frankham, 1998; Guy & Banim, 1991; Orme & Starkey, 1999; Strange et al., 2002a) and prefer their peers to deliver health education (Erhard, 1999; Hamdan et al., 2005). The quantitative analysis showed that the majority of students preferred to talk with other young people about smoking. However peer supporters were more likely to report this than non-peer supporters. This did not vary by smoking status. Again, this positive appraisal of this approach may have been related to the peer supporters being involved in the intervention and generally holding positive views about it. The qualitative analysis also revealed a range of positive views of this approach. These included: that it's easier to talk to friends than adults; that they are more likely to listen to what friends say; that they trust friends more than adults; that adults are less empathetic than friends; and that young people have a better approach (are less authoritarian and don't place as much pressure as adults). These findings are consistent with those of other researchers who reported that young people thought that what was said to peer educators was confidential (Backett-Milburn & Wilson, 2000; Forrest et al., 2002); that peer educators are more understanding and did not pretend to know everything (Harden et al., 2001); and that a less authoritarian approach was welcomed (Harden et al., 2001).

A minority thought that it was better to talk to adults, or that they didn't mind who they speak to. Reasons stated were that adults have more experience than young people so are more able to give this kind of information and that young people are more likely to take notice of what adults say. This supports other findings that peers are not necessarily credible (Cline & Engel, 1991; Frankham, 1998) or reliable sources of information (Helgerson & Petersen, 1988).

9.2.2.2 Engagement with the peer supporter role

This study shows that the majority of peer supporters engaged with the role. However, it cannot identify which peer supporters had conversations or whether conversations induced behavioural change. Eighty one per cent of students who attended the peer supporter training carried out the role and handed in a diary. Retention was similar for both sexes until the stage of handing the diaries, which again is encouraging given the results of previous studies.

In the questionnaires completed at follow-up, peer supporters reported that they had conversations about smoking, but it is clear that many took place immediately after the training. This was probably due to initial enthusiasm on their part and interest on the part of the non-peer supporters who wanted to know where they had been and what they had done (Audrey et al., 2006a). When students were asked whether a peer supporter had talked to them about smoking in the past few weeks, a higher proportion of peer supporters (47.1 per cent) answered affirmatively compared with non-peer supporters (21.5 per cent). While, as expected, more peer supporters provided a positive response, the phrase 'last few weeks' may have been open to interpretation (the whole ten-week intervention period or the last few weeks) (Audrey et al., 2006a). When asked whether peer supporters had conversations about smoking the majority of non-peer supporters (68.6 per cent) thought they had not whereas the majority of peer supporters (65.8 per cent) thought that they had. This is again probably due to the invisibility of the peer supporters to non-peer supporters and the generally more positive view of the intervention held by peer supporters.

Qualitative findings presented by Audrey and colleagues (2006a), some of which were reported here showed that the peer supporters talked mostly with their friends and each other. They also show that they spoke mostly with non-smokers and those in the high-risk group. Whilst the quantitative data shows that a higher proportion of peer supporters who were never smokers or in the high-risk group

reported having spoken to a peer supporter, amongst non-peer supporters, regular smokers were more likely to have spoken to peer supporters than students in other groups. However, examining the percentage of students who reported talking to peer supporters is misleading. It is more appropriate to observe the number of students who reported having spoken to a peer supporter which shows that amongst both peer supporters and non-peer supporters the majority of conversations (826 of 903) took place with never smokers and those in the high-risk group, supporting the qualitative data. Since the huge majority of individuals were from these groups, it is not surprising that the majority of conversations took place with these students. These data also show that peer supporters were reluctant to talk with smokers due to the potential for ridicule and the barriers they would face if they tried to encourage smokers to quit. This defends the a-priori decision that the target group for this intervention was the high-risk group of students and supports the need to encourage challenging students and smokers to engage with the role of peer supporter as peer supporters who do not know smokers are unlikely to talk to them.

9.2.2.3 Response of peer supporters to having conversations

In general, the peer supporters viewed the act of having conversations with their peers about smoking positively. The main reason given for this was that they felt helpful and were pleased that they could give information to others. The success and ease of their role may have been facilitated by smoking being an everyday conversation. Therefore this intervention successfully capitalised on existing information exchange, reinforcing existing information which is currently passed between peers (section 4.11) (Turner & Shepherd, 1999). The peer supporter training and follow-up sessions facilitated this by improving conversational skills and by ensuring the information provided was accurate. The few negative views reported largely related to initial worry and nerves which generally subsided over time. However, a number of

students felt uncomfortable in the role and had concerns about whether it was their business to get involved. This indicates a need for these issues to be addressed in the follow-up sessions.

9.2.2.4 Engagement with peer supporters

Further to the positive views held by peer supporters, the quantitative data showed that the majority of other students were positive about peer supporters talking to other Year 8 students about smoking. The qualitative data provided a number of reasons for this but these data did not reflect the largely positive views shown in the quantitative data. Peer supporters reported having received mixed responses from non-peer supporters but only a third of non-peer supporters interviewed described the peer supporters in a positive light. There are a number of possible reasons for this. The quantitative data asked students to indicate whether they agreed or disagreed with the statement "It's good that peer supporters can talk with Year 8 pupils about smoking." As stated previously, such fixed-choice responses limit the scope to elaborate on the answers provided and students may have been inclined to provide 'socially desirable' answers. Conversely, the qualitative data were largely generated in response to a question which asked how the non-peer supporters felt about having conversations with the peer supporters, therefore they are not entirely comparable. Since this was also an open-ended question, it also allowed students to provide a range of responses including ambivalence. Students who described the peer supporter model as unwelcome reported concerns over confidentiality supporting Cowie's (1998) findings. However, this was detailed as more problematic for smokers.

The different views provided by peer supporters and non-peer supporters were evident in the quantitative data which showed that peer supporters were more likely to view the social diffusion model positively than non-peer supporters. Both peer supporters and non-peer supporters reported in interviews and on questionnaires than it was not

the peer supporters' business whether they smoked but the non-peer supporters were statistically significantly more likely than peer supporters to report that peer supporters pressurised other students. Again, this more positive evaluation by peer supporters may be related to their involvement and non-peer supporters' resentment over not being involved or their lack of knowledge of the intervention. In terms of smoking status, ever smokers were more likely to provide negative responses to these questions (hold more negative views of peer supporters).

This discussion clearly shows that this informal approach to peer education was an acceptable method through which to spread a smoke-free message to Year 8 students. It is likely that this approach can be utilised in other peer-led health promotion interventions with adolescents. The more negative views of the intervention held by non-peer supporters and smokers may need to be addressed in future implementation.

9.3 Conclusions and implications for practice

There is an acknowledged lack of evidence for the effectiveness of school-based smoking prevention initiatives (Thomas, 2003) and peer-led interventions (Harden et al., 1999). The evaluation of the ASSIST intervention overcame criticisms aired in these fields of work by using a pragmatic RCT which incorporated an integral process evaluation and an evaluation of the school social networks. Therefore, in addition to the capacity to provide rigorous evidence of effectiveness under real-world conditions, it enabled examination of a number of factors which are fundamental to the success of the intervention.

Basic measures of network cohesion showed little variation between schools suggesting that this and similar social diffusion approaches can potentially have a similar impact in all schools. Furthermore, few isolated actors were identified suggesting that the

health promotion message had the ability to reach most students. This is a promising finding for this intervention approach in general.

While recognising that the centrality measures presented here are basic, they show that the peer supporters were more socially influential than other students and were identified from different sectors of the school community facilitating the diffusion of this health promotion message. The findings also show that students knew and spoke to peer supporters who were not in their social groups, providing evidence that the peer supporters had the potential to induce behavioural change amongst students other than close friends.

Whether direct verbal communication between peer supporters and other Year 8 students led to the effect seen in ASSIST is not known. Instead, behavioural change may have been induced through indirect communication whereby information passed to social contacts by peer supporters is subsequently communicated to others. It may also have been the result of young people modelling the peer supporters' non-smoking behaviour, or the anti-smoking values held by them as a result of them carrying out the peer supporter role. However, since, there was an apparent lack of awareness of the peer supporters amongst non-peer supporters, it seems unlikely that modelling was the primary cause of this effect.

The ASSIST peer nomination successfully identified peer supporters who represented the social diversity of the school year maximising the ability of their ability to identify with and communicate with their peers. This demonstrates the importance of using a whole-community nomination approach and paying attention to the gender balance of the school year. The only difference was seen in terms of smoking status. However, since there is an association between popularity and smoking and this research demonstrated that peer supporters were more popular (had higher degree centrality measures) than other students it is not surprising that smokers were nominated. As a consequence of this association, these students are likely to be among the most influential in their school year, and should therefore be included as peer supporters. However, encouraging smokers and

challenging students to participate should be considered carefully and their inclusion should be assessed against the risks to the credibility of the message they are asked to deliver.

The inclusion of smokers as peer supporters raises questions as to whether direct communication was the main source of influence in ASSIST. Since these students may have been more popular than others, they have more potential to both influence other students through interpersonal communication *and* act as a negative role model. However, despite their *ability* to exert influence through direct communication, their own smoking status may have acted as a barrier to their desire to engage with the peer supporter role resulting in them exerting more influence through modelling.

There was generally a more positive review of the individuals named versus those who acted as peer supporters. However, this is likely to be because students named people who they were close to on their questionnaires whereas they wouldn't necessarily know all those who were peer supporters. Although the questions selected students on the basis of measures of influence, and not on their ability to have conversations with other Year 8 students, the majority of those who acted as peer supporters were considered suitable to undertake the role.

While the value of including smokers as peer supporters has been recognised, respondents considered them inappropriate to adopt the peer supporter role. Given that behaviour change may have been induced through modelling of behaviours and values as well as through conversations, and since students expressed displeasure in peer supporters continuing to smoke, these smokers should be encouraged to give up the habit in order to maximise the effectiveness of the intervention. Consequently, it may be necessary to provide advice, and support for peer supporters who want to quit. This will also apply to other addictive behaviours to which this intervention may be applied. Where students were considered inappropriate because they were immature, or because they 'messed about', it will be necessary to encourage them to engage with the role in an appropriate manner from

the outset. This should include concealing information about monetary 'reward' until late in the intervention and emphasising the other benefits of adopting the role (a number of which have been identified in relation to peer education in section 4.7.4). This will also apply to other social diffusion interventions. However, while some students were considered inappropriate, they were likely to be considered appropriate by other students, again emphasising the need to employ the whole-community nomination approach to identify students from a range of social groups.

This study demonstrates that the ASSIST peer nomination approach successfully identified influential peer supporters to communicate a smoke-free message. However, there are no guarantees that this approach would successfully nominate young people to communicate other health-related messages. Nonetheless, there are reasons to be confident that it could. The peer nomination process was not smoking-related, identifying influential students on the basis of influence. Therefore, the combination of questions used could realistically be used to identify influential individuals for similar interventions which target different health behaviours. It is probable that the questions used may be inappropriate for younger or older people and it should be recognised that significantly amending them for use with other populations would not guarantee the results obtained in ASSIST. In terms of the characteristice of the peer supporters, a number of peer supporter characteristics were identified which would facilitate diffusion regardless of the message they are asked to disseminate. These included: being confident; easy to talk to; and willing to engage with the peer supporter role.

The positive outcome results demonstrate that concerns over the transferability of the 'Gay Hero' approach into the field of adolescent smoking were unfounded. This study provides evidence to support this. The ASSIST approach was considered acceptable by the majority of students involved. Delivery by young people instead of adults was regarded in a hugely positive light supporting the findings of previous research. Furthermore, the successful transference to adolescent smoking not only demonstrates the value in this field but also

demonstrates that it could successfully transferred to other populations and health behaviours. The peer supporters were willing and happy to engage with the role and have conversations, although the approach they took may not have been very visible to other students, resulting in them reporting that they were inactive.

Peer supporters were generally more positive about the intervention than non-peer supporters. This is probably because they were actively involved in the intervention. Non-peer supporters may have been resentful or upset about not being involved and whilst care was taken to inform students who had been nominated as peer supporters in a sensitive manner, so as not to highlight the fact that other students had not been nominated this process may need to be carried out more delicately to minimise any negative impact. Smokers were also more negative than non-smokers. This may be because of concerns over confidentiality or because they considered that the peer supporters were pressurising them to be smoke-free, or were interfering in their business. However, the role of the peer supporters was not to assist smoking cessation (they did not have the skills or knowledge for this although they could direct friends to relevant information sources) and it may be useful to integrate separate smoking cessation support into the intervention so peer supporters can direct students to local contacts if they wish to quit. This would also help to clarify the peer supporter role. If smokers cannot be encouraged to view peer supporters in a more positive light it is essential that the peer supporters are provided with adequate training to deal with conflict or negative responses which might occur as a result of talking to non-peer supporters or students engaging in the behaviour targeted by the intervention. Follow-up sessions should be utilised to comprehensively address any further problems.

Amongst both non-peer supporters and smokers negative views of the intervention could also be related to a lack of understanding of the rationales for the intervention. In order to maximise the positive effects of the intervention it is necessary to encourage these students to engage more positively with the intervention. In ASSIST, there was little

promotion of the peer supporter intervention, except in the form of smoking-related posters which were displayed in the school and any promotion initiated by the peer supporters or the schools themselves. It is possible that this contributed to low levels of awareness and understanding of the intervention amongst non-peer supporters and smokers which contributed to these negative views. Positively promoting the intervention to these students, and utilising more 'conversation starters' (as endorsed by Kelly (2004)) may help improve understanding and knowledge, and therefore enhance the acceptability and effectiveness of the approach.

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APPENDICES

Appendix 1: Literature Review

The first three chapters of the thesis comprise the literature review of adolescent smoking, and strategies to prevent the uptake of the habit. Chapter one describes the mortality and morbidity of smoking, the epidemiology of smoking, and the aetiology of adolescent smoking. Chapter two outlines efforts to prevent adolescent smoking. Chapter three discusses peer education as a promising approach to adolescent smoking prevention.

Search strategy

The literature review is not intended as a systematic review of all literature relevant to the current study, but aims to outline a number of issues relevant to this thesis. During my time working on the ASSIST evaluation, and subsequently on related projects, a number of relevant literature searches have been conducted by myself, or colleagues. The references gathered have been compiled in communal reference databases. These databases served as a useful starting point to obtaining literature for this review. The additional search methods used for each aspect of the review are outlined below.

Review of abstracts identified the most relevant publications. In all cases, studies were not utilised if they considered children or young adults, were published in a language other than English, and in general were excluded if they reported the results of research conducted in developing countries. In general, publications in print over 20 years ago were not included in the review. However, there are exceptions. These tended to be key methodological (particularly in the field of social network analysis) or theoretical texts, or relevant policy documents. Empirical studies over 20 years old were included only if they were of particular importance and relevance to this study.

Smoking

There is a huge literature relating to smoking; a keyword search for 'smoking' in the title or abstract of publications from 2001-10006 using Bath Information and Data Services (Ingenta) generated over 14,000 hits. Therefore, the literature used in this study was largely obtained from reports of national surveys. This was supplemented by:

- Checking references in published reports and journal articles.
- Notifications of relevant journal articles from Zetoc.

Aetiology of adolescent smoking behaviour

A number of relevant reviews were identified which formed the basis for much of the discussion on the aetiology of adolescent smoking behaviour. This was supplemented using a number of other sources, including:

- Electronic searches using ISI Web of Science, Embase, Ovid Medline and Bath Information and Data Services (Psych Info and Ingenta). The search terms used were 'smoking AND adolescen*', 'smoking AND young people', 'peer influence AND selection', 'smoking AND friends'. These were used as either a subject search or as a text keyword.
- Citation searches for publications citing key researchers in the field.
- Checking references in published journal articles.
- Use of the online bibliographic resources 'Teenagers and Smoking' and 'Teens and Drugs: The Role of Peer Pressure' produced by CSA Illumina (available from www.csa.com).
- Notifications of relevant journal articles from Zetoc.
- Personal communication with other researchers.

Health education, health promotion and health promotion theory

This section of the literature was largely constructed using a number of general health promotion texts, and the relevant references cited. These were supplemented using:

- Electronic searches using ISI Web of Science, Embase, Ovid Medline and Bath Information and Data Services (Psych Info and Ingenta). The search term used was 'smoking theor*'. This was used as either a subject search or as a text keyword.
- Checking references in published journal articles.
- Notifications of relevant journal articles from Zetoc.
- Personal communication with other researchers.

Adolescent smoking prevention interventions, including peer education

Given that there are a substantial number of reviews and meta-analyses in this field, these were used as a focus for identifying literature in this area. These were supplemented by:

- Electronic searches using ISI Web of Science, Embase, Ovid Medline and Bath Information and Data Services (Psych Info and Ingenta). The terms used were combinations of 'smoking', 'intervention', 'prevention', 'children', 'adolescent', 'youth', 'young people' and 'school'. These were used as either a subject search or as a text keyword.
- Checking references in published journal articles.
- Use of the online bibliographic resources 'Youth Smoking Prevention: What Works?' produced by The Prevention Researcher (available from http://www.tpronline.org/), and 'Teenagers and Smoking' produced by CSA Illumina (available from www.csa.com).
- Notifications of relevant journal articles from Zetoc.
- Personal communication with other researchers.

Diffusion theory and methods

Literature were identified through:

- Use of key methodological texts and theory texts, and the relevant references cited.
- Use of the online bibliographic resources 'Networks analysis bibliography' (available from http://www.insna.org/INSNA/bigbib_inf.html) and 'Social Network References' (available from http://www.socialnetworks.org/).
- Citation searches for publications citing key researchers in the field.
- Electronic searches using Bath Information and Data Services (Psych Info and Ingenta). The search terms used were 'network* centrality' and 'social centrality'. These were used as either a subject search or as a text keyword.
- Hand searches of a number of relevant journals such as 'Social Networks' and 'Connections'.
- Notifications of relevant journal articles from Zetoc.
- Involvement in email discussion groups, in particular those relating to social networks analysis (SOCNET, UCINET).
- Personal communication with other researchers.

Appendix 2: Illness and death from smoking

Non-lethal illness associated with smoking

Increased risk for smokers	
Acute necrotizing ulcerative gingivitis (gum disease)	Muscle injuries
Angina (20 x risk)	Neck pain
Back pain	Nystagmus (abnormal eye movements)
Buerger's Disease (severe circulatory disease)	Ocular Histoplasmosis (fungal eye infection)
Duodenal ulcer	Osteoporosis (in both sexes)
Cataract (2 x risk)	Osteoarthritis
Cataract, posterior subcapsular (3 x risk)	Penis (inability to have an erection)
Colon Polyps	Peripheral vascular disease
Crohn's Disease (chronic inflamed bowel)	Pneumonia
Depression	Psoriasis (2 x risk)
Type 2, non-insulin dependent Diabetes	Skin wrinkling (2 x risk)
Hearing loss	Stomach ulcer
Influenza	Rheumatoid arthritis
Impotence (2 x risk)	Tendon injuries
Optic Neuropathy (loss of vision, 16 x risk)	Tobacco Amblyopia (loss of vision)
Ligament injuries	Tooth loss
Macular degeneration (eyes, 2 x risk)	Tuberculosis
Function impaired in smokers	
Ejaculation (volume reduced)	Sperm count reduced
Fertility (30% lower in women)	Sperm motility impaired
Immune System (impaired)	Sperm less able to penetrate the ovum
Menopause (onset 1.74 years early on average)	Sperm shape abnormalities increased
Symptoms worse in smokers	
Asthma	Graves' disease (over-active thyroid gland)
Chronic rhinitis (chronic inflammation of the nose)	Multiple Sclerosis
Diabetic retinopathy (eyes)	Optic Neuritis (eyes)
Disease more severe or persistent in smokers	
Common cold	Pneumonia
Crohn's Disease (chronic inflamed bowel)	Tuberculosis
Influenza	

Deaths caused by smoking

Estimated percentages and numbers of deaths attributable to smoking in the UK by cause (based on 2002 mortality data)						
	Deaths from disease estimated to be caused by smoking					
	Number			As % of all deaths from disease		
	Men	Women	Total	Men	Women	Total
Cancer						
Lung	18002	10032	28034	89	75	84
Upper respiratory	525	85	610	74	50	66
Oesophagus	3248	1743	4991	71	65	68
Bladder	1521	318	1839	47	19	37
Kidney	788	72	860	40	6	27
Stomach	1385	266	1651	35	11	26
Pancreas	670	923	1593	20	26	23
Unspecified site						
Myeloid Leukaemia	264	131	395	19	11	15
Respiratory						
Chronic obstructive lung disease	13193	10685	23878	86	81	84
Pneumonia	3162	2900	6062	23	13	17
Circulatory						
Ischaemic heart disease	14182	6361	20543	22	12	17
Cerebrovascular disease	3064	3764	6828	12	9	10
Aortic aneurysm	3652	1939	5591	61	52	57
Myocardial degeneration	6670	2936	9606	22	12	15
Atherosclerosis	63	56	119	15	7	10
Digestive						
Ulcer of stomach/duodenum	907	1008	1915	45	45	45
Total caused by smoking	71296	43219	114597			
Preventable by smoking * :						
Parkinson's	1369	549	1918	55	28	43
Cancer of the endometrium		260	260		17	17
Total prevented by smoking						
Deaths from all causes due to smoking (causes less prevented)	69927	42410	112337			

* Studies have shown that smoking appears to have a protective effect against the onset of some diseases such as endometrial cancer. However, the positive effect is so small in comparison with the overwhelming toll of death and disease caused by smoking that there is no direct public health benefit.

Adapted from Action on Smoking and Health (2004a)

Appendix 3: Beneficial health effects of quitting smoking

Time since quitting	Beneficial health changes that take place
20 minutes	Blood pressure and pulse rate return to normal.
8 hours	Nicotine and carbon monoxide levels in blood reduce by half, oxygen levels return to normal.
24 hours	Carbon monoxide will be eliminated from the body. Lungs start to clear out mucus and other smoking debris.
48 hours	There is no nicotine left in the body. Ability to taste and smell is greatly improved.
72 hours	Breathing becomes easier. Bronchial tubes begin to relax and energy levels increase.
2 - 12 weeks	Circulation improves.
3 - 9 months	Coughs, wheezing and breathing problems improve as lung function is increased by up to 10%.
1 year	Risk of a heart attack falls to about half that of a smoker.
10 years	Risk of lung cancer falls to half that of a smoker.
15 years	Risk of heart attack falls to the same as someone who has never smoked.

Source: USDHSS (1990)

Appendix 4: Drug, alcohol and tobacco education within the national curriculum

Statutory requirements

Science
Key stage 1
Pupils should be taught:
about the role of drugs as medicines

Key stage 2
Pupils should be taught:
about the effects on the human body of tobacco, alcohol and other drugs, and how these relate to their personal health

Key stage 3
Pupils should be taught:
the role of lung structure in gas exchange, including the effect of smoking
that the abuse of alcohol, solvents and other drugs affects health
how the growth and reproduction of bacteria and the replication of viruses can affect health, and how the body's natural defences may be enhanced by immunisation and medicines
that the abuse of alcohol and solvents and other drugs affects health

Key stage 4
Pupils should be taught:
the effects of solvents, alcohol, tobacco and other drugs on body functions

Non-statutory guidance

PSHE and citizenship
Key stage 1
Pupils should be taught:
that all household products, including medicines, can be harmful if not used properly

Key stage 2
Pupils should be taught:
which commonly available substances and drugs are legal and illegal, their effects and risks

PSHE
Key stage 3
Pupils should be taught:
basic facts and laws, including school rules, about alcohol and tobacco, illegal substances and the risks of misusing prescribed drugs

Key stage 4
Pupils should be taught:
about the health risks of alcohol, tobacco and other drug use, early sexual activity and pregnancy, different food choices and sunbathing, and about safer choices they can make

Adapted from Qualifications and Curriculum Authority (2003, p13) and Department for Education and Skills (2004, pp95-97)

Appendix 5: Training and follow-up activities and objectives

Training

Day one

Name of Activity *WELCOME INTRODUCTIONS/HOUSEKEEPING*
Coding Red Information
Objectives

- To revisit information given at peer supporter recruitment meeting and the role of a peer supporter
- To discuss outline of training programme
- To set ground rules
- To introduce training staff

Name of Activity *MAKING IT WORK*
Coding Red Skills
Objectives

- To discuss with pupils the ground rules **they** think are important in order to ensure an enjoyable, productive and worthwhile training course
- To accept the rules required by the venue
- To agree that both trainers and peer supporters keep to the negotiated list

Name of Activity *PERSONAL SHIELD*
Coding Red Personal Development
Objectives

- To develop self-esteem and confidence
- To learn more about one another and present skills

Name of Activity *READY, STEADY, COOK*
Coding Red Information
Objectives

- To illustrate the ingredients of cigarettes using a format which will attract attention
- To discuss the poisonous nature of some of the constituents

Name of Activity *WHAT DO WE KNOW ABOUT SMOKING?*

Coding Red Skills/Information

Objectives

- To create a pool of knowledge about the health, economic, social and environmental risks of smoking, which comes from information the peer supporters themselves supply
- To give peer supporters confidence in the validity of information they already hold, as well as learning from one another

Name of Activity *WHY DO PEOPLE SMOKE?*

Coding Red Skills/Information

Objectives

- To reflect on the different reasons people have for choosing to smoke
- To reach an understanding of the reasons giving up may be difficult

Name of Activity *TRUE/FALSE STATEMENTS*

Coding Amber Information/Skills

Objectives

- To give peer supporters the opportunity to test their knowledge about smoking and smokers
- To give accurate information about smoking and smokers

Name of Activity *SUMMARY LUNCHTIME ARRANGEMENTS*

Coding Red Information

Objectives

- To consolidate the knowledge gained from the morning session
- To give information about the lunchtime arrangements and optional quizzes
- To give students the opportunity to raise any queries or concerns from the morning sessions
- To outline the timetable for lunchtime and afternoon session

Name of Activity *LISTENING SKILLS TRAIN*
Coding Red Skills
Objectives

- To demonstrate the importance of good observation and listening skills
- To show how the same information can be interpreted differently from person to person

Name of Activity *INFORMATION ISLANDS*
Coding Red Information
Objectives

- To find and memorise accurately information about the health, environmental, gender, legal and economic issues related to smoking
- To choose information which is interesting and important to Year 8 pupils
- To learn about the laws and government policies related to smoking

Name of Activity *AGREE, DISAGREE, DON'T KNOW*
Coding Red Skills
Objectives

- To give peer supporters the opportunity to explore their attitudes and opinions on the statements provided
- To challenge mistaken attitudes and assumptions about smoking and smokers

Name of Activity *CIRCLE TIME*
Coding Amber Personal development
Objectives

- To reflect on the day's activities, as a group
- To encourage every peer supporter to participate
- To encourage everyone to value each person's contribution
- To raise self-esteem of group members

Name of Activity *SUMMARY/TARGET EVALUATION*
Coding Red Skills
Objectives

- To summarise the Day One training programme
- To complete a target evaluation
- To preview Day Two training

Day two

Name of Activity *DAY TWO WELCOME/RECAP OF DAY ONE*
Coding Red Information
Objectives

- To welcome the peer supporters to Day Two of the training
- To revisit and renegotiate 'Making it Work' and agree any amendments
- To preview the programme for Day Two
- To motivate all the peer supporters to continue to participate actively in the training

Name of Activity *MYTHS AND FACTS*
Coding Red Information
Objectives

- To consider a selection of statements about smoking
- To dispel common myths about smoking

Name of Activity *SKILLS OF A PEER SUPPORTER*
Coding Red Skills
Objectives

- To reflect on the skills needed to be a successful peer supporter
- To prioritise the skills they think are most important using a ranking system

Name of Activity *DIARIES*
Coding Red Skills
Objectives

- To explain the meaning of the word 'conversation'
- To explain the purpose of record keeping
- To explain how to complete the diaries
- To allow peer supporters an opportunity to practice talking to a friend about smoking issues

Name of Activity *HOW? WHEN? & WHERE? BRAINSTORM*

Coding Red Skills

Objectives

- To develop awareness among peer supporters of appropriate situations to instigate conversations about smoking
- To emphasise the importance of appropriate verbal and non-verbal behaviour during conversations

Name of activity *WHEN/WHEN NOT ROLE-PLAY*

Coding Red Skills

Objectives

- To raise awareness of personal and emotional issues that may affect peer supporters' attempts to influence attitudes and behaviour towards smoking among their peers
- To encourage sensitivity towards personal circumstances, and an understanding of how this might influence responses
- To practise starting conversations

Name of Activity *SUMMARY OF MORNING SESSION*

Coding Red Information

Objectives

- To review the information and skills learned from the morning session
- To give information about the lunchtime arrangements
- To give peer supporters the opportunity to raise any queries or concerns about the training so far

Name of Activity *CONFLICT RESOLUTIONS*

Coding Red Skills/Personal Development

Objectives

- To help peer supporters to build confidence and self-esteem
- To establish ways of coping with difficult situations

Name of Activity *VALUES CONTINUUM*
Coding Amber Skills
Objectives

- To explore attitudes and values about smoking issues among the peer supporters
- To develop awareness of the reasons people might give for deciding to smoke

Name of Activity *JIGSAWS*
Coding Red Skills
Objectives

- To look at the role of health promotion resources for discouraging smoking
- To give the peer supporters an opportunity to comment on the effectiveness of such resources for their age group
- To select posters for use in schools
- To relate the use of posters in health education to the role of advertising for cigarettes

Name of Activity *SUMMARY DAY TWO EVALUATION/FOLLOW-UP INFORMATION*
Coding Red Information
Objectives

- To summarise and review the information acquired, and the skills and personal development which have been explored during the training
- To give out diaries and remind the peer supporters about the method and importance of recording conversations
- To give information about the follow-up visits
- To complete evaluation sheets, and sign assent forms

Activity links

A variety of games and group dividing activities were incorporated into the training programme.

Group dividing activities (GDAs)

These were used:

- as a structured way of allocating people to groups
- to ensure that there are opportunities for everyone to work with a variety of people in different sized groups
- to enable peer supporters to practise their negotiating and team-working skills with people outside of their normal friendship groups

Games with a purpose

These were used:

- to energise – when a more serious and lengthy activity has been completed
- to refocus – when there is a need to re-establish concentration in the group
- to challenge – when demonstrating team-work
- to reward – when the group has worked particularly well at an activity

Follow-up visits

Aims

- To consolidate the core skills developed during the two-day training course
- To provide active on-going support for peer supporters
- To respond to issues raised by peer supporters
- To monitor the conversations recorded in peer supporters' diaries
- To reflect with the students on their role as peer supporters

Objectives

- To pursue the common theme for all visits:
- To discuss with the students their work as a peer supporter
- To monitor diaries individually
- To assess any support needed for future meetings
- To carry out proactive support through activities which strengthen skills acquired during the training:
- To reinforce knowledge
- To discuss personal values and attitudes
- To consolidate communication skills through practice in starting conversations
- To address urgent issues and assess the need for support beyond that already included in the visit programme
- To discuss progress and offer some practical advice which reassures them

FOLLOW-UP VISIT ONE

Objectives

- To respond to issues raised by the peer supporters
- To review the first experiences of the peer supporters in their role and respond with appropriate support
- To practise starting conversations
- To monitor diaries

Activities

- Peer supporter issues
- Introductory warm-up exercise
- First experiences of being a peer supporter
- Starting conversations
- Monitoring the diaries

FOLLOW-UP VISIT TWO

Objectives

- To respond to issues raised by the peer supporters
- To review and consolidate conflict resolution skills developed during training
- To review assertiveness skills
- To increase confidence and self-esteem

Activities

- Peer supporter issues
- Introductory warm-up exercise
- Review of skills useful in resolving conflict
- Confidence and self-esteem building
- Monitoring the diaries

FOLLOW-UP VISIT THREE

Objectives

- To respond to issues raised by the peer supporters
- To review listening skills
- To explore personal values and attitudes and reflect on how they change over time
- To explore responses to tricky situations

Activities

- Peer supporter issues
- Introductory warm-up exercise
- Review of listening skills
- Personal values

- Lifeline – how attitudes and values change over time
- Monitoring the diaries

FOLLOW-UP VISIT FOUR

Objectives

- To respond to issues raised by the peer supporters
- To reflect on their experiences of being a peer supporter
- To consider changes in personal attitudes and values as a result of being a peer supporter
- To collect in the diaries

Activities

- Peer supporter issues
- Introductory warm-up exercise
- Peer supporter reflections
- Costs and benefits of taking risks
- Collection of the diaries

Appendix 6: Raw social network data

Raw network data can be represented in a number of formats. *Matrix format,* is where the contents of a matrix signifies if a tie exists between two actors. These matrices may be valued or dichotomous, where valued entries represent, for example, the strength of the ties or the distance between actors, and dichotomous entries represent the presence of absence of ties between actors. These matrices can be either square or rectangular. The following figure shows two matrices. The first represents weekly participation in physical activity. The result is a person-by-event matrix where cell *(i,j)* shows the number of times the person engages in the activity. The second represents friendship ties. The result is a person-by-person matrix where cell *(i,j)* is 1 if person *i* named person *j* as a friend, and 0 otherwise. Note that this matrix is symmetrical around it's diagonal since if, for example, Frank has a tie to Jane, Jane will also have a tie to Frank. If the data were directed, the data would not necessarily be symmetrical as Frank could quite plausibly nominate Jane without Jane nominating Frank. In this example, self-loops (ties to oneself) are not possible so all entries along the diagonal are equal to zero.

Data in matrix format

	Gym	Running	Football	Biking
Frank	0	2	3	0
Jane	2	0	1	0
Ann	1	1	0	4
Sarah	0	3	0	0
Bill	4	3	0	0
Kate	0	5	0	0

Valued rectangular case-by-case affiliation matrix

	Frank	Jane	Ann	Sarah
Frank	0	1	1	0
Jane	1	0	1	1
Ann	1	1	0	1
Sarah	0	1	0	0

Dichotomous square by-case matrix

Nodelist format is where all actors tied to a respondent (ego) are listed. The dichotomous matrix above would be presented as shown below.

Frank	Jane	Ann	
Jane	Frank	Ann	Sarah
Ann	Frank	Jane	Sarah
Sarah	Jane		

Edgelist format is where each link present in the networks listed. Again, the dichotomous matrix above would be presented as shown below.

Frank	Jane
Frank	Ann
Jane	Frank
Jane	Ann
Jane	Sarah
Ann	Frank
Ann	Jane
Ann	Sarah
Sarah	Jane

Appendix 7: Reasons given by schools via reply slips and telephone calls for not wishing to participate in ASSIST

Reason for not participating in study	No. of times reason given*
Internal school issues	
Pressure of work	21
Involved with other/too many initiatives	18
Involved with other smoking initiatives	13
School felt they did not have a smoking problem	9
Staff shortages/issues	7
School inspection	4
Pupils had learning difficulties	3
School closing	3
Smoking already covered in curriculum	1
School did not want to draw attention to smoking	1
Absenteeism issues	1
'Work-to-rule' union action	1
Nobody prepared to co-ordinate research	1
Too busy to reply	1
Head's decision – no reason given	1
Absent Headteacher	1
Building in progress	1
Research design issues	
Did not recall being contacted	9
A lot of administration involved	5
Concerned about parental reaction	2
More notice required	2
Concerned about amount of time spent out of school by peer supporters	1
Concerned about pupil-centred method of selection of influential pupils	1
Target group too young	1
Concerned about pupils giving samples	1
Informed by study team that school was too small	1
Total	**110**

NB. Some schools gave more than one reason for not wishing to participate. Reasons were obtained from 82 schools which chose not to participate.

Appendix 8: Selection of schools to act as in-depth process evaluation schools

ENGLAND
Control

School	Approximate year size	Type	Sex	Fsm*	Notes
c15	66	Independent	Girls	1	Independent
c4	282	State	Mixed	5.4	
c11	165	State	Mixed	6	Selected as process school
c7	210	State	Mixed	8.8	
c17	280	State	Mixed	9.3	
c8	165	State	Mixed	10.1	
c2	199	State	Mixed	10.3	
c14	135	State	Mixed	11.3	
c12	170	State	Mixed	11.4	
c1	300	State	Mixed	13.7	
c3	147	State	Mixed	18.3	
c5	180	State	Mixed	20	
c16	209	State	Mixed	23.9	Selected as process school
c9	160	State	Mixed	27.5	
c6	190	State	Mixed	28.4	
c8	80	State	Mixed	31.9	
c13	170	State	Mixed	32.8	

Intervention

School	Approximate year size	Type	Sex	Fsm*	Notes
i5	88	Independent	Mixed	1	Independent
i3	150	Independent	Mixed	1	Independent
i1	250	State	Mixed	3.1	
I15	280	State	Mixed	3.8	
I10	220	State	Mixed	4.5	
i2	170	State	Mixed	6	Selected as process school
i4	180	State	Mixed	6.5	
I12	240	State	Mixed	6.6	
i8	195	State	Mixed	7.5	
i7	260	State	Mixed	9.5	
I13	240	State	Mixed	21.8	Selected as process school
i6	105	State	Boys	22.6	
I14	73	State	Mixed	24.4	
I11	178	State	Mixed	25.4	
I9	110	State	Mixed	36.3	

*Fsm = free school meal entitlement used as proxy for level of deprivation
Grey shading identifies school with less than 200 students in Year 8

WALES

Control

School	Approximate year size	Type	Sex	Fsm*	Notes
c23	400	State	Mixed	8.1	Recruited late into study following school drop-out
c20	260	State	Mixed	8.3	Selected as process school
c21	240	State	Mixed	8.7	
c26	86	State	Mixed	11.2	Welsh medium
c27	160	State	Mixed	13.6	
c18	202	State	Mixed	13.6	
c29	250	State	Mixed	24.5	
c24	190	State	Mixed	25.7	
c28	116	State	Mixed	26.1	Selected as process school
c19	180	State	Mixed	31.3	Not selected as wished to select small school like small intervention school selected (i17)
c25	300	State	Mixed	35.4	
c22	200	State	Mixed	49	

Intervention

School	Approximate year size	Type	Sex	Fsm*	Notes
i27	180	State	Mixed	4.3	
i19	250	State	Mixed	4.8	Selected as process school
i129	230	State	Mixed	12.4	
i28	200	State	Mixed	14.1	Welsh medium
i23	185	State	Mixed	17.3	
i24	220	State	Mixed	18.8	
i16	232	State	Mixed	20.8	
i21	100	State	Mixed	22.5	
i25	155	State	Mixed	22.7	
i26	150	State	Mixed	23.9	
i20	250	State	Girls	23.9	
i18	163	State	Mixed	24.9	
i22	216	State	Mixed	25.3	
i17	140	State	Mixed	25.9	Selected as process school
i30	136	State	Mixed	40.9	Recruited late into study following school drop-out

*Fsm = free school meal entitlement used as proxy for level of deprivation
Grey shading identifies school with less than 200 students in Year 8

Appendix 9: Social network questionnaires previously used elsewhere

Questionnaire used by Pearson and Michell (2000)

NAME OF 1ST FRIEND ....
1st name 2nd name

About this friend. . .

1. Best friend **or** Just a friend
☐ ☐
Tick **one** box

2. Boy **or** Girl
☐ ☐
Tick **one** box

3. In your Class **or** In your year **or** In another year at your school **or** At another school **or** Left school
☐ ☐ ☐ ☐ ☐
Tick **one** box

4. We go around together in school **or** We see each other in school **and** out of school **or** We just see each other out of school
☐ ☐ ☐
Tick **one** box

5. We do activities together (sport, computer games swimming etc.) | We just hang about together we don't do much | We are close, talk a lot, share secrets | We are like each other; think the same way
☐ ☐ ☐ ☐
Tick **one or more** boxes

Questionnaire used by the University of Birmingham

Remember to tick only one box/fill in one answer per question unless the question says to do otherwise!

Name of first friend (first and last names)

_____

Are they?:
a) Your best friend □
b) just a friend □

Are they:
a) male □
b) female □

Are they:
a) In your class? □
b) In your year? □
c) In another year at your school? □
d) At another school? □
e) Left school? □

Which of the following best describes them (tick one)
a) Popular, cool, loud and fun? □
b) Sporty, popular, trendy? □
c) A troublemaker, rebel? □
d) Sometimes in trouble, doesn't like school? □
e) Quiet, friendly, nice, doing well at school? □
f) Loners, prefers own company □
g) None of the above □

Tick one box only
a) we go around together at school □
b) we see each other in school and out of school □
c) we just see each other out of school □

Tick one box only
a) we do activities together □
b) we just hang out together, we don't do much □
c) we are close, talk a lot; share secrets □
d) we are like each other, think the same way □

Which of these applies to you:
a) I buy cigarettes from this friend? □
b) I get cigarettes for free from this friend? □
c) I ask this friend to buy cigarettes for me from a shop? □
d) I don't get any cigarettes from this friend. □

Does this friend smoke?
a) Yes □
b) No □
c) Don't know □

Appendix 10: Example contents of questionnaire used to collect data on school social networks at first-post intervention datasweep

ASSIST RESEARCH PROJECT

Please read these instructions before filling in this questionnaire.

Instructions

1. ***Do not put your name*** anywhere on the form.
2. Please fill in the form on your own and do not talk to anyone.
3. Think about your friends and fill in ***one page for each friend.***
4. If you have one friend, please fill out one page. If you have two friends, please fill out two pages, and so on for ***up to six friends.***
5. If you have more than six friends, fill in pages for your six closest friends.
6. You can name ***any of your friends.*** You can include friends who do not go to your school.
7. You can name both boys and girls.
8. Your answers are ***confidential*** - they will only be seen by the research team.
9. When you have finished filling in the form, please put it in the envelope.

BEFORE YOU FILL IN THE NEXT PAGES, PLEASE WRITE THE FULL NAMES OF YOUR FRIENDS BELOW.

If you have one friend, please write one name below. If you have two friends, please write two names and so on. If you have more than six friends, write the names of your six closest friends below.

Remember that you can name any of your friends.
You can include friends who do not go to your school.

	Name of friend (first name and surname)
1	
2	
3	
4	
5	
6	

Remember that the answers you give are confidential.

PLEASE TURN TO THE NEXT PAGE AND ANSWER SOME QUESTIONS ABOUT THE FRIEND/FRIENDS YOU HAVE JUST NAMED.

Name of 1st friend (first & surname) _____

Form/tutor group (if at your school) _____

Answer the questions on this page for the friend you have named above.

1a) Is this friend (Please tick one box only)

Your best friend ☐ 1
Just a friend ☐ 2

1b) Is this friend (Please tick one box only)

A boy ☐ 1
A girl ☐ 2

1c) This friend (Please tick one box only)

Is in Year 8 at my school ☐ 1
Is in a year below Year 8 at my school ☐ 2
Is in a year above Year 8 at my school ☐ 3
Is at another school ☐ 4
Has left school ☐ 5

1d) When do you see each other? (Please tick one box only)

In school only ☐ 1
In and out of school ☐ 2
Out of school only ☐ 3

1e) How would you describe your friendship? (You can tick more than one box)

We do activities together (sport, computer games etc.) ☐ 1
We just hang out but don't do activities together ☐ 2
We are close and talk a lot together ☐ 3
We are like each other ☐ 4
We think the same way ☐ 5

Appendix 11: Verifying the names of friends

It was important to recognise the significance of ties external to the school year. As a consequence, students were allowed to name friends who were outside of their school year in their social network questionnaires (see section 7.2.3.1). To ensure that information on ties made outside of the study cohort (i.e. those in other years in the school and those who were not at the same school) were retained for use in future analyses, unique identification numbers were allocated to these individuals. However, the trustworthiness of ties made to individuals whom we had no information on was queried. There were also occasions when individuals purportedly in the same school year as the respondent were named, but we did not have information on them for a variety of reasons, for example, they may have been new to the school since class lists had been sent to us or nicknames were provided. Measures were therefore employed to maximise the amount of data obtained, and ensure that data collected were as reliable as possible.

In order to achieve this, schools were approached and asked to verify the names and details of individuals named from their school but who were outside the study cohort, and to answer any queries about students apparently in the same year as the respondent. In May 2003, schools were contacted by letter or telephone to ask them if they were happy to help us with the queries arising from the first post-intervention questionnaires. The approach varied due to the sensitive timing of the request; the first post-intervention datasweep had recently been completed in the schools and it was soon to be the end of term so schools were naturally busy. The research team considered that some schools may be more co-operative than others in agreeing to complete an additional task. Consequently, some schools were not approached as it might jeopardise their involvement in the trial. Furthermore, since the collection of social network data were an additional element of the study, it was seen as being of secondary importance.

Of the schools contacted, the majority agreed to verify the existence of friends named by students in the trial. Of the 54 schools

approached, two schools actively refused to supply the data. One contact teacher felt it was inappropriate that young people were naming their friends and providing information about their friendship and in the other, a decision was made by senior management to withhold this information. Schools were also approached for this information following subsequent datasweeps. At each datasweep there were also a number of schools which simply did not respond to requests and phonecalls for assistance with this part of the work. Schools were offered two ways of supplying the information. We either sent the schools a list of students named so they could check their registers, or they to send us class lists for the entire school so we could look for the names of individuals named. A final approach was adopted if schools were reluctant to engage with either of these processes; a researcher went to the school to search the electronic register themselves. This process enabled us to use the dates of birth and form group of students who were on the school register as identifying information instead of the student's name.

Carrying out this exercise has allowed us to be confident that individuals in different years at the same school were bone fide friends, and successfully answered a number of queries about students in the same year, for example, in several cases, where form groups were provided the schools were able to identify students from nicknames given on questionnaires. It was not possible to verify the names of friends who were outside of the respondents' schools, therefore, these individuals were only allocated a unique identification number if the respondent had provided a first name *and* a surname for their friend.

Entry of data (from the first post-intervention datasweep) from ten schools revealed that prior to verification, the proportion of students named who were in other years at the same school was 13.5 per cent. A small number of unknown students were also identified as being in the same year at the same school. The proportion of ties made to students in other years at the same school was 5 per cent. Following verification, the proportion of ties to students remaining unverified was 0.4 per cent. We feel that this demonstrates the benefit of carrying out this procedure, and that the efforts made were justified.

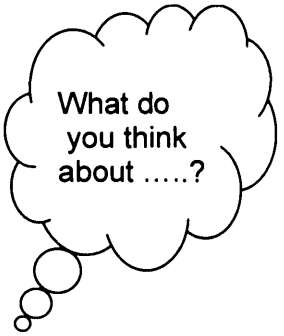
Appendix 12: Selection of two additional intervention schools used in network analysis

Since only schools in the south Wales valleys were considered for selection, schools in England are not included in this figure. For details of the intervention schools in England, see Appendix 7.

School	Year Size	Type	Sex	Fsm*	Process evaluation school	Incomplete social networks dataset	Not in South Wales valleys	Upper South Wales valleys
i27	180	State	Mixed	4.3				
i19	250	State	Mixed	4.8				
i29	230	State	Mixed	12.4				
i28	200	State	Mixed	14.1				
i23	185	State	Mixed	17.3				
i24	220	State	Mixed	18.8				
i16	232	State	Mixed	20.8				
i21	100	State	Mixed	22.5				
i25	155	State	Mixed	22.7				
i26	150	State	Mixed	23.9				
i20	250	State	Girls	23.9				
i18	163	State	Mixed	24.9				
i22	216	State	Mixed	25.3				
i17	140	State	Mixed	25.9				
i30	136	State	Mixed	40.9				

*Fsm = free school meal entitlement used as proxy for deprivation
Grey shading identifies school with less than 200 students in Year 8

Appendix 13: Letter used to invite students for interview



ASSIST - A Stop Smoking In Schools Trial

Thank you for your help with the ASSIST research.

Now we are now trying to find out what young people think about the work we have been doing. I would like to interview some of the students who were asked to be peer supporters and some who were not.

Not everyone in Year 8 is going to be interviewed - we used 'random selection'. (Numbers were used instead of names so that we did not know who we were choosing, and then we matched the names back to the numbers.)

If you are asked to come for an interview, we hope you will be as honest as you can. Don't forget that it is not a test, and we will not tell anyone you know what you say.

The date and time of your interview is written on the slip at the bottom of this letter.

I look forward to seeing you.

Best wishes

Jo Holliday
Cardiff University

Name ..... Form/tutor group .....

Please come to room .....

on ..... at .....

for an interview/focus group discussion about ASSIST (A Stop Smoking in Schools Trial).

Appendix 14: Letter used to gain parental permission for interview in school i19

Dear parent/guardian

Re: (A Stop Smoking in Schools Trial) ASSIST.

A Stop Smoking In Schools Trial is trying to find better ways of reducing smoking amongst young people in South East Wales and the Bristol area. In particular, we would like to know whether Year 8 pupils can be trained as 'peer supporters' to help reduce smoking amongst pupils in their year.

In September 2001 we asked for your permission for your child to take part in the above project run by Cardiff and Bristol Universities. Since then, your child has taken part by completing questionnaires, and maybe by being trained as a peer supporter.

As part of our research, we would like to know how this kind of project works in schools. In order to do this, we are asking pupils and school staff to tell us a bit more about their experiences of the project in short interviews and discussion groups.

Your child has been randomly selected to participate in one of these interviews so I am writing to ask for your permission for him/ her to take part.

We hope you will allow your child to help us with this very important area of research. **If you do not wish your child to take part in these interviews** please complete the slip below and return it to the school via your child's form tutor by **Friday 17th May 2002.**

If you have any queries, do not hesitate to contact me on 029 2087 5360 or hollidayj1@cardiff.ac.uk.

Yours sincerely

Jo Holliday
Research Associate, ASSIST

I do not want my child to take part in the interview

Name of child .....

Registration class .....

Name of parent/ guardian .....

Signature of parent/ guardian .....

Appendix 15: Individual and group interview topic lists used with students

Semi-structured individual interview: 30% of peer supporters

To help us with our research, we would like to ask you some questions about the Stop Smoking in Schools trial in your school.

Part 1 (peer questionnaire)
Do you remember we asked you to write the names of pupils in Year 8 in a questionnaire? (Show peer questionnaire).

Looking at each question in turn:

- was this question easy to understand?
- what did you understand by
  - 'respect'
  - 'good leaders in sports and other group activities'
  - 'look up to'
- was it easy to think of pupils in Year 8? Why/why not?
- do you think the people you named were suitable to be peer supporters for a stop smoking in schools project? Why/why not?
- can you think of any better questions?

Do you think those who were asked to be peer supporters were really suitable to talk with other pupils in Year 8 about smoking? Why/why not?

How did you feel about being asked to be a peer supporter? Why?

How do you think other people felt when they were not asked to be a peer supporter? Why?

Thinking back to the meeting when we asked you if you would like to be a peer supporter:

- did you understand what we were asking you to do?
- why did you agree to come on the training course?
- did you have any worries at that time about whether to be a peer supporter?

Part 2 (training to be a peer supporter)
Do you remember we took you on a two-day training course to give you information, skills and confidence to have conversations with other pupils in Year 8 about smoking?

Did the training give you enough information about smoking to talk to other pupils in Year 8 about it? Did you learn anything new? If yes, what?

Did the training give you any skills to talk to other pupils in Year 8 about smoking?

Did the training give you confidence to talk with pupils in Year 8 about smoking?

Part 3 (back in school – conversations with Year 8 pupils about smoking)
At the end of the training we asked you to go back to school and have conversations with other Year 8 pupils about smoking.

Since the peer supporter training, have you had any conversations with Year 8 pupils about smoking?

Can you remember when and where you had conversations?

How did you decide which pupils you would speak to? (e.g. only friends, boys or girls, people who don't smoke, people who have just tried smoking a few times, people who smoke regularly?)

Did you feel able to talk to people in Year 8 about not starting to smoke?

Did you feel able to talk to people in Year 8 about why they should stop smoking?

How did you feel about having the conversations? (e.g. pleased/didn't care/felt silly/anxious etc.)

How do you think other pupils felt about the fact that you were having conversations with them about smoking? (e.g. pleased/didn't care/thought you were interfering?)

Do you think the conversations made any difference to:
the way the other pupils feel about smoking? why/why not?
whether or not they smoke or will take up smoking in the future? why/why not?

Part 4 (follow up visits)
The trainers came to visit you in school 4 times to give you more information and support while you were a peer supporter.

Did you find the visits helpful?

Did you feel able to talk about any problems you were having?

Did you get the support you needed to be a peer supporter? (e.g. help with how to start conversations, solutions to problems?)

Part 5 (the diaries)
We asked you to keep a diary of the conversations you had with other pupils in Year 8 about smoking. (If possible, take the diary to the interview to discuss with the pupil.)

Did you fill in your diary at all? If no, why not?

Did you complete your diary soon after you had spoken to someone? Why/why not?

Do you think it helped you to be a peer supporter? Why/why not?

Can you think of any ways you would change/improve the diary?

Part 6 (smoking and peer education in general)
Peer education projects of this kind are used in other areas (e.g. sex education, anti-bullying). Thinking about the idea of peer education:

Do you think peer education can make a difference to the way young people aged 12/13 years behave? Why/why not?

Do you think peer education can make a difference to whether young people smoke or not? Why/why not?

Do you think there are any differences between the way boys and girls think/behave in relation to smoking?

Do you think there are any differences between the way boys and girls react to peer education?

When you started on the project, did you think it was a good idea? What do you think now?

If you were given the chance to do something like this again, even if it was something run by your school and not the university, would you?

Thank you for your help with our research.

Group interview topic list: 2 groups 6/8 peer supporters

To help us with our research, we would like to ask you some questions about the Stop Smoking in Schools trial in your school.

Part 1 (peer questionnaire)
Do you remember we asked you to write the names of pupils in Year 8 in a questionnaire? (Show peer questionnaire).

Looking at each question in turn:

- was this question easy to understand?
- what did you understand by
  - 'respect'
  - 'good leaders in sports and other group activities'
  - 'look up to'
- was it easy to think of pupils in Year 8? Why/why not?
- do you think the people you named were suitable to be peer supporters for a stop smoking in schools project? Why/why not?
- can you think of any better questions?

Do you think those who were asked to be peer supporters were really suitable to talk with other pupils in Year 8 about smoking? Why/why not?

Thinking back to the meeting when we asked you if you would like to be a peer supporter:

- did you understand what we were asking you to do?
- why did you agree to come on the training course?
- did you have any worries at that time about whether to be a peer supporter?

Part 2 (training to be a peer supporter)
Do you remember we took you on a two-day training course to give you information, skills and confidence to have conversations with other pupils in Year 8 about smoking?

Did the training give you enough information about smoking to talk to other pupils in Year 8 about it? Did you learn anything new? If yes, what?

Did the training give you any skills to talk to other pupils in Year 8 about smoking?

Did the training give you confidence to talk with pupils in Year 8 about smoking?

Part 3 (back in school – conversations with Year 8 pupils about smoking)
At the end of the training we asked you to go back to school and have conversations with other Year 8 pupils about smoking.

Since the peer supporter training, have you had any conversations with Year 8 pupils about smoking?

How did you decide which pupils you would speak to? (e.g. only friends, boys or girls, people who don't smoke, people who have just tried smoking a few times, people who smoke regularly?)

Did you mostly speak to smokers or non-smokers in Year 8?

How did you feel about having the conversations? (e.g. pleased/didn't care/felt silly/anxious etc.)

How do you think other pupils felt about the fact that you were having conversations with them about smoking? (e.g. pleased/didn't care/thought you were interfering?)

Do you think the conversations made any difference to:

- the way the other pupils feel about smoking? why/why not?
- whether or not they smoke or will take up smoking in the future? why/why not?

Part 4 (follow up visits)
The trainers came to visit you in school 4 times to give you more information and support while you were a peer supporter.

Did you find the visits helpful?

Did you feel able to talk about any problems you were having?

Did you get the support you needed to be a peer supporter? (e.g. help with how to start conversations, solutions to problems?)

Part 5 (the diaries)
We asked you to keep a diary of the conversations you had with other pupils in Year 8 about smoking. (If possible, take the diary to the interview to discuss with the pupil.)

Do you think it helped you to be a peer supporter? Why/why not?

Part 6 (smoking and peer education in general)
Peer education projects of this kind are used in other areas (e.g. sex education, anti-bullying). Thinking about the idea of peer education:

Do you think peer education can make a difference to the way young people aged 12/13 years behave? Why/why not?

Do you think peer education can make a difference to whether young people smoke or not? Why/why not?

Do you think there are any differences between the way boys and girls think/behave in relation to smoking?

Do you think there are any differences between the way boys and girls react to peer education?

How does this project compare to other types of smoking intervention you may have experienced?

Thank you for your help with our research.

Semi-structured individual interview: pupils selected as peer supporters who did not complete the training and follow-up visits.

Peer nomination process

- How did you feel about being asked to be a peer supporter? Why?
- Do you think that you were a suitable person to be a peer supporter for A Stop Smoking in Schools Trial?
- Why?
- Do you think that the other peer supporters were suitable to talk with other pupils in Year 8 about smoking?
- Why?
- Do you remember when we asked you questions about your year group? (take copy of PQ)
- Were these questions clear and easy to answer?
- What did you understand by
  - 'respect'
  - 'good leaders in sports and other group activities'
  - 'look up to'
- Was this the best way to select this group of people?
- If no, what would be a better way to do this?

Recruitment

- Did the peer-recruitment meeting provide you with enough background information about ASSIST?
- If no, what other information would you have liked to know before going on the training?
- Did you understand what we were asking you to do?
- Did you have any concerns about being a peer supporter at the time?

Training

- How useful did you find the training?
- After the training, did you have a complete understanding of what was expected of you as a peer-supporter?
- After the training, did you have the information, skills and confidence you needed to act as a peer-supporter?

For individuals who dropped out at this stage

- Why did you choose to drop out at this stage?
- Is there anything that would have encouraged you to continue to be a peer-supporter?

Follow-up visits

- How useful did you find the follow-up sessions?
- Do you think you received sufficient support and help during the follow-up visits?

- Did you feel able to discuss problems you were having with the members of staff?

For individuals who dropped out at this stage

- Why did you choose to drop out at this stage?
- Is there anything that would have encouraged you to continue to be a peer-supporter?
- Has being involved in ASSIST (to whatever extent) changed your own attitudes towards smoking?

Thank you for your help with our research.

Semi-structured individual interview: Pupils who were asked to become peer supporters but did not attend the training

To help us with our research, we would like to ask you some questions about the Stop Smoking in Schools trial in your school.

Part 1 (peer questionnaire)
Do you remember we asked you to write the names of pupils in Year 8 in a questionnaire? (Show peer questionnaire).

Looking at each question in turn:

- was this question easy to understand?
- what did you understand by
  - 'respect'
  - 'good leaders in sports and other group activities'
  - 'look up to'
- was it easy to think of pupils in Year 8? Why/why not?
- do you think the people you named were suitable to be peer supporters for a stop smoking in schools project? Why/why not?
- can you think of any better questions?

Part 2 (being asked to be a peer supporter)
Using this questionnaire, we made up a list of pupils and asked them to come to a meeting about being a peer supporter for the Stop Smoking in Schools Trial.

a) If they did not attend the recruitment meeting

- did you know that we invited some pupils to come to a meeting about being a peer supporter?
- if yes, how did you feel about being asked to come to the meeting?
- you didn't come to the meeting, can you say why?
- is there anything that would have encouraged you to come to the meeting?

b) If they did attend the recruitment meeting

- Thinking back to the meeting when we asked you if you would like to be a peer supporter:
- how did you feel about being asked to be a peer supporter?
- did you understand what we were asking you to do?
- why did you choose not to come on the training and be a peer supporter?
- is there anything that would have encouraged you to become a peer supporter?

Part 3 (the ASSIST project in your school)

- Do you know anyone who was a peer supporter for the ASSIST project at your school?
- Have you spoken with them about being a peer supporter? Or about smoking?
- If yes, did this change your mind about the idea of being a peer supporter? How?

Part 4 (smoking and peer education)

Give brief explanation of peer education.

Thinking about the idea of peer education:

- do you think peer education can make a difference to the way young people aged 12/13 years behave? Why/why not?
- do you think peer education can make a difference to whether young people smoke or not? Why/why not?

Thank you for your help with our research.

Semi-structured individual interview: 30% sample contact with peer supporters

To help us with our research, we would like to ask you some questions about the Stop Smoking in Schools trial in your school.

Part 1 (peer questionnaire)
Do you remember we asked you to write the names of pupils in Year 8 in a questionnaire? (Show peer questionnaire).

Looking at each question in turn:

- was this question easy to understand?
- what did you understand by
  - 'respect'
  - 'good leaders in sports and other group activities'
  - 'look up to'
- was it easy to think of pupils in Year 8? Why/why not?
- do you think the people you named were suitable to be peer supporters for a stop smoking in schools project? Why/why not?
- can you think of any better questions?

Do you think the pupils who were asked to be peer supporters were really suitable to talk with other pupils in Year 8 about smoking? Why/why not?

How did you feel about not being asked to be a peer supporter? Why?

Part 2 (conversations with peer supporters)
We took some Year 8 pupils on a two-day training course to give them information, skills and confidence to have conversations with other pupils in Year 8 about smoking.

Have you had any conversations with any peer supporters about smoking?

Can you remember when and where you had conversations?

Did you learn anything new about smoking from the peer supporters? If yes, what?

How did you feel about having conversations about smoking with a peer supporter? (e.g. pleased/didn't care/thought they were interfering etc.)

Did the conversation(s) make any difference to:

- the way you feel about smoking? why/why not?
- whether or not you smoke or will take up smoking in the future? why/why not?

Part 3 (the diaries)
We asked the peer supporters to keep a diary of the conversations they had with other pupils in Year 8 about smoking.

Did you see the peer supporter fill in the diary at all?

If yes, how did you feel about them recording the conversation in the diary

Part 4 (peer education in general)
Peer education projects of this kind are used in other areas (e.g. sex education, anti-bullying). Thinking about the idea of peer education:

Do you think peer education can make a difference to the way young people aged 12/13 years behave? Why/why not?

Do you think there are any differences between the way boys and girls think/behave in relation to smoking?
Do you think there are any differences between the way boys and girls react to peer education?

Do you think peer education can make a difference to whether young people smoke or not? Why/why not?

How does this project compare to other types of smoking intervention you may have experienced?

Thank you for you help with our research.

Appendix 16: Options for running the Kliquefinder© algorithm

These options are contained in the file "kliqfind.par" which is an element of the Kliquefinder© software.

This file is called kliqfind.par. It contains the parameters that tell Kliquefinder how it should go about clustering the data. The user should change only the values of the parameters, and not any of the labelling or formatting associated with those values. Each set of parameters consists of five lines:

1)GENERAL HEADING
2)the actual fortran format used by kliqfind
3)values of parameters
4)Fortran format layout as a guide for placing parameters
(corresponds to fortran format)
5)labels of parameters (in the appropriate order)

If the user feels the need, he/she may change the fortran format associated with the parameters.

The user also has the option to specify each parameter interactively by submitting a null file to kliqfind. Kliqfind can then write a new file for you which saves the parameters in the proper format. You may then copy this new file to kliqfind.par. Explanations of each parameter appear at the bottom of this file and in the user guide.

```
START VALUES
(I3,1x,I1,1X,I1,1X,I1,1X,F10.5)
001 1 1 1 4161.41610
123x1x1x1x1234.12345
numdyad dydtriad startgrp,noattach,raseed

MATRIX MULTIPLICATION
(F10.5,1X,F10.5,1X,I4,1X,I4)
  1.00000   2.00000 9999   1
1234.12345x1234.12345x1234x1234
direct thresht lookt,maxseed

BOUNDARY SPANNING
(4F10.5)
   .50000  1.00000   .500     .90000
1234.123451234.123451234.123451234.12345
boundval,fixr,blabound,betwmult

PROXIMITY
(F10.5,1X,F10.5,1X,I1,1X,I1,1X,I1,1X,I1)
-100.00001   3.10000 0 0 2 3
1234.12345x1234.12345X1X1X1X1
nearval,pctile,mutdyad,noneg,halfdyad,dissolve
```

CONVERGENCE
(F10.5,1X,I8,1X,I1,1X,I1)
.00005 2000 0 1
1234.12345x12345678x1x1
stopval,kcount2,quickend,attachi

OBJECTIVE FUNCTION TO BE MAXIMIZED: STRUCTURAL EQUIVALENCE
(I1,1X,I1,1X,I1)
0 1 1
1x1x1
structeq,network,actrsqr

OBJECTIVE FUNCTION TO BE MAXIMIZED: CONNECTIVITY
(I2,1X,3(I1,1X),F10.5,1X,F10.5,1X,I1)
5 0 1 0 1.00000 1.00000 1
12x1x1x1x1234.12345x1234.12345x1
quantype,squarit,netlev,pergroup,colwt,rowwt,hyperg

MANIPULATION OF DATA
(I1,1X,I1,1X,I1,1X,I1,1X,I1,1X,I1,1X,I1,1X,I1)
0 0 0 0 0 0 1
1x1x1x1x1x1x1
transpos,reweight,symmat,invert,rectmat,gusemarg,tagalong

EVALUATION
(I4,1X,F10.5,1X,F10.5,1X,I8,1X,I1,1X,F10.5)
000 0.00000 1.00000 0 1 10.00000
1234x1234.12345x1234.12345x12345678X1X1234.12345
neval,baseval,topval,numres,newgrps,hiwteval

ANCHORED MULTIDIMENSIONAL SCALING (BETWEEN GROUPS)
(F10.5,1X,I4,1X,F10.5,1X,8(I4,1X),F10.5,1X,I4,1X,F10.5,1X,I4,1X,I4,1X
,3F10.5)
1.00000 2 .2000 1 -1 999 0 1 6 4 30 -2.0000 -3
.15 2 0 .75 .25 1.00000
1234.12345X1234X1234.12345X1234X1234X1234X1234X1234X1234
X1234X1234X1234.12345X1234X1234.12345X1234X1234X1234.1234
51234.123451234.12345
IGRATIO,NUMDIM,MINPICT,CENTER,DANCHOR,DANCHOR2,MOVE
2,ZSYMMAT,STARTINC,BYINC,MAXINC,KEXP,NORMAL,MINVALG,B
YANGLE,BYSCALE,PCTCENG1,PCTCENG2,DRADIUSG

ANCHORED MULTIDIMENSIONAL SCALING (WITHIN GROUPS)
(8(I4,1X),F10.5,1X,I4,1X,F10.5,1X,I4,1X,I4,1X,3F10.5)
1 1 999 0 1 6 4 30 -2.0000 -3 .5 2 0 .75
.25 1.0000
1234X1234X1234X1234X1234X1234X1234X1234X1234.12345X1234
X1234.12345X1234X1234X1234.123451234.123451234.12345

```
CENTERI,DANCHORI,DANCH2I,MOVE2I,ZSYMMATI,STARTINI,BYIN
CI,MAXINCI,KEXPI,NORMALI,MINVALI,BYANGLEI,BYSCALEI,PCTC
ENI1,PCTCENI2,DRADIUSI

ROTATION OF ACTORS WITHIN GROUPS
(3(I4,1X))
  15   2   1
1234X1234X1234
RINCREM,MEASURE,EXTREME
```

Explanation of Parameters

START VALUES
numdyad number of dyads to start groups
dydtriad =1 if you want triads
=2 if you want dyads
startgrp = 1 if you want to use triads to initiate clusters
2 if you want a random start (with numdyad groups)
3 if you want to start from a priori groups
4 * special for simulated data: read in a priori placements *
noattach = 1 if you want to run the new way, adding one dyad at a time.
= 0 if you want to choose the number of dyads to start with and attach only to them.
raseed = seed used for random assignment of actors to groups

MATRIX MULTIPLICATION
direct is the emphasis to put on direct choices in findtrid
thresht is the threshold for using a start triad (so that not all triads must be looked at
lookt is the total number of triads to look at, cannot be greater than 9999.
maxseed is the maximum number of times an actor can be used in a seed group.

BOUNDARY SPANNING
boundval = value above which boundary spanners are flagged for extra print out
blabound = value above which Blau boundary spanners are flagged for extra print out
fixr = the maximum value of the number of connections initiated by a single actor as fixed by the measurement process

PROXIMITY
nearval = if an actor's closeness to their best group is less than nearval, then a new group is started pctile is the percentile of measures of closeness that should be used to determine nearval. I.E., if pctile = .5000, then we use the median of current closeness as the measure of nearval. a value of greater than one will keep nearval fixed as input.

mutdyad = 0 if dyads can be built while only one actor makes connections across the network
= 1 if both actors must make connections to build a dyad
noneg = 0 if assignments which result in a negative contribution to the objective function should be sustained
= 1 if assignments which result in a negative contribution to the objective function should be invalidated
halfdyad =1 if value contribution of dyad to objective function should be halved when considering removing an actor from the dyad
=2 if Dyads cannot be formed at all.
=0 otherwise
dissolve: if an actor is removed from a group of size 'dissolve' then all other actors in that group are reassigned to their next best groups.
dissolve =1 if you do not want to reassign actors to their best groups.

CONVERGENCE
stopval is the minimum change to end the cluster routine.
kcount2 is the number of reassignments to make in a phase of the ascent
quickend =1 if you don't want to attach isolates or finish ascent -- you just want output on a priori groups
attachi =1 if you want to attach isolates at end of iteration and then reascend

OBJECTIVE FUNCTION TO BE MAXIMIZED: STRUCTURAL EQUIVALENCE
structeq =1 if you want to model via structural equivalence (based on R-squared)
network =1 if you want diagonals of matrix to be assigned the largest off-diagonal value in the matrix
actrsqr = use actual change in r-square for structural equivalence
r-squarechange = groupsize/(groupsize+1) * euclidean distance from mean

OBJECTIVE FUNCTION TO BE MAXIMIZED: CONNECTIVITY
quantype =1 if you want to use standardized scores as measure of distance
=2 if you want to use pearson distance -- (Observed-Expected)/sqrt(Expected)
=3 if you want to use likelihood ratio -- Observed*log(observed/expected)
squarit = 1 if you want to square the distance measure, (but preserve the initial sign)
netlev = 1 if objective function should be evaluated at the network level (only applies to Hubert's compactness which is summed at the network level)
pergroup =1 if you want to maximize the average objective function per group

rowwt = the weight to give to the connections initiated by the actor in assigning the actor to a group
colwt = the weight to assign to connections directed to an actor in assigning the actor to a group
hyperg =1 if hypergeometric distribution is assumed, 0 if binomial distribution is assumed (only affects calculation of variances).

DATA MANIPULATION
transpos =1 if you want to work with the transpose of the original matrix
reweight =the value of the highest weight. All weights higher than reweight will be trimmed to the value of reweight. Set reweight equal to zero if all weights should remain as input
symmat is whether or not we want original similarities matrix between people to be combined and analyzed as a symmetric (1) matrix or not (0).
invert =1 if your raw data indicate distances as opposed to proximities
rectmat = 0 if original matrix is square and intact (rows and columns are same elements
= 1 if original matrix is rectangular, and you want to work with X'X (similarity of columns)
= 2 if original matrix is rectangular, and you want to work with XX' (similarity of rows)
gusemarg =1 if you want to adjust elements from multiplied matrix my row or column marginal
=0 otherwise
tagalong =1 if actors who are connected to only one other actor in the network should be removed from analysis and assigned to the subgroup of the actor with whom they are connected
=0 if actors who are connected to only one other actor should remain in the analysis
=-1 if actors who are connected to no others in the network should remain in the analysis

EVALUATION
neval = number of samples to use for evaluating final cluster solution
baseval is the base percentage of similarity at which to create new solutions for evaluating the cluster solution
topval = highest percentage of similarity with final solution in evaluation
numres = number of times to process through the ascent-evaluation-residual cycle (one cycle is assumed).
newgrps = should new groups be created in rival solutions?
Note: one can do a true montecarlo evaluation of a given solution as described by Hubert if one sets quickend=1, baseval=0.000,topval=0.0 and newgrps=0
hiwteval proportional weight at low end of similarity with final solution compared with high end. Currently is meaningless -- 6-11-92

ANCHORED MULTIDIMENSIONAL SCALING

igratio = the ratio of distances within subgroups to between subgroups
numdim = the number of dimensions into which the space should be divided. The current maximim is 2.
minpict is the minimum distance in the plot as a percentage of the maximum value.
center = 1 if you want points to be recentered about (0,0) after relative positions have been identified
danchor = the position (in order of centrality) of the anchoring actor. A number equal to zero indicates random assignment, a number less than zero will be converted to positive, but pctiles will be used instead of the mean to identify centrality (see pctcen), a number larger than the number of actors indicates the last actor.
danchor2 = the position (in order of centrality) of the second anchoring actor. A number less than zero will be converted to positive, but pctiles will be used instead of the mean to identify centrality (see pctcen), a number larger than the number of actors indicates the last actor.
move2 =1 if the second anchoring actor may be repositioned, 0 if it's angle remains at 0.
zsymmat =1 if the priximites should be treated as symmetric, 0 otherwise
startinc = the number of increments of the angle space for the first iteration
byinc = the number of increments of the angle space to increase at each iteration
maxinc = the maximal number of increments of the angle space should be divided
kexp = the exponent in the distances, negative implies take absolute value, 0 implies take the log normal -- for between groups:
=0 if you do not want any normalization
=1 if you want to normalize the non-radius distances by the true distance,
=2 if you want to take negative logs
=3 if you want to take log(hiwt)-log(max distance)
minval is used if normal is greater than 1. It indicates the minimum value for a between group matrix element
byscale =1 if you want to scale distances by the radii of the relevant actors
=0 otherwise
byangle =1 if you want to use angles as basis of plotting instead
=0 if you want to use Euclidean distances
pctcen = indicates the percentile used for obtaining the anchoring groups if danchor is less than 0. If value is positive, kliquefinder will first determine most central subgroup or actor by its degree, and then settle ties based on the pctcent. If the value is negative, only the pctcent will be used to identify the most central subgroups and actors.

dradius = the number that you should divide the radius by to balance out stress

ROTATION OF ACTORS WITHIN SUBGROUPS

rincrem = the number of increments to divide the angle space when rotating actors within their subgroup space
measure = the measure which should be used to determine the rotation -- 1=compactness
2=density
extreme =1 if the radius of an actor to it's anchor should be considered in determining rotation (the larger the radius, the more the influence). 0 otherwise

Appendix 17: Characteristics of clusters identified by Kliquefinder©

Characteristics of clusters: School c11

Cluster	Actors (n)	Peer Supporters (n)	Males (n)	Ever smokers (n)	High-risk group (n)
1	6	1	1	1	1
2	9	1	0	0	0
3	7	4	7	2	1
4	5	0	0	3	2
5	5	0	2	2	1
6	5	0	4	3	3
7	7	0	7	3	1
8	6	2	6	4	4
9	7	2	2	6	4
10	7	0	0	4	4
11	10	3	1	7	5
12	6	1	2	1	1
13	6	0	6	5	4
14	8	1	1	3	3
15	5	0	5	1	1
16	9	3	0	2	2
17	5	1	5	2	2
18	9	6	9	8	4
19	6	0	6	3	3
20	9	0	0	7	6
21	6	0	6	1	1
22	7	3	1	0	0
23	7	3	0	3	2
Isolates	1	0	0	1	0
Total	158	31	71	72	55

Characteristics of clusters: School c16

Cluster	Actors (n)	Peer Supporters (n)	Males (n)	Ever smokers (n)	High-risk group (n)
1	3	0	0	1	1
2	3	0	0	2	2
3	4	1	4	1	1
4	5	1	5	2	2
5	10	5	10	0	0
6	6	0	0	2	2
7	6	1	1	5	5
8	3	0	0	0	0
9	4	1	4	0	0
10	4	2	0	4	0
11	4	0	0	1	1
12	5	2	0	0	0
13	5	0	5	2	2
914	5	1	0	2	2
15	4	0	4	1	1
16	4	4	0	2	2
17	6	0	6	1	1
18	3	1	0	1	1
19	7	0	7	1	1
20	6	0	0	0	0
21	6	2	6	4	3
22	7	1	0	1	1
23	7	0	0	2	2
24	7	0	6	5	5
25	9	1	9	3	2
26	11	5	9	7	7
27	6	2	0	3	2
28	8	4	0	2	2
29	5	2	1	3	3
30	7	0	7	3	3
31	6	1	6	2	1
32	12	2	12	4	4
Isolates	6	0	5	0	0
Total	194	39	107	67	59

Characteristics of clusters: School c20

Cluster	Actors (n)	Peer Supporters (n)	Males (n)	Ever smokers (n)	High-risk group (n)
1	3	1	1	2	1
2	3	1	3	1	1
3	3	1	0	3	3
4	4	0	0	2	2
5	3	1	0	3	3
6	5	1	5	1	1
7	6	0	6	1	1
8	4	1	0	4	4
9	6	4	6	5	2
10	4	1	4	3	3
11	4	0	4	2	2
12	4	0	4	0	0
13	5	0	5	3	3
14	4	0	4	0	0
15	5	2	0	1	1
16	3	0	3	1	1
17	6	3	6	3	3
18	3	0	2	1	1
19	4	1	0	0	0
20	4	1	3	1	1
21	4	0	0	0	0
22	5	0	0	0	0
23	4	1	0	0	0
24	4	1	2	1	1
25	4	0	4	0	0
26	5	0	0	1	1
27	5	0	0	5	5
28	5	1	5	0	0
29	5	0	5	1	1
30	7	0	1	1	1
31	4	0	0	0	0
32	5	0	1	1	1
33	5	0	5	0	0
34	5	0	0	1	1
35	5	0	0	0	0
36	6	0	0	3	3
37	4	1	4	3	3
38	6	3	6	0	0
39	5	1	5	0	0
40	3	1	0	0	0
41	7	2	0	1	1
42	6	0	6	2	2
43	5	2	2	4	4
44	5	2	0	4	4

Cluster	Actors (n)	Peer Supporters (n)	Males (n)	Ever smokers (n)	High-risk group (n)
45	6	3	0	2	2
46	5	3	1	4	4
47	6	1	0	0	0
48	5	0	5	2	2
49	5	3	5	2	2
50	5	0	0	0	0
51	6	1	0	0	0
52	7	2	7	0	0
Isolates	2	0	1	1	1
Total	249	46	121	76	72

Characteristics of clusters: School c28

Cluster	Actors (n)	Peer Supporters (n)	Males (n)	Ever smokers (n)	High-risk group (n)
1	3	1	2	1	1
2	3	0	0	1	1
3	5	2	5	2	0
4	5	1	5	4	3
5	6	0	6	4	3
6	3	0	0	3	1
7	5	0	1	4	1
8	4	0	4	1	1
9	4	1	3	4	1
10	4	2	4	3	0
11	5	0	0	5	5
12	3	0	1	0	0
13	4	0	0	0	0
14	3	0	0	1	0
15	4	2	3	3	1
16	5	2	0	5	3
17	3	1	3	2	2
18	5	1	0	3	3
19	5	3	5	2	2
20	5	1	5	3	3
21	5	0	5	0	0
22	7	1	7	1	1
23	5	4	0	4	1
24	7	1	0	6	6
Isolates	4	0	4	2	1
Total	112	23	63	64	40

Characteristics of clusters: School i2

Cluster	Actors (n)	Peer Supporters (n)	Males (n)	Ever smokers (n)	High-risk group (n)	Students who know a peer supporter (n)	Students who have talked to a peer supporter (n)
1	5	0	0	1	0	4	1
2	4	0	4	0	0	3	0
3	6	0	6	2	2	5	0
4	5	1	5	3	3	2	1
5	4	0	0	1	1	4	2
6	6	0	0	0	0	6	0
7	5	0	0	0	0	4	0
8	10	1	9	5	3	9	2
9	5	0	5	2	2	1	0
10	5	1	0	4	4	5	0
11	6	3	6	4	3	4	1
12	4	0	4	2	2	4	0
13	4	1	4	3	2	3	1
14	7	2	0	1	1	7	6
15	10	3	0	0	0	9	2
16	7	0	7	3	2	2	0
17	10	2	0	1	1	10	1
18	7	1	7	3	3	7	3
19	8	4	8	8	5	8	2
20	6	3	6	4	4	5	3
21	4	0	0	1	1	4	1
22	9	2	0	2	2	7	3
23	8	1	8	3	3	7	1
24	6	1	0	0	0	6	1
25	10	1	2	7	6	10	6
Isolates	0	0	0	0	0	0	0
Total	161	27	81	60	50	136	37

Characteristics of clusters: School i13

Cluster	Actors (n)	Peer Supporters (n)	Males (n)	Ever smokers (n)	High-risk group (n)	Students who know a peer supporter (n)	Students who have talked to a peer supporter (n)
1	5	2	3	2	2	5	3
2	6	0	6	4	4	5	0
3	5	0	0	4	4	5	2
4	6	3	2	3	3	3	3
5	4	2	0	3	3	3	2
6	4	0	0	2	2	3	0
7	8	0	8	2	2	4	0
8	6	1	6	3	3	4	0
9	5	1	0	3	3	5	3
10	5	1	0	2	2	5	5
11	7	1	7	0	0	6	0
12	7	0	1	2	2	5	0
13	5	0	0	0	0	3	0
14	7	0	7	3	1	2	0
15	8	0	0	3	3	4	1
16	6	0	0	4	4	4	1
17	8	0	8	0	0	5	1
18	7	2	0	1	1	5	1
19	5	3	0	5	5	5	0
20	5	0	0	2	2	1	1
21	6	3	0	6	6	6	4
22	6	2	6	3	3	6	2
23	7	2	7	4	4	6	1
24	7	0	0	5	5	3	1
25	5	0	0	5	2	3	2
26	6	3	6	4	4	5	0
27	6	2	6	3	2	5	0
28	7	2	3	4	4	7	6
29	10	3	10	1	1	9	3
30	11	4	11	5	4	11	1
31	7	0	7	7	6	4	1
32	6	0	0	0	0	5	0
33	10	2	0	7	7	10	4
Isolates	9	1	8	2	2	0	1
Total	222	40	112	104	96	162	49

Characteristics of clusters: School i16

Cluster	Actors (n)	Peer Supporters (n)	Males (n)	Ever smokers (n)	High-risk group (n)	Students who know a peer supporter (n)	Students who have talked to a peer supporter (n)
1	4	2	4	1	1	4	2
2	3	0	3	2	2	3	0
3	6	2	0	2	2	5	1
4	4	0	4	3	2	1	0
5	4	1	0	1	1	4	4
6	6	0	6	4	4	2	0
7	4	0	3	3	3	2	1
8	4	0	0	2	2	4	0
9	2	0	2	0	0	0	0
10	3	1	0	0	0	2	0
11	5	4	5	3	3	5	1
12	4	0	0	1	1	3	0
13	3	1	3	0	0	3	2
14	4	0	0	0	0	3	0
15	5	1	5	0	0	4	1
16	7	0	0	3	2	3	1
17	4	0	4	3	3	1	0
18	5	0	0	4	4	5	2
19	5	0	5	5	4	5	1
20	6	2	6	2	2	3	2
21	7	3	7	7	4	6	0
22	7	0	7	3	3	3	0
23	7	2	6	6	6	5	2
24	8	3	0	5	3	8	6
25	7	2	0	3	2	7	3
26	5	0	5	1	1	5	0
27	4	0	4	0	0	2	1
28	4	0	4	1	1	3	0
29	6	2	6	4	4	5	1
30	5	1	0	3	3	5	4
31	6	0	0	4	4	6	3
32	5	2	0	0	0	4	2
33	5	1	0	1	1	4	2
34	5	0	0	1	1	0	0
35	9	3	0	7	5	6	4
36	7	0	7	0	0	5	1
37	6	3	6	3	3	5	0
38	9	3	0	1	1	9	4
Isolates	7	0	4	2	2	0	0
Total	207	39	106	91	80	150	51

Characteristics of clusters: School i17

Cluster	Actors (n)	Peer Supporters (n)	Males (n)	Ever smokers (n)	High-risk group (n)	Students who know a peer supporter (n)	Students who have talked to a peer supporter (n)
1	4	0	4	2	2	4	1
2	5	1	5	4	3	5	2
3	6	0	5	3	3	2	2
4	5	0	5	1	1	3	1
5	5	5	0	1	1	5	5
6	8	1	0	6	6	7	3
7	5	0	0	2	2	4	0
8	5	1	5	0	0	3	2
9	4	0	4	2	2	0	0
10	7	0	0	5	5	6	1
11	4	0	0	2	2	3	1
12	6	3	6	3	3	3	2
13	6	0	6	1	1	5	0
14	7	4	7	1	1	7	4
15	8	2	2	5	4	8	1
16	9	1	1	1	1	9	3
17	7	1	0	4	4	7	1
18	5	0	5	4	2	2	2
19	7	2	7	2	1	5	0
20	6	0	4	5	5	4	3
21	8	6	0	2	2	8	6
Isolates	2	0	1	1	0	0	0
Total	129	27	67	57	51	100	40

Characteristics of clusters: School i19

Cluster	Actors (n)	Peer Supporters (n)	Males (n)	Ever smokers (n)	High-risk group (n)	Students who know a peer supporter (n)	Students who have talked to a peer supporter (n)
1	4	0	0	0	0	4	1
2	3	0	0	2	2	2	0
3	4	0	4	0	0	2	0
4	4	0	4	2	2	3	1
5	4	0	4	2	2	3	1
6	3	0	3	1	1	3	2
7	6	1	6	4	4	5	1
8	5	1	3	4	1	4	2
9	4	1	4	0	0	4	2
10	3	0	0	3	3	3	1
11	6	2	0	0	0	6	3
12	7	0	0	7	7	7	1
13	4	2	4	2	2	4	2
14	6	5	0	6	6	6	3
15	9	3	8	1	1	9	6
16	5	0	5	1	1	5	1
17	4	1	4	2	2	3	0
18	5	5	5	5	5	5	2
19	4	0	0	2	2	4	1
20	5	1	0	4	4	5	2
21	6	0	0	0	0	6	2
22	7	1	7	0	0	5	4
23	8	3	8	5	4	7	2
24	3	0	2	0	0	3	2
25	5	2	0	1	1	5	1
26	4	0	0	0	0	4	1
27	5	2	0	2	2	5	4
28	5	1	0	0	0	5	1
29	5	0	4	1	1	4	0
30	5	1	0	3	3	5	2
31	3	0	3	1	1	2	0
32	6	0	1	2	2	6	0
33	4	0	4	2	2	3	0
34	4	0	1	4	3	4	0
35	7	0	7	1	1	6	0
36	6	0	5	3	3	6	0
37	5	0	0	4	0	5	0
38	5	0	0	0	0	1	0
39	5	1	0	0	0	5	1
40	8	1	8	1	1	8	0
41	6	0	6	2	2	6	2
42	6	3	0	5	4	6	1
43	9	3	6	5	5	9	3
44	5	0	0	3	3	5	0

Cluster	Actors (n)	Peer Supporters (n)	Males (n)	Ever smokers (n)	High-risk group (n)	Students who know a peer supporter (n)	Students who have talked to a peer supporter (n)
45	6	2	6	0	0	6	3
46	6	0	6	1	1	4	1
47	7	0	7	1	1	3	2
48	4	1	4	4	4	4	1
49	7	3	0	2	2	7	4
50	6	1	0	6	1	6	0
Isolates	3	0	3	1	1	1	0
Total	266	47	142	108	93	239	69

Characteristics of clusters: School i23

Cluster	Actors (n)	Peer Supporters (n)	Males (n)	Ever smokers (n)	High-risk group (n)	Students who know a peer supporter (n)	Students who have talked to a peer supporter (n)
1	3	0	3	2	2	1	0
2	4	2	4	2	2	1	3
3	5	0	0	2	2	4	0
4	5	1	0	3	3	5	1
5	3	0	3	0	0	1	0
6	4	0	4	1	1	4	0
7	5	1	5	1	1	5	0
8	6	3	6	4	4	6	2
9	6	1	0	1	1	6	2
10	6	2	0	3	3	6	1
11	5	2	0	5	3	5	1
12	6	0	6	6	6	6	0
13	4	0	4	3	3	3	0
14	4	1	0	3	1	3	2
15	6	2	6	5	4	6	0
16	6	1	0	3	3	4	0
17	7	3	0	6	6	7	1
18	8	0	0	1	1	5	0
19	4	2	4	1	1	4	1
20	3	2	0	1	1	3	1
21	7	1	0	4	3	7	0
22	6	2	6	1	1	5	0
23	7	2	0	3	3	7	2
24	4	0	4	2	2	3	0
25	7	1	0	3	3	7	4
26	7	0	7	2	2	5	6
27	4	0	0	3	1	2	1
28	7	0	7	1	1	7	1
29	7	2	7	4	4	7	6
30	5	1	5	2	1	3	1
31	7	3	0	1	1	7	4
Isolates	3	0	2	1	1	0	0
Total	171	35	83	80	71	145	40