Predicting and explaining uptake of cervical screening: the role of social cognitions

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Abstract

The aim of the prospective studies in this thesis was to identify factors relating to intentions to have a smear test as part of the national screening programme in the UK and actual uptake of this test. A second aim was to assess the sufficiency and efficacy of social cognition models in predicting these intentions and behaviour.

Nearly 2,000 women died from cervical cancer in 1992 in the UK and a further 23,000 were affected by the disease, indicating that cervical cancer is a significant public health problem. It has been shown that screening can prevent death from this cancer and also it has been observed that the majority of women dying from cervical cancer have never been screened. Exploring how women behave in relation to cervical screening is therefore essential for identifying factors which may be used to ultimately increase uptake.

Study 1 was based largely on the Health Belief Model (Becker, 1974). One hundred and eighty-three women (28 per cent response rate) completed a questionnaire assessing demographic characteristics; knowledge of, and attitudes towards, cervical cancer and cervical screening; and intention to attend for screening in the future. One hundred and fifty of these women subsequently attended for a smear test and 33 did not. It was found that intentions were predicted by perceptions of the costs and benefits of screening and whether women had ever had a smear test. The best predictors of uptake of screening were an intention to attend for screening and the woman having a current sexual partner.

The second study attempted to extend and replicate the results of study 1. This study repeated the measures used to assess the Health Belief Model and also included measures based on the Theory of Planned Behaviour (Ajzen, 1991). One hundred and forty-two women participated in the study (59 per cent response rate), completing questionnaires before being invited to attend for screening. Seventy-two women subsequently had a smear test. Consistent with study 1, intentions were predicted by ever having had a smear test and having a positive overall attitude to attendance for screening. Years of education and frequency of contact with a GP also significantly added to the prediction of intentions to be screened. No individual variable contributed to the variance explained in behaviour. Beliefs derived from the Theory of Planned Behaviour accounted for considerably more variance in intentions than those derived from the Health Belief Model.

The results of the studies indicate that the models used do not provide a complete explanation of influences on women's behaviour, accounting for relatively little of the variance in uptake of screening. This calls into question their efficacy in this behavioural domain. Suggestions for improvements to the models are given along with practical implications for increasing uptake of cervical screening.

Chapter 1

Introduction

Each year in the UK cervical cancer causes the death of over 2,000 women and the ill health of a further 23,000. The detection of the pre-cursors of this cancer, in order to prevent unnecessary death and disease, is the aim of a national screening programme which has existed for over 30 years and in recent times has become part of government policy. Payments are offered to GPs for screening a given percentage of women, and in 1993 a national target was set to reduce the incidence of cervical cancer by 20 per cent by the year 2001.

It has been suggested that some 70 per cent of cervical cancer could be prevented if at least 80 per cent of women attended for cervical screening. The programme in the UK was carried out on an ad hoc basis until 1988 when the system for inviting women to be screened was computerised and efforts made to ensure that all eligible women were receiving screening, rather than some groups of women being screened frequently, whilst others were relatively neglected. No randomised controlled trials were carried out before the introduction of the screening programme in the UK and in fact the evidence for the effectiveness of screening comes largely from other countries where organised programmes have existed for longer. However, audits carried out latterly in the UK of reasons for deaths from cervical cancer have found that some cases of cervical cancer could have been prevented if women had been regularly screened.

A number of risk factors for developing cervical abnormalities have been identified, chief among these being unprotected sexual intercourse, particularly with many partners and at a young age; being a smoker and, in common with many other cancers, increasing age. The development of cervical cancer is also linked to conditions of poverty. However, women are not selected to be screened on any of these criteria - indeed to do so would be potentially stigmatising - and thus the majority of women aged between 20 and 65 in the UK are to some extent affected by the screening programme. Most women do attend for screening but among those with cervical cancer there is a disproportionately large number of women who have never been screened.

Patterns of uptake of screening have been observed showing that certain types of women under-use screening services. The typical profile of a non-user is an older women from the lower social classes, who is less educated, unmarried, and has no usual source of health care. It is important to note, therefore, that some of the risk factors for developing cervical cancer and also factors which affect uptake of screening are the same. Even with an organised screening programme, then, the social factors related to screening uptake continue to have an influence and it is therefore important to look at possible explanations as to why this may be the case. The application of social cognition models to the understanding of this behaviour may provide an answer and indeed, psychological processes have also been found to be involved in uptake of screening. In particular, it has emerged that a feeling of invulnerability to cervical cancer and a belief that a smear test is not beneficial and involves psychological and physical costs is associated with non-attendance.

Whilst observation of the types of women who do not attend for screening can build up a picture of who may be at risk of being under-screened, it is not clear from the current literature what is of particular importance in influencing intentions to be screened and actual behaviour. Specifically, whether unchangeable demographic variables or differences in social cognitions are more important. Basing a study of behaviour on a psychological theory gives more weight to the findings. The theory details which beliefs may be useful to examine and allows the chance of exploring how demographic differences in uptake may be mediated by attitudinal differences. This indicates where health promotion may be directed and how services may be altered to improve uptake among certain groups of women.

This thesis consists of two prospective studies of uptake of cervical screening among two inner city populations of women. The studies are designed to examine the cognitions underlying women's behaviour in relation to cervical screening as well as the socio-demographic factors which impact on intentions and behaviour. Chapter 2 presents an overview of cervical cancer and factors which increase a woman's chances of developing it. The cervical smear test is described together with the problems associated with it in terms of possible psychological and physical morbidity caused by over treatment of questionable abnormalities and the psychological impact of the various stages of the screening process.

There are a variety of different social cognition models which can be used to explore decision making, some specifically devised to examine health behaviour; for example the Health Belief Model (Becker, 1974; Becker and Rosenstock, 1987) and Protection Motivation Theory (Rogers, 1975; 1983) and others to look at social behaviour more generally, for example the Theory of Reasoned Action/Planned Behaviour (Fishbein and Ajzen, 1975; Ajzen, 1991). It is important to apply a theory which is relevant to the particular behaviour in question as health behaviour is extremely diverse, including personal health practices carried out daily, uptake of screening every few years, or a once only predictive test or immunisation.

Psychological models of health behaviour are discussed in Chapter 3 and those which are applicable to uptake of screening are detailed together with previous research which has used them to explain and predict behaviour. The review focuses chiefly on population screening for cancer, including cervical screening and breast screening. Demographic and social factors associated with screening uptake are also discussed in this chapter. The relative dearth of prospective research and studies which have examined how and why social and demographic factors may be related to uptake of screening is highlighted.

Study 1 focuses on the application of the Health Belief Model (HBM) together with some elements of the Theory of Planned Behaviour (TPB). It uses self-completion questionnaires to examine the demographic and social characteristics of a sample of women and to look at their beliefs about cervical cancer and cervical screening before attending (or not attending) for a routine smear test. After the time for screening has passed, these women's beliefs are reassessed. The sample, development of reliable measures and methodology are described in Chapter 4 and the results presented in Chapter 5.

The aims of study 1 were:-

- to identify the psychological factors associated with intentions to be screened and uptake of screening.
- to identify the demographic and social characteristics associated with intentions to be screened and uptake of screening.
- to explore the strength of association between social cognitions and intentions in comparison with the association between social cognitions and behaviour.
- to assess the ability of identified factors to predict intentions and future attendance in a multivariate analysis.
- to examine the sufficiency of the HBM to predict behaviour in the absence of the mediating role of reported intentions.
- to explore how social cognitions may mediate any effects on intentions and behaviour of demographic and social factors.
- to explore the role played by past behaviour in influencing intentions and future uptake of screening.
- to examine whether uptake of screening alters attitudes towards screening for first time users.

The limitations of study 1, particularly in terms of the response rate achieved are discussed in Chapter 6 together with the theoretical implications of the results.

Study 2, which is also prospective, addresses the limitations of study 1 and attempts to replicate and extend the findings of study 1. It uses two theoretical perspectives - the HBM and also the TPB. The aims of the study are detailed in Chapter 7. The development of the measures and the methods for study 2 are described in Chapter 8 and the results presented in Chapter 9.

The aims of Study 2 were:-

- to attempt to replicate the results of study 1 with a higher response rate and a more representative sample.
- to use the results of the study to refine the social cognition models.
- to extend the measurement of subjective norms.
- to extend the indicators of past behaviour.
- to compare the efficacy of the two social cognition models to predict intentions to be screened and later behaviour.
- to test the sufficiency of the social cognition models to explain intentions and behaviour.
- to explore the role that a belief in having social support may play in uptake of screening for a potentially serious condition.
- to examine how anticipated affect may improve the prediction of intentions and behaviour when used in combination with constructs described by the social cognition models.
- to explore how past behaviour may be related to intentions and behaviour for an infrequently performed behaviour.

Chapter 10 discusses the results of study 2. Chapter 11 is an overall discussion of both studies, highlighting the main findings and their implications. The practical application of the results of the studies is discussed together with possible areas for future research.

Chapter 2

Cervical cancer and the cervical smear test

2.1 Introduction

An online search of Medline and PsychInfo computer databases was carried out to identify papers about cervical cancer and cervical screening. Key papers on cervical cancer and its causes, those articles which report an assessment of a cervical screening programme, and those on the psychological impact of cervical screening were included in the review. The emphasis in this review is on cervical cancer and cervical screening in the UK, with studies from other countries included where appropriate. The literature concerning individual factors affecting uptake of screening is discussed in chapter 3.

This chapter examines the problem of cervical cancer in the UK and discusses possible risk factors associated with its development. The growth of the screening programme in the UK is discussed together with the impact that screening has had on mortality from cervical cancer in this and other countries. Finally, the effect of the screening programme on women's psychological well being is explored.

2.2 Cervical cancer

In 1988 - which is the latest date for which figures are available - in England and Wales there were nearly 4,500 new cases registered for invasive carcinoma of the cervix uteri –

malignant cancer of the cervix that has spread to other areas of the body. In addition, there were over 18,500 new cases of carcinoma in situ – malignant cancer which is usually asymptomatic and which has not spread but which has a one in three chance of doing so (Department of Health 1994a)[1]. True incidence rates of carcinoma in situ however are likely to be higher. This is because the majority of these cases are detected by cervical screening, yet not all women are invited to be screened annually and not all eligible women are screened. Invasive carcinoma, in contrast, may also be detected by the presence of symptoms so its detection is not dependent on women presenting for screening. The estimate of the number of cases of this type of cancer is therefore more reliable.

Among countries in the European Community, the UK has the second highest incidence rate of invasive cervical cancer after Denmark (Esteve *et al,* 1993). Cervical cancer is the eighth most common cancer in women in the UK and accounts for three per cent of all deaths from cancer among women. In 1992 nearly 2,000 women died from this cancer in the UK (Austoker, 1994a). Cervical cancer is therefore a significant public health problem.

The natural history of cervical cancer, i.e. how and why it develops is not known. It is not the case that all cervical abnormalities showing evidence of dyskaryosis (i.e. cell abnormalities) will develop into invasive cancer if left untreated. Indeed it has been found that pre-invasive lesions occur at higher frequencies than invasive disease (e.g. Hakama *et al,* 1985). In addition, La Vecchia *et al* (1986) found that, although pre-invasive carcinoma, known as cervical intraepithelial neoplasia (CIN), and invasive cervical cancer shared epidemiological features, the specific agents implicated in pre-invasive lesions were probably different from those causing invasive cervical cancer. However, in some women, the disease can rapidly spread from the cervix throughout the body leading, if untreated, to death. Harris *et al* (1980) in fact found, in contrast to

[1] 1988 was the year in which an organised screening programme was introduced in the UK so death rates, and the incidence of new cases both in situ and invasive, may alter as the effect of this programme becomes apparent.

Hakama *et al* and La Vecchia *et al*, that the factors related to cases of in situ cervical cancer were also associated with dyskaryosis, indicating that these do have a similar natural history. The difficulty for clinicians is knowing which cervical abnormalities will progress to cancer and which will not.

Cervical abnormalities which are not malignant are treated by a variety of methods. These include cryocautery, cold coagulation, loop diathermy, laser treatment and cone biopsy. Pre-invasive malignant disease requires surgery, usually a hysterectomy, and invasive disease requires surgery plus radiotherapy or chemotherapy. A survey in the West Midlands of women treated for cervical cancer in 1981 found that if women are treated when the cancer is at stage I, i.e. when it has not spread to the lymphatic system or adjacent organs, about 80 per cent are still alive five years later compared to only seven per cent surviving for five years when treated when the cancer is at stage IV and has spread (West Midlands Cancer Intelligence Unit, 1990). These type of statistics indicate the potential benefits of screening programmes, as screening can detect asymptomatic stage I cancer. See table 2.4.1 for details of the stages of cervical cancer.

2.3 Risk factors for developing cervical cancer

The causes of cervical cancer are not known and therefore primary prevention is impossible. However, research has identified a number of risk factors whereby women in certain groups have been found to have a higher rate of cervical cancer. The main risk factors for women in the UK are discussed below (the list is not, however, exhaustive).

2.3.1 Sexual behaviour

Patterns of deaths from cervical cancer show a birth cohort effect (Osmond *et al*, 1983). Women born around 1921 and those born after 1941 have higher rates of cervical cancer. This is believed to be related to sexual behaviour as these women would have spent their early adult life either during the second world war (1939-1945) or during the so called 'sexual revolution' of the 1960's and 1970's. During these unsettled times it has been suggested that multiple partners were more common than monogamy with one heterosexual partner (e.g. Ibbotson and Wyke, 1995).

Observation of this birth cohort effect therefore led to the investigation of evidence that a woman's sexual behaviour places her at greater risk of developing cervical cancer. There are a number of ways in which sexual behaviour can be a risk, one of which is by sexually transmitted disease. Human papilloma virus (HPV) can be sexually transmitted and some types (16 and 18) of this virus are implicated as a risk factor for cervical cancer as they have been found in 80-90 per cent of cervical carcinomas (Ley *et al*, 1991). Women may be exposed to this virus several years before the appearance of cancer and a high proportion of women with cervical abnormalities show the presence of HPV (Allerding *et al*, 1985; Campion *et al*, 1985). However, there is doubt about how likely it is that dyskaryosis caused by a virus will develop into cervical cancer. In fact, there is also a high prevalence of HPV in women with a normal cervix (De Villiers *et al*, 1987). Therefore, the presence of this virus does not necessarily mean women will develop cervical abnormalities or cervical cancer.

Age at first intercourse and number of partners are also risk factors. The younger a woman is when she first has heterosexual intercourse and the greater the number of partners she has both increase her risk of developing cervical abnormalities (Harris *et al*, 1980). A woman's cervix is more vulnerable to infection at adolescence as this is when squamous metaplasia – the replacement of one kind of cell lining with another – takes place. Pre-cancerous changes occur at the squamocolumnar junction. Before adolescence the squamocolumnar junction is in a woman's endocervical canal. At adolescence hormonal changes cause it to descend into a woman's vaginal canal. Gradually the columnar cells are replaced by squamous cells, a process which may take several years leaving the area vulnerable to infection. Two studies involved interviewing women with cervical cancer and a group of controls about their sexual history. In Italy, La Vecchia *et al* (1986) compared 206 women with CIN and 327 women with invasive cervical cancer with 206 and 327 controls, respectively. They found that women who had sexual intercourse under 18 years of age were two times more likely to develop carcinoma in situ and five times as likely to develop invasive disease than women who first had sex when they were over 23 years old. This effect was independent of the number of sexual partners the women had had. Similarly, in England, Harris *et al* (1980) interviewed 237 cases and 422 controls and found that women who had sex before they were 17 years old were 2-3 times more likely to develop mild dyskaryosis, severe dyskaryosis and carcinoma in situ than women who had sex for the first time when they were over 21 years old.

However, it seems that it is not the increased vulnerability of the squamocolumnar junction per se which is the risk factor for cervical cancer. Instead, if a woman has sexual intercourse at a young age then she may have more sexual partners over the course of her lifetime. When the relative risks of early intercourse and many sexual partners are compared, in most studies, it is the latter factor which seems to be more important for increasing the risk of dyskaryosis and cervical cancer (e.g. Harris *et al*, 1980; Zverina and Sasinka, 1992), although, as mentioned, the effects of these were independent in the 1986 study by La Vecchia *et al.* The work by Harris *et al* (1980) examining a variety of possible risk factors suggests that risk increases from having more than two partners and increases again with three or more partners. Women who had more than six partners were six times more likely to develop cervical abnormalities and carcinoma in situ than women who had only had one partner. It has been suggested that chemicals in semen may lower the immunological defence system of the cervix and make it more susceptible to infection and consequently to abnormalities. Having multiple partners increases the chance of developing an infection and also increases the risk of having intercourse with a man who is carrying the HPV infection.

A woman may also be at risk of developing cervical cancer if her partner began to have sexual intercourse at an early age and if he has had many partners (Buckley *et al*, 1981). This is because these factors would increase his chances of contracting infections such as HPV (Zverina and Sasinka, 1992). Buckley *et al* (1981) matched women who had cervical cancer and who had only had one sexual partner with controls for age and age at first intercourse. They found that the partners of women with cervical cancer were more likely to have had multiple partners.

However, the incidence of cervical cancer is not related to sexual activity alone. Nuns do not have a substantially lower rate of cervical cancer (Kinlen, 1982) nor have prostitutes been found to have a higher incidence of cervical cancer (Keighley, 1968; Sebastian *et al*, 1978) as would be expected based on the sexual behaviour of these two groups of women. This indicates that other risk factors are also important for the development of cervical abnormalities.

2.3.2 Contraception

The risk imposed by sexual behaviour is, however, affected by the method of contraception a woman uses as this can also increase or decrease her risk of developing cervical cancer. Women who have used the contraceptive pill and long-acting injectable steroid contraceptives for over 5 to 10 years have been found to have a higher relative risk of developing cervical abnormalities compared to non-users (World Health Organisation, 1985), although the increased risk was found to be slight and translated into a decreased life expectancy of a matter of days for pill users (Fortney *et al*, 1985). However, Harris *et al* (1980) found a linear relationship between length of use of oral contraception and risk of severe dyskaryosis and carcinoma in situ. This increased risk was still evident when number of sexual partners had been taken into account. Whilst there is, in fact, no direct evidence that the contraceptive pill is a carcinogen, pill users are engaging in sexual activity leaving their cervix unprotected. Barrier methods of contraception, in contrast, are associated with a lower incidence of cervical cancer as they protect the cervix from semen and from bacterial and viral carcinogens (Zverina and Sasinka, 1992).

It seems, therefore, that the greater the number of partners a woman has, the greater her chance of having sex with someone infected with HPV. In addition, use of the contraceptive pill increases the exposure of a woman's cervix to HPV and semen, in comparison with barrier methods of contraception, and therefore increases the chance of developing cervical cancer.

2.3.3 Smoking

It has been found that tobacco smoking, either by a woman or her partner, is a major risk factor for the development of cervical cancer. Greenburg *et al* (1985) found that women who smoked over 20 cigarettes a day had twice the risk of developing dyskaryosis and carcinoma in situ compared to non-smokers, and for invasive cervical cancer, smokers of over 15 cigarettes a day had 3.5 times the chance of developing this disease. Estimates by Harris *et al* (1980) were even higher, with women smoking over 20 cigarettes a day being found to have 3-4 times the risk of non-smokers for developing dyskaryosis or carcinoma in situ. These findings were still evident after adjustments for number of sexual partners and age had been made. However, no direct link between smoking and the development of cervical cancer has been established and whilst it is not clear how smoking has an effect, three explanations have been suggested.

Firstly, the cervix can extract and concentrate substances from blood and it has been suggested that the cancer-causing agents in tobacco may concentrate in the cervix where they may lead to abnormal changes, or exacerbate the effect of viruses – such as HPV (Greenburg *et al*, 1985). Secondly, it is postulated that smokers might have lower immunity which would lessen their ability to resist disease, including viruses that are thought to cause pre-cancer and cancer (Burger *et al*, 1993). In fact smokers have been found to have a reduced Langerhans cell population in comparison with non-smokers (Barton *et al*, 1988) which lowers the immunological defence mechanisms of the cervix increasing susceptibility to infection. Thirdly, there is an association between smoking and sexual activity, which could explain the increased risk of developing cervical cancer among smokers. Female smokers have been found to be both more likely to be infected with HPV and to have had more sexual partners, than non-smokers (Ley *et al*, 1991).

2.3.4 Social class

Poverty is a significant risk factor for the development of cervical cancer. In the UK, mortality statistics show cervical cancer to have the steepest social class gradient of any cancer, with studies finding it to be from twice to five times as common in classes four and five as it is in the professional classes (Murphy *et al*, 1992; Nathoo, 1988; Office of Population Censuses and Surveys - OPCS -, 1988).

Few epidemiological studies have examined social and occupational risks for developing cervical cancer. This is partly due to the difficulties in retrieving the necessary information to do this. For example a woman's own occupation was not given on death certificates up to the 1970's unless she was unmarried (Roberts, 1990). However, some explanations for social risk factors have been offered.

One possible explanation for the pattern of incidence is that the type of occupation undertaken by a woman or her partner can influence her risk. Manual occupations, with poor or unhygienic conditions, contribute to cancer risk and infections can be passed between partners. Indeed, it has been found that the standardised mortality ratios are raised for a woman when her partner's job increases *his* risk of cancer (Robinson, 1983) and women who work in the textile industries around oily wastes can transmit poisons to their genitals via their hands, or the poisons can be absorbed through the skin and concentrate in the cervix causing abnormalities.

A second explanation postulated for the social class difference is differing patterns of sexual behaviour. However, research has found that women in the lower social classes, whilst having sexual intercourse at an earlier age and thus potentially increasing their risk of developing cervical abnormalities, nonetheless actually have fewer sexual partners than women from higher social classes (Mant *et al*, 1988). In addition, men from the lower social classes were found by Forman and Chilvers (1989) to have no more partners than other men. Thus, this explanation inadequately accounts for the higher prevalence of cervical cancer among women from lower social classes.

A third explanation is lifestyle factors such as eating and smoking habits. The development of cervical cancer has been found to be associated with diets lacking in vitamins A and C (Lambley, 1993). Women in social class four are nearly eight times more likely to report that they eat a diet which is high in fats and sugars and low in fibre, than those women in social class one (Austoker, 1994b). It is hypothesised that diet affects the immune system which in turn facilitates or retards the action of pre-existing abnormalities in the cervix. This is another reason why smoking may increase the risk of cervical cancer as it decreases levels of vitamin C. In addition, women in social class five are nearly four times more likely to be smokers than women in social class one (Austoker, 1994b) which, as has already been stated, would increase their risk of developing cervical abnormalities.

There is evidence from some studies, however, that the social class difference may be narrowing. Harris *et al* (1980) found no independent social class difference among cases and controls when other risk factors, for example having more sexual partners, was taken into account. A decade later, Wilson and Fowler (1990) found no significant social class difference in women who died from cervical cancer in Nottingham. It is possible, however, that whilst in certain areas there is no social class difference, overall in the UK there is a difference as the lower social classes do suffer more ill health in general (Davey Smith *et al*, 1990; Townsend and Davidson, 1982).

Finally, women from the lower social classes may be more likely to develop cervical cancer because they are less likely to attend for a smear test and make use of other preventive health services. However, recently here too it has been shown that in younger women uptake between social classes is similar (Coulter and Baldwin, 1987) and a study by Wright *et al* (1992) found that the social class difference had disappeared. More details about this and possible explanations for differential rates of uptake of screening among different class women are discussed in the following chapter, section 3.4.5.

2.3.5 Age

The recorded incidence rates for cervical cancer indicate that the older a woman is, the greater her risk of developing cervical cancer and cervical abnormalities. Only 16 per cent of all newly diagnosed invasive cervical cancers in 1988 were found in women below 35-years-old (Department of Health, 1994a). In addition, a relationship has been observed between a woman's age and the stage at which cervical cancer is diagnosed - the older the woman, the more likely she is to have invasive cervical cancer. In an audit carried out of 348 women in 24 health authorities in England, Wales and Scotland during 1992 it was found that 56 per cent of cases of invasive cervical cancer in women under 35 years old were stage 1a (microinvasive cancer confined to the cervix - see table 2.4.1) compared to 14 per cent of the cases in women aged 65-74 and none of the cases in women over 75 years old (Sasieni *et al*, 1996). The older women had cancers at a more advanced stage. As has been noted above, the stage at which a cancer is diagnosed has implications for successful treatment and survival. Concerning mortality from cervical cancer, 95 per cent of those women who died in 1992 from cervical cancer in England and Wales were over 35 years old (OPCS, 1993).

It is not clear why older women are seemingly at greater risk. It may be because prior to 1988 when cervical screening was organised on a national scale the vast majority of women over 35-years-old who had cervical cancer had never been screened (Chamberlain, 1988). This suggests that the age difference in incidence may actually result from screening practice rather than chronological age, as younger women may have opportunity to be screened opportunistically during antenatal and contraceptive advice visits. This opportunity for screening means that cases of asymptomatic cancer in situ can be detected before they become invasive. The age difference may also reflect the fact that cervical cancer can be a slow progressing cancer and therefore takes some years to develop, hence the higher rate in the older women.

2.3.6 Conclusions

As can be seen, not all women are at the same risk for developing cervical abnormalities. However, due to uncertainties about which risk factors are the most important, nearly all women in the UK within a certain age range are asked to attend for cervical screening. This type of screening is discussed in the following section.

2.4 Cervical screening

2.4.1. Introduction

The aim of cervical screening is to detect cancerous and pre-cancerous abnormalities of the cervix by use of a cervical smear test. It is a form of selective screening: " ... actively seeking to identify a disease or pre-disease condition in people who are presumed and presume themselves to be healthy ..." (Holland and Stewart, 1990, p.1). As cervical screening, in common with other forms of screening, is seeking to identify a problem which at the time of screening is not causing the individual trouble, the physical and psychological benefits and disadvantages of it should be clear to those at whom it is aimed. In 1968 Wilson and Junger presented a World Health Organisation Public Health paper detailing screening criteria. These criteria were later reduced by Holland and Stewart (1990) into four aspects: condition, diagnosis, treatment and cost. The details of these four aspects of screening should hold true for any good screening programme.

The disease or condition screened for should be an important health problem (in terms of its prevalence and impact on individual populations) and be recognisable at a pre or early symptomatic stage and its natural history must also be understood. The diagnostic test should be suitable and of reasonable sensitivity and specificity as well as being acceptable to the population being screened. Facilities should exist to assess and treat those affected and this treatment should be effective together with there being an agreed policy on whom to treat. Finally, the cost of the programme must be balanced in relation to possible expenditure on medical care as a whole.

Does cervical screening adhere to these criteria? This will be broadly discussed below together with an overview of the psychological and physical impact of this screening on women. However, as a programme is in existence in the UK of which women are expected and encouraged to avail themselves, the crucial point for the subject of this thesis is how women behave in the face of this, irrespective of whether the existing programme meets specific criteria.

As regards the first criterion, whilst cervical cancer is not as prevalent as some other diseases and types of cancer, some form of screening programme to detect cervical abnormalities has been running for over 30 years in European countries, including the UK. It seems that this attention has been given to cervical screening because of a belief in the detectability of cervical cancer at a pre-cancerous stage. This detectability was seized upon as a means of eradicating cervical cancer despite the suggestion in recent years, as mentioned above, that pre-invasive abnormalities may not all become invasive cancers (e.g. Hakama *et al*, 1985) and in addition that knowledge of the natural history of cervical cancer is far from perfect.

2.4.2 Procedure and results of the smear test

The smear test may only be performed when the vagina is clear of blood, infected discharge, semen or contraceptive cream. The woman lies supine on a couch with her knees bent and her legs apart. A speculum is inserted into the vagina and opened to part the vaginal walls to allow access to the cervix. A specially designed spatula or cytobrush is swept around the cervix and vaginal walls to collect cells which are placed on a slide, fixed and sent to a laboratory for examination. Up to 98 per cent of the pre-invasive carcinomas microscopically detected are squamous cell carcinoma, although some women (usually virgins) develop adenocarcinoma. The higher proportion of squamous cell carcinoma may be due to the fact that the smear test is not designed to detect abnormalities in the endocervical canal where adenocarcinoma usually develops.

Results are classified according to five categories. These range from a normal smear, where no abnormality has been found (class 1), to a smear which shows a mild infection (class 2), through a mildly abnormal smear (class 3) and a moderately abnormal smear (class 4) to a severely abnormal smear (class 5), where a severe abnormality in the cells of the cervix has been detected. The aim of the test is to identify women with suspicious test results – those in smear test classes three to five. These smear test results are classed as positive.

Most women undergoing a smear test will receive a negative result. In England these rates were 94.9 per cent in 1992/3. Some women (4.4 per cent in 1992/3) will receive an abnormal result (borderline, mild, moderate dyskaryosis) and fewer still (0.7 per cent in 1992/3) will receive a positive result (Department of Health, 1994b). However, the interpretation of these statistics is not straightforward and rates are not uniform throughout the UK. The number of positive smears includes duplication of results from women who had more than one test in a year. Furthermore, regional variations exist which reflect differences in classification and interpretation of the smear tests as well as real differences in the incidence of cell abnormalities.

Women with abnormal or positive results are referred for further investigation, usually involving a colposcopy (visual examination of the cervix with a colposcope). The colposcopy enables the position, size and extent of an area of cervical abnormality to be identified. A biopsy (a small sample of cervical tissue) is usually taken and classified according to one of three stages of CIN. CIN I corresponds to a class 3 smear, CIN II to

Table 2.4.1 Smear test results, classification of biopsy and stages of pre-invasive and invasive carcinoma of the cervix.

Class of smear	Classification of biopsy	Stages of pre-invasive and invasive carcinoma of the cervix	Finding
1	-	-	Normal
2	-	-	Inflamed cells or a mild infection
3	CIN I	Stage 0 (pre-invasive)	Mildly abnormal cells
4	CIN II	Stage 0 (pre-invasive)	Moderately abnormal cells
5	CIN III	Stage 0 (pre-invasive)	Severely abnormal cell/carcinoma in situ
-	-	Stage I (invasive)	Carcinoma confined to the cervix
-	-	Stage II (invasive)	Carcinoma extends beyond cervix but not to the pelvic wall; involves vagina but not the lower third
-	-	Stage III (invasive)	Carcinoma extends to pelvic walls; involves lower third of vagina
-	-	Stage IV (invasive)	Carcinoma extends beyond true pelvis or has clinically involved mucosa of bladder or rectum

a class 4 smear and CIN III to a class 5 smear (see table 2.4.1). After diagnosis, appropriate treatment can be performed, as mentioned in section 2.2.

2.4.3. Organisation of cervical screening in the UK

Cervical screening was conducted in most parts of the UK on an ad hoc basis between 1964 and 1988, although two organised programmes existed in north-east Scotland. In 1988, computerisation of population registers was introduced and a programme involving inviting women to be screened (call/recall programme) was begun in order to increase coverage. In 1993, a national target was set to reduce the incidence of cervical cancer by 20 per cent by the year 2001 (Department of Health, 1993a) and this was to be achieved partly by increasing uptake of cervical screening. A history of the cervical screening programme in the UK is shown in Appendix 1. By 1990 the screening programme in the UK had developed to its current form.

Every month each Family Health Services Authority (FHSA) produces a list of women aged between 25 and 64-years-old[2] who have not had a smear test within the past five years or who are eligible for screening because they are screened more often due to a previously detected abnormality. This list is sent to GPs who indicate if screening is inappropriate for their patients; for example, women who have had a hysterectomy for a non-malignant condition (and had normal smear test results beforehand) are not invited to attend. Invitation letters explaining the advisability of having a test and what it is designed to do are then sent to women by the FHSA. In some districts a leaflet describing the smear test is also sent with the initial letter (see Appendices 2a and 2b). Between 1988/9 and 1992/3 the percentage of the target population being screened in the previous 5.5 years increased from 43 per cent to 83 per cent (Department of Health, 1990-1994). However, regional variations occur and Inner London Health Authorities achieve the lowest coverage of all UK Health Authorities.

[2] Between 20 and 60-years-old in Scotland.

As mentioned, women are called for screening at least every five years, although the appropriate interval has been the subject of debate (Chamberlain, 1986; National Audit Office, 1992). Some District Health Authorities operate a five-yearly recall, whilst others operate a three-yearly recall, or a mixture of the two depending upon the age of the woman. Some GPs choose to screen women every three years even when their district policy is for five yearly screening.

Estimates of the optimal (in terms of reduction of risk of disease) screening interval and age ranges to cover are problematic as they rely on assumptions about the progression of the disease and that 100 per cent of eligible women will attend for the test. However, it is generally accepted that coverage of the appropriate age range of women is a more important determinant of risk reduction than the frequency of screening (e.g. Day, 1989; International Agency for Research on Cancer - IARC - Working Group, 1986; Smith and Chamberlain, 1987). In addition, the number of smear tests women have to undergo is reduced which is preferable for women and also cheaper for the National Health Service. For instance, it is estimated that screening all women aged 20-64 years old annually would lead to a 93 per cent reduction in incidence of cervical cancer and involve women having 45 tests, whereas screening the same age range every 3 years would reduce incidence by 91 per cent and only involve 15 tests per woman.

Producing accurate lists of women due for screening for the national programme in the UK can prove to be problematic. Registers of addresses are often out of date and inaccurate. A comparison between the number of residents on FHSA registers and an estimate of the total population found that the lists exceeded the population by up to 18 per cent as people had moved or died (National Audit Office, 1992). Women who cannot be contacted have been found by some studies to account for up to half of women who do not attend for screening (Beardow *et al*, 1989; Scaife, 1972; Rang and Tod, 1988).

Furthermore, despite having eight weeks to check the list of women due for screening some GPs fail to do so (Haran *et al*, 1989) causing women to be invited for screening when they are not due, eligible women not being called, and invitations being sent to women who have moved or died. It is expected that this problem will gradually decrease as GPs are encouraged to keep accurate records in order to achieve their targets for payments: £2,610 for screening 80 per cent of their target group in the previous five and a half years and £870 (i.e. 33 per cent of the full amount) for screening 50 per cent (figures for 1997). The introduction of these target payments in 1990 seems to have led to more women being screened. Between April 1990 and October 1993 the percentage of GPs screening 80 per cent of their population increased from 53 per cent to 83 per cent (Austoker, 1994a). The assumption underlying the introduction of these financial incentives is that low uptake of screening is due to poor organisation and to the behaviour of GPs. The increase in screening after the introduction of payment seems to bear this out. However, it remains of interest to explore psychological and social predictors of screening behaviour under an organised screening programme, both among those who do attend for cervical screening and the minority of women who do not.

2.5 The impact of cervical screening

2.5.1 Cervical screening and mortality from cervical cancer

The purpose of cervical screening is to prevent mortality from cervical cancer, however, it is extremely difficult to assess the impact of cervical screening in these terms. Indeed, there is a marked absence of any substantial evaluation of the screening programme in the UK. No randomised controlled trials were carried out before the introduction of screening and, as mentioned previously, the exact nature of the natural history of cervical cancer is not known, although the assumption is that minor abnormalities will progress to more serious abnormalities and then to cervical cancer.

In fact the evidence for the benefit of cervical screening - solely in terms of a reduction in mortality and morbidity from cervical cancer and incidence of cervical cancer - comes mainly from data outside the UK. The exceptions to this are two assessments of the programmes in north-east Scotland, where, as mentioned, organised screening programmes have existed for longer than in the rest of the UK. A picture of the impact of cervical screening has been built up from a combination of case-control studies, comparisons of incidence in screened and unscreened women, and examinations of time trends in incidence in relation to screening activity. Organised programmes are found in Denmark, Finland, Iceland, Norway and Sweden, north-east Scotland and British Columbia in Canada (see table 2.5.1). The findings from this literature will be summarised followed by details of studies which have examined the impact of cervical screening in the UK, and which highlight potential problems.

Data from this research are difficult to interpret and compare as the screening programmes target different age groups, use different inter-screen intervals and aim to cover a differing percentage of the population. This lack of consistency demonstrates how screening has generally grown up on an ad hoc basis in most places. In general, though, the literature shows that organised screening programmes with a wide coverage of the population are the most effective at controlling cervical cancer and that the incidence of, and mortality from, cervical cancer are falling in groups of screened women and rising in unscreened groups (non-attenders or those women outside the age ranges for screening). Many studies have observed a change in the stage distribution of cancers, with cervical cancers generally being detected more frequently at an earlier stage. The literature also indicates that careful follow-up of women helps the overall success of the programmes. Most studies regard the detection of carcinoma in situ (which has a better successful treatment rate) as a success of the programme.

In countries where the organised screening programme is nation-wide, such as Finland, Iceland and Sweden, incidence of, and mortality from, cervical cancer has fallen (Hakama and Louhivuori, 1988; Sigurdsson *et al*, 1989; Pettersson *et al*, 1985).

Incidence rates in unscreened women have slightly risen (e.g. over 60's in Sweden), changed very little (e.g. 20-29 year olds in Finland; 25-69 year olds in Iceland) or fallen only very slightly (e.g. over 55's in Finland). Incidence rates increased in both Iceland and Sweden soon after introduction of the programme but this is interpreted as advantageous in that carcinomas were diagnosed before they became symptomatic. Whilst these data give an encouraging impression, some of the statistics are difficult to

Table 2.5.1 Details of organised cervical screening programmes

	Denmark	Finland	Iceland	Norway	Sweden	Canada	North-east Scotland
Extent of programme	some counties	nationwide	nationwide	one county	nationwide	one province	two regions
Targeted coverage of population	40%	100%	100%	5%	100%	-	-
Year in which organised screening began	1962	1963	1964	1959	1964	1949	1960/2
Year in which organised screening fully developed	1975	1970	1969	-	1973	1955	1988
Year coverage achieved	1980	1970	1969	1960	1973	-	-
Targeted age range	30-50	30-55	25-69	25-59	30-49	20+	20/25-60
Recommended screening interval (yrs)	3	5	2-3	3	4	1	5
Compliance of target population	80%	75%	90%	70%	70%	85%	92%
Change in mortality by age group (%)							
30-39	-61	-72	-100	-48	-59	-72 overall 1955-1985	-64 overall
40-49	-53	-77	-77	-23	-63		
50-59	-26	-60	-66	-2	-40		
60-69	+1	-32	-66	+14	+7		

Developed from Anderson *et al* (1988); Day (1989); Dugid *et al*, (1985); Hakama and Louhivuori (1988); Laara *et al* (1987); Macgregor *et al* (1985); Pettersson *et al* (1985); Sigurdsson *et al* (1989).

interpret. For example in the study carried out by Sigurdsson *et al* (1989), incidence of, and mortality from, adenocarcinomas were also included and these cancers are not detectable by screening.

In the European Community, Denmark has the highest rates of incidence of, and mortality from, cervical cancer. Whilst an organised screening programme was begun in 1962 different policies operate in different counties and many smear tests are taken by GPs outside of programmes, making it difficult to assess the efficacy of the programme. In the light of the different policies operating in different Danish counties, Lynge (1983) examined the effectiveness of screening taking into account both trends in incidence of cervical cancer in places with and without organised screening, and of smears taken outside an organised programme and within one. Lynge's aim was to explore whether any reduction in incidence was caused by the benefit bestowed by the existence of a programme or by already falling incidence rates. Findings were encouraging. Incidence was reduced in women aged 30-59 years old in areas with organised programmes started before 1969 and there was also a reduction in areas without organised programmes but with high rates of screening activity during 1974 and 1975. However, this reduction was smaller and slower. Only minor reductions in incidence of cancer were found in areas with lower levels of screening. These findings point to the importance of good organisation of a programme as well to the actual number of smear tests performed. Mortality rates were not examined. However, an earlier study by Berget (1979) in one Danish county showed an encouraging effect of the screening programme on mortality, with a 80 per cent fall in mortality among women covered by the programme, no fall in mortality among those outside of the age range, and a rise observed in women who did not attend for screening, although they were eligible.

In Norway, only one county has an organised screening programme; consequently this covers just five per cent of women. The programme began in 1959 for screening 25-59 year olds every three years. There was no change in incidence to begin with then incidence fell gradually from the late 1970's and cancers were generally being found earlier giving women a higher chance of survival (Pedersen *et al*, 1971). Overall in Norway, however, in the absence of an organised programme, Lynge (1983) reports generally increasing trends of cervical cancer.

Andersen *et al* (1988) examined the impact of one of the earliest screening programmes which was in British Columbia, a province in Canada. The programme began in 1949 and aimed to screen all women over 20 years old annually. By 1970 85 per cent of the population had been screened at least once and since this date 40 per cent of women have been screened annually. The programme is well organised and follow-up of cases detected by screening is virtually 100 per cent. Between 1955 and 1985 there was a 78 per cent fall in incidence of invasive cancer and a 72 per cent fall in mortality. However, since 1970 there has been a worrying increase in the incidence of carcinoma in situ particularly among 20-30 year olds. Anderson *et al* (1988) nevertheless, suggest that the reduction in invasive carcinoma and the detection of in situ cases is evidence of the success of the programme. They argue that the programme is preventing an increase in invasive carcinoma in younger women by treating early cancers, although this makes the, now disputed, assumption that all cervical abnormalities will progress in the same way.

In the UK results are less impressive. Two organised programmes were begun in north-east Scotland in the early 1960's, one in Tayside and one in Grampian. In the Grampian region, the programme covered 25-60 year old married women. By 1969 90 per cent of women had been screened. Between 1968 and 1976 mortality fell in the 35-54 year olds and 55-64 year olds but also in the over 65's who were not screened. Additionally, the rate of mortality also fell in women aged 35-54 and in the over 65s in the rest of Scotland, although this was a smaller reduction (Macgregor and Teper, 1978).

In Tayside, the programme started in 1962 and expanded in 1966. Duguid *et al* (1985) examined details of cases of cervical cancer reported between 1957 and 1981 to examine the influence of the programme. Between 1977 and 1981, 47 per cent of women were screened at least once, most were aged between 20 and 39 years old and the lowest rates of screening were in women aged between 40-59 years old. Between 1957 and 1981, incidence and mortality fell overall. Examining these trends by age it was found that among women aged under 34, both death rates and incidence were low. Among 35-54 year olds mortality fell in the five years after the start of the programme by 64 per cent and incidence fell by 60 per cent. From 1972 there was a similar fall in mortality in the over 55's. However, part of this fall was in women over 75 years old who were not included in the programme.

The International Union Against Cancer (UICC) (Hakama *et al*, 1985) concluded, mainly from the evidence provided by the programmes discussed above, that cervical screening could reduce the incidence of, and mortality from, cervical cancer. However, they recommended that for screening programmes to be successful they must be well organised and include accurate population registers in order that the target population may be identified and that individual women are identifiable. The programmes should also include measures to guarantee high coverage and ensure that adequate facilities exist for taking and interpreting smears, and for treating women.

2.5.2 Cervical screening and mortality in the UK

Examining the situation overall in the UK, although there are regional variations, there has been a decrease in mortality from cervical cancer from 88 per million in 1972 to 63 per million in 1992 (OPCS, 1993; Cancer Research Campaign, 1994a). However, incidence rates have not altered substantially. The registration rate of invasive cervical cancer in England and Wales changed little between 1971 and 1989. There have been no treatment improvements since 1971 so the fall in mortality suggests that cancers are being detected when their prognosis is better.

There are, however, age differences in these trends. The recorded incidence of carcinoma in situ in women under 35-years-old was found to have risen by 200 per cent between 1960 and 1980 with the number of deaths up by 72 per cent (Imperial Cancer Research Fund Co-ordinating Committee on Cervical Screening, 1984). In fact, cervical cancer is the most common cancer in these younger women. The apparent increase in carcinoma in situ may, however, be due to more cases being detected by screening rather than a true increase especially as a higher proportion of women under 35-years-old were screened during these years. For women between the ages of 35 and 44, too, death rates rose from 49 per million in 1976 to 74 per million in 1990. However, for women over 45 years old there was a decrease in the rate of invasive carcinoma and mortality from cervical cancer (Austoker, 1994a). The death rate for these older women fell from 195 per million in 1976 to 136 per million in 1990.

Whilst the screening programme overall in the UK has not been assessed in the way programmes have in other countries, audits indicate that deaths are more likely in unscreened women. In 1991 the National Co-ordinating Network for Cervical Screening Working Group proposed regular auditing of the national screening programme in the UK and deaths from cervical cancer and non-fatal invasive disease to establish possible failings of the programme and to examine the relative importance of its various aspects - such as screening interval, coverage and follow-up of abnormal smears - in order to provide a measure of the effectiveness of the programme in the absence of a randomised controlled trial. A number of problems have been highlighted by these audits which may account for the disappointing impact the programme has had on incidence rates in the UK despite 83 per cent of women in England being up-to-date with their smear tests. These problems include a lack of organisation where women are not invited to be screened or followed up adequately; inaccuracy of the smear test where results are given as negative when they are not; a failure to screen the appropriate groups of women - younger women have been screened extensively and older women have been relatively neglected - and an inability of screening to prevent rapidly progressing cancers.

A recent paper reports on the results of an audit carried out in 24 District Health Authorities of 348 women who had invasive cervical cancer diagnosed in 1992 (Sasieni *et al*, 1996). This audit gives an encouraging picture of the impact of the programme. Two matched controls were used for each case. Sasieni *et al* (1996) concluded, taking into account the time since the woman's last smear test, her screening history, and follow-up of abnormal and positive smears, that in the absence of screening in the previous five and a half years the incidence of cervical cancer would have been 57 per cent greater. Examining cervical cancer rates in only those women under 70 years old (i.e. those covered by the programme) the authors estimate that there would have been 75 per cent more cases without screening.

Audits, however, have some disadvantages which mean their results should be interpreted cautiously. They are usually carried out on a small number of cases and in particular geographical areas. For example, in the Sasieni *et al*, (1996) study no inner city population took part where screening may be less efficient. However, comparing results from more recent audits with earlier work by Ellman and Chamberlain (1984) shows encouraging trends. The study by Ellman and Chamberlain carried out in 1980 in Greater London found that 68 per cent of the cases of fully invasive cancer had had no screening; Macgregor *et al* (1985) found this to be true for only 50 per cent of cases in north-east Scotland; Slater *et al* (1994) in Rotherham in 1989-1991 found it for 47 per cent of cases and Sasieni *et al* (1996) found only 41 per cent of cases had no screening recorded. However, it remains possible that the differences may be due in part to the different geographical areas where the audits were carried out.

Positive smear test results require action and treatment if screening is to be of any value (Robertson and Woodend, 1995). In the audits carried out of cases of invasive cervical cancer there was a failure to ensure adequate follow up of an abnormal smear test result in between 13-28 per cent of cases (Ellman and Chamberlain, 1984; Sasieni *et al*, 1996; Slater *et al*, 1994). Inadequate follow up may be due to poor organisation or the behaviour of either the GP or the patient herself. Contrary to recommendations, one third of all Health Authorities do not contact women with negative results. Therefore, if a woman is not contacted she may assume that all is well when her results may have been lost and so a woman with cervical cancer could remain untreated. A further problem seems to be that screening and diagnostic services are split between primary and secondary health care sectors. This can lead to confusion as to who is responsible for the care of the patient and can result in delays in treating abnormalities and inadequate provision being made for following up women with positive results (National Audit Office, 1992). In addition, some patients may fail to attend for follow up appointments.

The sensitivity of the smear test has been questioned as there is reported to be a small percentage of errors in the assessment of smear tests leading to false negative results which indicate that a woman is free of cervical abnormalities when in fact she is not. It is estimated that 16 per cent of all smear tests performed may receive this false result (IARC Working Group, 1986). A false negative result may cause pre-invasive cancer to go undetected until it possibly becomes symptomatic, and therefore invasive, and consequently less responsive to treatment.

However improvements are being made to the screening programme in the UK. Some of the characteristics of successful programmes, such as those in Finland, Sweden and Iceland, have been incorporated into the programme in the UK. In addition attempts have been made to eliminate the shortfalls of the UK programme which have been highlighted by audits. Improvements made include, targeting the highest risk age groups, persisting in attempts to screen women who have never been screened and ensuring adequate follow-up of abnormal smear test results. Standards for this programme have also been set to improve its effectiveness such as appointing a national co-ordinator and training health professionals responsible for screening. These measures have only recently been instigated and any benefit that accrues in terms of reduced incidence and mortality may take a few years to become apparent.

2.5.3 Psychological impact of screening on women

As the cervical screening programme has existed for over 30 years in the UK its potential to have a psychological impact on the women being screened is sometimes ignored. Indeed, besides the outcome in terms of effects on morbidity and mortality from cervical cancer, a national screening programme has to be managed carefully in order to minimise any negative psychological impact it has on its intended recipients. Cervical screening, in common with other screening programmes, may have both positive and negative psychological implications for the individuals at whom it is aimed. Research has demonstrated that each of the various stages to the cervical screening process may have psychological effects including; receipt of the screening invitation; the test itself; receipt of the results; and subsequent investigations and treatment. Evidence for these effects is presented below.

Simply being invited to attend for a test may cause anxiety. It has been found that some women believe an invitation to attend for cervical screening indicates that their GP 'knows' that they have cervical cancer (Nathoo, 1988). Whilst only 17 women who did not attend for a smear test participated in this study, which has implications for the generalisability of the result, such findings point to the need for clear information about the purpose of the smear test and the reasons for women being invited in order to avoid misunderstanding.

Undergoing the smear test itself may also have a negative psychological effect. This indicates the need for the voluntary nature of screening to be stressed so women do not feel coerced into attendance. Posner and Vessey (1988) report that some women feel distressed by the test seeing it as an "invasion" of their bodies. Schwartz *et al* (1989) found that over half (54 per cent) of the women who had been screened in their study found the test to be painful or uncomfortable and 46 per cent found it embarrassing. Strikingly though, despite these feelings only one per cent of the 600 women interviewed thought that the test was a waste of time.

Those women for whom no cervical abnormalities have been detected can be reassured that they are not developing a life threatening disease. Some studies have found that women who attend for screening feel significantly more relaxed after receiving a negative smear test result (e.g. Reelick *et al*, 1984). Most women undergoing screening will, in fact, receive this result. On the other hand, receiving a negative result can have the detrimental effect of reminding people of the possibility that they could become ill (Stoate, 1989).

Current practice of informing women of results is more sensitive and more stringent than in the past. An abnormal or positive result will have psychological implications and it is important that women are given the opportunity to discuss the meaning of the result with their GP as soon as possible after receiving it (Austoker, 1994a). It is possible that as smear tests are presented as routine, women may expect to be told that nothing is wrong, making the receipt of an abnormal or positive result and subsequent investigation more difficult. For example, some women who had received notification of an abnormal smear test result described themselves as 'devastated' and a small number even began to think about arrangements for their funeral believing the result indicated that they had terminal cancer (Posner and Vessey, 1988). In a study of self-image conducted by Reelick *et al* (1984), women who had received a positive smear test result felt significantly more gloomy and less healthy than they had done before undergoing screening, although these adverse effects were generally not apparent six months later. Anxiety has been found to be partly associated with not having enough information to understand what the result means (Bell *et al*, 1992). These findings, then, point to the importance of stressing the meaning of the result and offering support to those with abnormal or positive findings.

Attempts to minimise anxiety associated with cervical screening have been successfully carried out. Wilkinson *et al* (1990) found that sending a personal, rather than computer-generated, letter and an explanatory leaflet led to fewer women believing they had cancer. The leaflet stated that most cervical abnormalities do not indicate the presence of cancer. Women who received the personal message were also less likely to believe that their general health had deteriorated and were significantly less anxious than women who received the computer-generated letter.

Inaccurate results of the smear test can also have adverse psychological effects. Whilst genuine negative results can provide reassurance it is possible that a false negative result may cause women to have greater difficulty in coming to terms with the disease if it is subsequently diagnosed. In addition, sometimes the cervical cells necessary for interpreting a smear test can be missing from the slide due to an error by the health professional, or they may be obscured by blood or mucus, and the woman is requested to return for a repeat smear test. Under these circumstances she may be left with the feeling that something is wrong although the problem was due to a clinical error.

A further problem with cervical screening is its relatively high false positive rate. It is difficult to judge false positive rates as they depend on how the case is managed, whether women are asked to return for a repeat smear test or whether they are immediately sent for colposcopy directed biopsy, where the mistake would be detected straightaway. False positive results usually occur at the lower end of the abnormality scale where the abnormalities are less obvious. However, such results lead to unnecessary anxiety. It has been suggested that the chances of being recalled should therefore be explained to women before they undergo cervical screening, for whilst one in ten women may be recalled, by no means all of these women will, on further investigation, be found to have a cervical abnormality (Marteau, 1989a; Marteau, 1990a, Soutter, 1995). False positive results can cause psychological difficulties as women may feel that any subsequent negative results are wrong and that they really do have the disease. This outcome has been identified for screening for hypertension (Bloom and Monterossa, 1981), and for ante-natal screening (Richards, 1989), and suggested in relation to cervical screening (McCormick, 1989).

In 1992 Duncan, reporting on the UK Cervical Screening Programme, recommended that women with severe cervical abnormalities should be referred for colposcopy whereas milder abnormalities should be monitored with repeat smears. However, there is far from universal agreement about these guidelines either in terms of their clinical effectiveness or the psychological implications for women (e.g. Flannelly *et al*, 1994; Soutter and Fletcher, 1994).

A number of studies have investigated the psychological effects of treatment for cervical abnormalities. Bell *et al* (1992) found that those women who were monitored with repeat smears were less anxious than those referred for colposcopy. However, those in the monitoring group had minor abnormalities whereas those referred for colposcopy by the very nature of it had more severe cervical abnormalities. This difference may have influenced the results although some studies have found that the degree of anxiety is not associated with the actual severity of the abnormality (e.g. Doherty *et al*, 1991; Marteau *et al*, 1990a).

In addition, Bell *et al* (1992) found that although the monitored group experienced less acute anxiety, this anxiety nonetheless intruded into their daily lives more than for the colposcopy group. This study and others (e.g. Posner and Vessey, 1988; Marteau *et al*, 1990a and 1996; Wolfe *et al*, 1992) found that women were highly anxious before colposcopy and less anxious afterwards although the anxiety was not eliminated (Doherty *et al*, 1991). The anxieties seemed to be associated both with the procedure itself and also with the uncertainty about what may be found. Marteau *et al* (1990a) showed the extent to which the investigation could be feared in that the thought of the procedure was found to be as bad for women as the thought of cancer being detected. Other studies found that women were anxious about their fertility and sexual function (Campion *et al*, 1988; Reelick *et al*, 1994). Personal accounts by Quilliam (1990) and Britten (1988) highlight the anxiety and distress these investigations may cause. Nine days after colposcopy and a biopsy Britten started to bleed, she writes "on the seventh day the bleeding became torrential and in the evening I delivered a blood clot the size of a fist".

Finally, awareness of screening programmes may have a psychological impact. Some commentators strongly object to the existence of screening programmes seeing them as an unwarranted intrusion by the state into individuals' lives (e.g. McKie, 1995; Skrabanek 1988a) and as carrying more costs than benefits (McCormick, 1989). Skrabanek (1988b) suggests that screening 'medicalises health' and, in turn, the healthy person, for example, where women are monitored following an abnormal smear test result and consequently forced to confront possible illness when the abnormality may not have caused them any difficulty if left undetected. However, no large scale studies have been carried out to examine whether this is the case and such dissenting views are in the minority.

The psychological impact of screening is not directly addressed in this thesis, however, account is taken of the potential psychological influence of the programme in that its impact should be represented in women's beliefs about attending for screening. For example, negative experiences will shape women's attitudes to having a smear test (as would be predicted from social learning theory, Bandura, 1986). This will be discussed in greater depth in Chapter 3.

2.6 Summary

Cervical cancer is a relatively common disease among young women, although incidence rates and deaths in this group make up a very small proportion of all cases. The disease is less prevalent in older women than some other cancers, for example, breast cancer. There are recognised risk factors for the development of cervical cancer, the main ones being sexual behaviour and smoking, but despite this, the present screening programme in the UK does not take account of the fact that some women are more at risk than others.

A negative smear test result can provide reassurance, and early treatment of cervical abnormalities can prevent death from cervical cancer. Indeed the stage at which cervical cancer is treated is directly related to survival, with earlier treatment being beneficial. Assessment of screening programmes in Nordic countries has indicated that screening can reduce rates of cervical cancer and good organisation of these programmes and wide coverage of women have been highlighted as vital elements of success. Cervical screening in the UK, however, has had less impact on mortality from cervical cancer than is desirable. Evidence for its effect comes mainly from small scale audits of deaths from cervical cancer where projections are made of possible disease rates in the absence of screening.

It has been argued that 70 per cent of cervical cancer could be prevented in the long term if 80 per cent of women regularly attended for high quality cervical screening (Austoker, 1994a). Efforts are being made in the UK to ensure that screening is of this high quality. In addition, GPs are actively encouraged to screen 80 per cent of their target group of women each five years in order to achieve payment. Whilst most women do attend for screening, either regularly or sporadically, among the minority of women who have never been screened there is an overrepresentation of cases of cervical cancer. Chamberlain (1988) reports that two thirds of women with invasive cancer have never been screened. In addition, uptake has been found to be lower amongst certain groups of women. This issue is discussed in the following chapter. For those women who do attend for a smear test, cervical screening can have negative, as well as positive, effects.

The crucial point is that there is a screening programme in existence in the UK which women are expected to use. It is therefore important to study how women respond to an invitation to be screened. The following chapter explores in detail the factors which may predict response to screening and describes psychological theories which can be used as a framework for examining how these factors relate to screening behaviour.

Chapter 3

Influences on uptake of screening

3.1 Introduction and selection of studies to review

The review in this chapter focuses on screening uptake and aims to identify the relevant cognitive and demographic variables which may predict it. Social cognition models have been applied to a wide variety of health behaviours. However, health behaviour is diverse and a review of predictors of all types of behaviour would be impractical, and, moreover, irrelevant to an understanding of uptake of cancer screening. Cervical screening falls into a particular category of health behaviour. It is likely that due to its nature individuals would make a decision each time about whether or not to be screened. This makes it a useful behaviour to study with the application of decision making models. Cervical screening is a 'simple', infrequent, repeatable, behaviour, which is not intrinsically enjoyable and which is dependent on the utilisation of health services. These aspects of this behaviour, and how they lead uptake of screening to differ from other health behaviours, are discussed below.

Health behaviour is increasingly being seen as multidimensional, rather than unidimensional (e.g. Calnan, 1985; Harris and Guten, 1979) and in particular there is reason to expect that the same cognitions will not underlie different types of behaviour. Indeed, Calnan (1985) found that use of breast screening and cervical screening was predicted by a different set of factors from that predicting personal health behaviour (e.g. smoking, diet, exercise). Other behaviours which have been the focus of research are those for which the cessation of the behaviour is of interest, not the implementation of it. For example, smoking and unsafe sex. In fact many well designed studies have been carried out examining smoking and sexual risk behaviour (e.g. Sutton, 1992a; Sutton *et al*, 1987; Abraham and Sheeran 1993a, 1994). Further distinctions regarding health behaviours are that some are 'public' whereas others are 'private'. That is, some behaviours are more observable to other people in an individual's environment (e.g. smoking and exercise) than other behaviours (e.g. screening uptake). Also, some are 'simple' requiring one behaviour and others are 'complex' requiring repetition and maintenance such as quitting smoking or taking up exercise. Although screening is repeatable, its infrequent nature means that maintenance of the behaviour is not relevant. Undergoing screening is a unique and interesting activity to study as the potential outcome of the behaviour is discovering bad news, unlike other behaviours which individuals may find enjoyable. These various differences may affect the type and relative influence of beliefs on behaviour (e.g. van Ryn *et al*, 1996).

However, screening itself is not an homogeneous behaviour (e.g. Marteau, 1993). Screening for the purposes of this thesis is defined as an activity where the individual is dependent on a health professional to carry out the examination or test and to make a diagnosis from the result. In particular, the review concentrates on a particular type of screening - population screening for cancer. Population screening for cancer includes screening for breast cancer using an x-ray i.e. a mammogram and by clinical breast examination; for prostate cancer by digital rectal examination; for adenoma-carcinoma of the bowel by flexible sigmoidoscopy; and for cervical abnormalities or cervical cancer by use of the cervical smear test. All these screening tests, by their nature, involve screening for a serious disease and also require intimate examinations. This makes comparison reasonable as factors affecting uptake of one test may be relevant to the understanding and prediction of uptake of another.

Screening which relies on self-examination and detection of a potential problem does not come into the scope of the review, as both the test and 'diagnosis' are carried out by the individual themselves in the first instance. There may of course be some overlap in the cognitions that underlie the performance of such behaviours and uptake of population based screening.

Some screening is carried out on pregnant women. This too will not be included in the following review as the screening undertaken during pregnancy for neural tube defects differs in important ways from population screening for cancer. Women are already 'in the system' unlike routine asymptomatic screening, particularly in a national programme where individuals are sent a letter inviting them to attend. In addition, screening in pregnancy is not offered in the same way as cancer screening. Screening in pregnancy can take two forms; one set of tests is to assess the health of the mother and the other is for screening for foetal abnormalities. Some tests for the mother are carried out routinely e.g. blood pressure measurement and urinalysis to detect pregnancy induced hypertension. Consent is often not obtained for these tests therefore screening is not being explicitly offered. Women are also screened for anaemia and antibodies in their blood (e.g. rhesus antibody) which may affect the baby and where consent is obtained.

Other types of screening in pregnancy are reserved for particular risk groups of women. Alpha Feto-Protein (AFP) screening is carried out for neural tube defects and Down's syndrome by way of a blood test. If there is a raised level of AFP in maternal serum or the mother is of advanced age (i.e. over 35 years old) amniocentesis is offered for screening for chromosomal abnormalities. This type of screening is therefore to assess the health of a person other than the individual undergoing the test, i.e. the unborn child. Additionally, the test *itself* carries a risk (i.e. miscarriage) unlike the tests used in population based cancer screening. Moreover, the implications of a positive result are different from the implications of a positive result on a cancer screening test. Treatment is not offered other than the 'treatment' afforded by a termination of the pregnancy and attitudes to this have been found to be important in influencing a decision to undergo screening (Marteau *et al*, 1992). Likewise, screening for infection with HIV is not included in this review and is similar in some respects to screening during pregnancy in that no curative treatment can be offered. Research in this area has mainly focused on the preventive role of safer sex practices and predictors of this behaviour.

A number of studies have examined attitudes to, and uptake of, genetic screening (e.g. Evers-Kiebooms *et al*, 1987 and 1989; Lerman *et al*, 1994 and 1995; Mohammed *et al*, 1994; Teltscher and Polgar, 1981). This screening can take a variety of forms, for example, carrier status screening where the individual is not currently affected but any children they have may be affected; or screening for late onset disorders with 100 per cent penetrance, e.g. Huntington's disease, where the individual is not affected now but if they are found to be carrying the gene they will definitely develop the disease; or screening for late onset disorders which do not have full penetrance, such as for genes which predispose women to develop breast and/or ovarian cancer i.e. BRCA1 or BRCA2 mutations. Genetic screening, then, aims to predict a (negative health) outcome in the future and not a current state. The implications of a positive result from a predictive test are more severe than for routine cancer screening as there is no treatment for many genetic disorders and currently no cure for any. In addition it is 'at risk' individuals who are screened rather than the general population, e.g. those with a family history of a disease or from a particular ethnic background. Individuals in this position may grow up with the expectation that they will undergo predictive testing later in their lives. Genetic screening has much wider implications for the individual's family and for family planning than population cancer screening. Therefore it is reasonable that uptake may be predicted by different cognitions from those predicting routine cancer screening.

For the purposes of reviewing the current literature, the papers originally describing the various social cognition models were firstly collated (Ajzen, 1991; Bandura, 1977; Becker, 1974; Becker and Rosenstock, 1987; Fishbein and Ajzen, 1975; Prochaska and DiClemente, 1983 and 1984; Prochaska *et al*, 1992; Rogers, 1975 and 1983; Schwarzer, 1992; Wallston *et al*, 1978; Weinstein, 1988). Following this computerised databases were searched: PsychInfo since 1984, Medline since 1977 and BIDS since 1981 for references to the Health Belief Model, The Theory of Reasoned Action, the Theory of

Planned Behavio(u)r, Protection Motivation Theory, Social Cognitive Theory, Social Learning Theory, Health Locus of Control, Precaution Adoption Process, Transtheoretical Model of Change and Subjective Expected Utility Theory. The resulting 4,587 references were linked to a number of key words to limit their number. These were screening, cancer, pap smear, cervical smear, uptake, participation, mammography, mammogram, colorectal, bowel, prostate and sigmoidoscopy.

A number of exclusions were made from the resulting references. The following types of studies were excluded; those which had children as the main participants and measures taken of their parents' beliefs; references to dissertations; and review papers without original data. This is in line with the method adopted by Harrison *et al* (1992) in their meta analysis of studies using the Health Belief Model (HBM). Studies which did not compare non-attenders and attenders were also excluded, for example Fallowfield *et al* (1990) where only reasons given by non-attenders for their behaviour were explored. Some studies of this nature were based on a social cognition model, e.g. Price *et al* (1993) applied the HBM to prostate screening. However, as no outcome measure was used, the result is that the study becomes purely descriptive and its explanatory power is lost. Studies using social cognition models to develop interventions rather than to predict behaviour were also excluded. Intervention studies include evaluations of (a) methods of increasing women's knowledge about the importance of screening (e.g. Reynolds *et al*, 1990); (b) strategies for inviting women to attend for screening (e.g. Taplin *et al*, 1994) and (c) methods of enhancing rates of doctors recommendations that women should be screened (e.g. Rimer *et al*, 1993). Such studies were excluded as they do not indicate which cognitions influence uptake in the absence of this intervention.

Studies to be included therefore met the following criteria:

- The study focused on factors influencing uptake of screening for cancer.
- The measures were guided by a social cognition model and at least one construct from a social cognition model was used to predict intentions or behaviour or both.

- A description of the psychometric properties of the measures used is given or the measures are described in sufficient detail.
- An outcome measure was included, i.e. past behaviour, reported intention to be screened or uptake of screening in a given time period.
- A comparison was made between individuals who attend for screening and those who do not, or comparisons are made between individuals reporting differing levels of intention to attend for screening.

No studies of uptake of prostate cancer screening or to having a flexible sigmoidoscopy screening to detect colon cancer which used a framework guided by a social cognition model were found. Some studies looked at adherence to faecal occult blood screening which is designed to detect colon cancer; however this is a self administered test (e.g. MacRrae *et al*, 1984). Cervical screening, the subject of this thesis, is arguably most comparable to breast screening as national screening programmes in the UK operate to detect both breast and cervical cancer, and the screening involves women undressing to reveal intimate parts of their bodies.

The focus of the review is on the literature concerning individual women's cognitions rather than on how the screening services are provided as screening is voluntary and ultimately it is the individual's choice as to whether or not they attend. Organisational problems affecting uptake of screening have, however, been frequently mentioned (see Elkind *et al*, 1988).

The psychological basis of the choice women make is of interest. Social cognition models allow factors influencing this choice to be explored. It is an important practical question as to why women refuse or accept the offer of a smear test and an important psychological question as to what is taken into account by women in reaching their decisions. Why and under what conditions do people take action?

The following section of this chapter discusses the psychological predictors of uptake of screening and outlines the theoretical models which have been particularly influential in informing this area and demonstrating the fundamental importance of psychological factors in understanding screening uptake. The similarity among the constructs in the models is highlighted. Section 3.3 appraises previous research which has used health behaviour models and identifies the deficiencies in this literature. Section 3.4 examines the social and demographic factors associated with screening participation and discusses how their influence on intentions and behaviour may be mediated by cognitions. An overview of study 1 of this thesis is given in Section 3.5, together with a summary of its hypotheses.

3.2. The role of social cognition models in explaining uptake of screening: discussion of theories

3.2.1. The Health Belief Model

The HBM (Becker, 1974; Becker and Rosenstock, 1987) is the most widely used model of health behaviour. It was developed by social psychologists in the Public Health Service in the United States in the 1950s and 1960s to explain why people do or do not take preventive health measures. It has been applied in a number of contexts including use of preventive screening; obtaining immunisations; compliance with medical regimens and response to illness symptoms. It utilises Kasl and Cobb's (1966) definition of preventive health behaviour:

> "any activity undertaken by a person believing himself [or herself] to be healthy, for the purpose of preventing disease or detecting it in an asymptomatic stage" (p.246).

Prior to the development of the HBM, investigations of preventive health behaviour examined who used preventive health services and then tried to extrapolate to why the services were used. Becker and his colleagues developed the HBM to investigate which beliefs would mediate the observed effects of social and demographic variables on health behaviour and which could therefore be the focus of health education, being potentially more amenable to change than static demographic characteristics.

The HBM is based on the social-psychological theory of Lewin (1935) and is phenomenological in nature, being concerned with the individual's subjective world. The basis for Lewin's theory is the abstract idea of an individual 'existing in a life space'. An individual's subjective world, it is suggested, consists of various 'areas', some positively valued, some negatively valued and some neutral. In the positive areas, such as those representing an individual's physical health, there is a desired goal object, for instance good health, and tension will be reduced for the individual 'existing' in this area. In the negative regions, there is no desired goal object and 'existing' in these areas will increase tension for the individual. Diseases, if they are represented in the individual's 'life space' at all, occupy regions of negative value. The negative regions are thought to exert a force moving the individual away from the area unless this causes the individual to enter an area of even greater negative value. Therefore, "one's daily activities were thus conceived of as a process of being pulled by positive forces and repelled by negative forces" (Rosenstock, 1974a, p.3).

The HBM was developed from Lewin's "goal setting in the level-of-aspiration situation". Level-of-aspiration refers to how difficult it is to achieve the goal for which the individual aims. Lewin argued that an individual chooses goals based on a consideration of how likely each is to lead to success or failure and how likely he or she is to succeed at each stage of attempting to achieve the goal. For example, he or she may choose to attend for a screening test to achieve good health – the goal. Lewin postulates that success which is improbable will not be chosen over probable success, although the improbable success is likely to be more highly valued. The value of any level is believed to be culturally, as well as personally, determined. So it is argued that an individual's behaviour is dependent upon her perceived value of an outcome, for example the desirability of good health, and her estimation of whether or not an action will lead to that outcome, for example the perceived efficacy of screening to ensure good health.

As diseases occupy areas of negative value, individuals will generally wish to avoid them and be motivated to preserve or attain good health. However, if, in order to avoid disease, an individual has to perform an action perceived to involve high personal cost and to be worse than the possibility of falling ill, she may not perform the action. Individuals will therefore consider the advantages and disadvantages of various health actions before performing them. This encompasses the main emphasis of the HBM. It is a value expectancy model, where the perceived value of an outcome and the expectation that a behaviour will lead to that outcome may exert an influence on an individual's behaviour.

The HBM is less abstract than Lewin's theory and in its original form includes four main elements: perceived susceptibility to a disease; perceived severity of a disease; perceived benefits of a preventive health action; and perceived costs of a preventive health action.

A point to note is that some behaviours may seem to be health-related but are not perceived as such by the individual, such as dieting. These behaviours are not expected to be predicted by the HBM which focuses on using individuals' beliefs about their risk of developing a disease and their attitudes towards a preventive health behaviour to explain and predict their uptake of this behaviour

In addition, people vary in how far they are interested in health and in how far they value their health and are motivated to look after it. The model is based on the premise that individuals are motivated to achieve and maintain good health (Becker and Rosenstock, 1987). Therefore if people are not motivated in this way their behaviour will not be so successfully predicted by the model. This 'health motivation' is sometimes used as an additional predictor variable in some formulations of the model and constructs from health locus of control theory have sometimes been used to measure it. From Rotter's social learning theory (1966) a health locus of control scale was developed to examine an individuals' general orientation about health as Rotter argued that expectancies about health could be general as well as specific. The distinction was made between internal and external locus of control. 'Internals' believe that they have personal control over health events whereas 'externals' believe that events are determined by factors other than their personal actions. The multidimensional health locus of control scale (MHLC) was developed in 1978 by Wallston and colleagues to distinguish between two types of externals: those believing that events are controlled by powerful others, e.g. doctors, and those believing that events are controlled by fate or chance. The theory predicts that 'internals' would engage in health promoting activities, but also that 'powerful others' externals may do so if the health behaviour is recommended by a doctor. Measures of general health value have also been used to explore the relationship between this value and behaviour. Health value may be relative (e.g. Rokeach, 1967) or absolute (e.g. Lau, Hartman and Ware 1986). If an individual has a high health value and a belief that health is controllable by themselves or others then they are more likely to carry out a preventive behaviour.

The HBM forms the framework for study 1 in this thesis. Its main elements are described below.

3.2.1.1 Perceived susceptibility to disease

This refers to an individual's estimation of how susceptible he or she is to a particular illness. If the individual feels that he or she is unlikely to contract the illness, then they will not take steps to prevent it. If, on the other hand he or she believes that they are likely to contract a disease then preventive action may be seen as advantageous. For example, a woman who has had only one partner and who mistakenly believes cervical cancer only affects 'promiscuous' women, may not perceive herself to be susceptible to cervical cancer and may not attend for a smear test. On the other hand, a woman who is overweight, and who mistakenly believes that this puts her at risk, may attend for the smear test. Thus, it is a woman's perception of her own susceptibility to the disease which is believed to lead to action. Of course, her perceived susceptibility may be consistent with her actual risk. For perceived susceptibility to have any effect on an individual's behaviour, the individual must believe *himself or herself* to be susceptible not just to believe people in general are susceptible to the disease. This construct has been operationalised in terms of perceived likelihoods, perceived probabilities and perceived possibilities of developing a disease. At the very least, it is necessary for individuals to have heard of the disease in order to assess their susceptibility to it. Unrealistic optimism has been identified as a phenomenon (Weinstein, 1982). This is where, on average, people judge themselves to be less at risk of developing a disease than other people. In some cases this may affect the ability of this element of the model to distinguish between people who will take action and those who will not.

3.2.1.2 Perceived severity of disease

This refers to the perceived severity of the disease in terms of its physical, personal and social consequences such as pain experienced, effects on perceptions of self and how others perceive the individual. Again it is the individual's perceptions which are considered to be important. So if he or she does not consider the illness to be very severe, even if he or she believes that they are highly susceptible, action may not be taken. If the consequences of the illness are seen as severe then there is a greater chance that he or she will take preventive action. For example, a woman may feel she is at high risk of developing cervical cancer but may believe it is not fatal if left untreated and so does not attend for a smear test. Alternatively, she may feel susceptible to cervical cancer and view it as a severe illness and consequently attend for her smear test. Perceived social consequences are considered to be as important as the perceived physical consequences of a disease. For example, a woman may believe cervical cancer is very severe because, if she contracted it, she would be stigmatised as 'promiscuous'. Therefore, she may be more likely to attend for screening. Perceived severity, like perceived susceptibility, is partly dependent on awareness of the disease.

According to the HBM, when perceived susceptibility and perceived severity are both high the individual may be motivated to take a preventive health action. There have been recent developments in the conceptualisation of these elements. For example, Ronis (1992) suggests that items to measure these should be dependent on behaviour and phrased in terms of susceptibility/severity if the individual does or does not take the action. A feeling of high susceptibility with inaction would be motivating whereas a high susceptibility even with action would not be likely to increase the chances of an individual acting. It has also been argued that perceptions of susceptibility and severity are making obsolete assumptions about the effect of fear appeals on behaviour (Schwarzer, 1992) and that these perceptions should be considered as more distal predictors of behaviour via their effect on other cognitions - for example perceived costs and benefits of action, to be discussed below. It is argued that for people who have already undergone the behaviour these perceptions of threat may not be important. Indeed, Schwarzer (1992) argues that the link between threat perceptions and intentions to perform a behaviour are negligible if expectancies are already established. However, screening is a relatively infrequent behaviour so it would seem reasonable to assume that a perception of threat may be necessary each time and almost certainly for people who have not performed the behaviour in the past. Perceptions of susceptibility and severity alone are insufficient for the individual to decide which course of action to undertake. The HBM states that this decision is also determined by a costs and benefits assessment. The particular costs and benefits which are pertinent depends on the behaviour in question.

3.2.1.3 Perceived benefits

According to the HBM, the perceived benefits of a particular preventive action motivate the individual to act. The benefits of engaging in the behaviour can include both medical and psychosocial benefits. Concerning medical benefits a belief that the test in question would be effective in detecting any sign of disease may influence an individual's behaviour. In addition, attitudes about the likelihood attending for screening leading to early treatment may also be important in motivating an individual to attend for screening as would be a belief that early treatment would lead to an improved prognosis. However, in combination with these type of benefits, beliefs about psychological benefits can also be important. An individual may feel that attendance for screening would be reassuring and offer peace of mind and that the prospect of feeling this would be motivation enough to attend for screening. Of course, the relative importance of these different types of benefits will vary between individuals and between screening tests. It is possible that fluctuations in these attitudes towards screening may also occur in response to the sporadic 'scare stories' which appear in the media where errors in the interpretation of screening tests are exposed.

3.2.1.4 Perceived costs

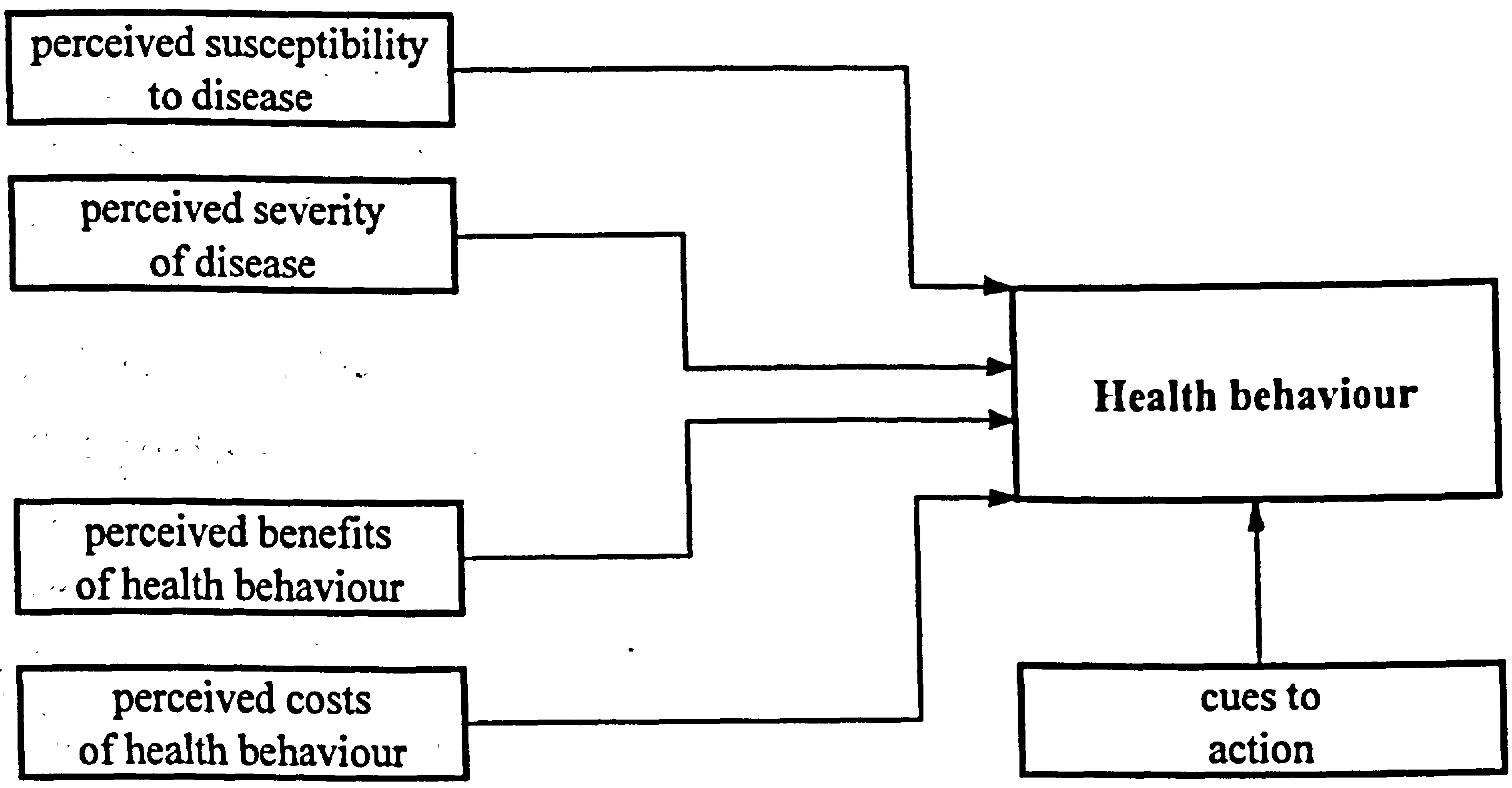
Perceived costs of the preventive health behaviour seem to fall into two categories: psychological costs, such as the fear and embarrassment associated with screening, and practical costs to the behaviour such as the inconvenience of screening and its interference with an individual's other responsibilities. In most applications of the HBM both types of costs are assessed, although it is possible that for different behaviours one type may be more important than the other (some researchers refer to the costs of a behaviour as 'barriers', but essentially the same concept is measured). The perceived costs of a behaviour, i.e. potential reasons for not carrying it out, would be taken into account when forming an intention to perform a behaviour. In addition to beliefs about the negative consequences of the behaviour costs can also include beliefs about one's ability to carry out the behaviour. In 1988 Becker and Rosenstock reinterpreted the costs element of the HBM to include self efficacy which was gaining increasing importance as a variable predictive of health behaviour. This construct is discussed in more detail below.

3.2.1.5 Cues to action

Cues to action are usually necessary for a preventive health behaviour to occur. Cues can be internal, such as an individual's perception of her bodily states, for example an unusual pain, or they can be external, such as mass media campaigns or personal invitations to attend for screening, or the experience of others suffering from the illness. According to the HBM the 'level' of cue required varies with an individual's 'level of readiness'. Readiness refers to an individual's consideration of her susceptibility to the disease, the perceived severity of it and the costs and benefits of taking preventive health action. So a state of high readiness would exist when an individual feels very susceptible to a disease, considers it to be very severe and feels that the benefits of taking a preventive health action outweigh the costs. In this state, a mild cue, for example the sight of an advertisement in a magazine for a screening test, may be sufficient to prompt an individual to attend for screening.

Original formulations of the HBM do not specify how the above variables may interact to influence health behaviour, or how much influence each element would have on the dependent variable (although multiple regression techniques can show for a particular data set which element has more weight in affecting behaviour). Indeed, Jonas (1993) did not find evidence for a multiplicative model and argues that people cannot perform the trade offs this requires, such as weighing costs against benefits. However, as Sutton (1987) points out, the model represents an 'as if' situation whereby it is not suggested that people really do this but behave 'as if' they do. Indeed it would seem that to actually subtract the perceived costs of an action from its perceived benefits is not valid as to do this confounds the two and they are arguably too complex, involving too many aspects, to be transformed into one value. Due to the problem with combining variables it has been argued that the HBM is more a collection of variables than a systematic theory but, perhaps due to its simple outline, it has been widely used to predict health behaviour (see figure 3.2.1 for a diagrammatic representation of the model).

Figure 3.2.1 Diagrammatic representation of the Health Belief Model



3.2.2. Protection Motivation Theory

Protection Motivation Theory (PMT) was developed by Rogers (1975) in an attempt to understand the basis of the fear appeals which were used in health promotion and which had been developed based on the theories of Hovland *et al* (1953) and Leventhal (1970). This theory includes similar elements to the HBM but instead of being concerned with predicting behaviour it is more oriented towards changing maladaptive behaviour. Individuals are given a message pointing out the negative consequences of a behaviour or the risk of developing a disease and proposing a course of action which would involve attitude and behaviour change and which may avert the danger. In 1983, Rogers revised the theory making it a more general theory of persuasive communication. Protection motivation is central to the theory and is postulated to be determined by two processes: threat appraisal and coping appraisal. Indeed, Rogers argues that emotional arousal itself i.e. fear, has no direct link to protection motivation. This was also suggested by Schwarzer (1992) in connection with perceptions of susceptibility and severity and the HBM as mentioned above. Protection motivation can be measured by a behavioural intention to perform a maladaptive or adaptive behaviour.

Threat appraisal involves a consideration of the severity of the health threat and a perception of personal vulnerability to it and these are argued to inhibit the chances of a maladaptive response - for example not attending for screening or continuing to smoke - which may have intrinsic and extrinsic rewards for the individual. Coping appraisal involves a consideration of whether or not the health action is an effective means of alleviating the threat; this is known as response efficacy. The costs of the adaptive response limit the chances of the adaptive response being carried out. The model also includes a consideration by the individual of whether he or she will be able to carry out the adaptive response (e.g. the screening) - this is their perceived self efficacy. The concept of self efficacy comes from Bandura's social cognitive theory (Bandura, 1977), where he postulates that people's perceptions of their capabilities affect their behaviour. Individuals who have high self efficacy are more likely to attempt behaviours. Self efficacy is specific to the behaviour in question and not a generalised expectancy.

PMT suggests that together the results of the threat appraisal and the coping appraisal lead to a protection motivation, which is, as mentioned above, best assessed by an intention to behave in a certain way (Prentice-Dunn and Rogers, 1986). It is not clear, however, how these two perceptions should be combined to predict protection motivation. Rogers (1983) argued that the main effects of vulnerability, severity, response efficacy and self efficacy in the model combine in an additive way, after the original multiplicative rule for vulnerability, severity and efficacy (Rogers, 1975) failed to receive empirical support. Sutton (1982) suggests that the failure may be because perceptions of vulnerability and response efficacy are not independent. So Rogers would suggest that protection motivation is a linear function of beliefs that the threat is severe, of personal vulnerability, that one can perform the coping response and that the response is effective. It is a negative linear function of the reinforcements associated with the maladaptive response and of the response costs. Weinstein (1993) suggests that it is the difference between threat and coping appraisal that should be considered and Schwarzer (1992) suggests that the model is essentially untestable using these two appraisal processes and that empirical applications have had to simplify it.

Although PMT was originally developed to explain fear appeals the sources of information which initiate the threat/coping appraisals can be numerous including fear appeals, prior experience with similar threats and experiences of others. PMT has been operationalised by attempting to manipulate cognitions to influence behaviour, usually by providing individuals with different types of information which stress the dangers of a failure to adopt a recommended health action. Rippetoe and Rogers (1987), for example, manipulated the threat component in relation to breast cancer by showing graphic photographs of a cancerous breast in the high threat condition and a photograph of a young woman's healthy breasts in the low threat condition.

3.2.3. Theory of Reasoned Action/Theory of Planned Behaviour

The Theory of Reasoned Action (TRA) was devised by Fishbein and Ajzen in 1975 to explain social behaviour and not exclusively health behaviour. It is very much focused on behaviour, and not on perceptions of diseases as the HBM and PMT are. The TRA postulates that the proximal determinant of a behaviour is an intention to perform it; an element not explicitly included in the HBM. In turn, intentions are determined by two sets of variables - one set to do with the individual - attitudes to behaviour - and the other to do with the individual's social environment - subjective norms. It is important when employing the theory that the measures used are consistent in terms of target, action, time frame and situation in order to achieve the best prediction of intentions and behaviour. The attitude to the behaviour in question may be positive or negative, e.g. that having a smear test is beneficial or having a test is foolish. Subjective norms involve perceptions of how other people in the individuals' world think the individual should behave in relation to the particular behaviour in question (injunctive social norm) and can also include how these other people behave themselves (descriptive social norm). For example, people who are close to the woman think she should attend for a smear test, and that women the individual knows attend for smear tests. It has recently been suggested (e.g. Conner *et al*, 1996) that norms could be extended to include representative social norms, e.g. a pop star or media figure, although this would appear to be extending the list of possible referents rather than extending the types of social norm. This addition is perhaps particularly relevant for research involving adolescents (who are arguably more susceptible to the influence of 'idols') and also to a 'visible' behaviour like dieting, smoking etc.

The two constructs - attitudes and norms - are believed to be determined respectively by behavioural beliefs and normative beliefs. The proximal determinant of an attitude to a behaviour is argued to be a combination of the judged likelihood of the salient consequences of the behaviour and the value the individual places on these consequences. For example, a belief that a smear test would detect a cervical abnormality early and that detecting a cervical abnormality early would be good. Each likelihood is multiplied by each value and summed to give the behavioural belief score. The emphasis here is on the saliency of the beliefs, for although an individual may possess many beliefs about a behaviour, only a few will be salient at any one time and it is the salient beliefs which are argued to determine the person's attitude. The determinants of the subjective norm are firstly the beliefs that individuals' salient referents (people whose opinions are relevant in the particular behavioural context), think the women should behave in a certain way and secondly the womens' motivation to comply with these people. For each referent the belief is multiplied by a motivation to comply and then summed to form normative beliefs.

Ajzen and Fishbein argue that this model is 'sufficient' to explain behaviour and that any influence on behaviour of individual differences such as social class, age etc. will be mediated by the elements in the model. For example, individuals in the lower social classes may not attend for screening because they have a more negative view of screening, so the social class variable would be shown to be related to attitudes towards behaviour. The theory has been criticised for leaving out any explicit mention of threat, emotions, and affect, such as the perceptions of threat included in the HBM. However, this omission is not surprising as the theory was not specifically developed for looking at health behaviour. In addition, it is arguable that threat could be represented in the model through the behavioural beliefs in terms of the likelihood of an outcome representing susceptibility and the evaluation of this outcome representing its severity. For example, 'if I do not have a smear test I will develop cervical cancer (likely - unlikely)', 'developing cervical cancer would be (good - bad)'.

In 1986 Ajzen and Madden expanded the TRA by adding an additional element of perceived behavioural control. The most recent version of the revised theory, known as the Theory of Planned Behaviour (TPB), appeared in 1991 and resulted from the observation that the TRA was only applicable to behaviours over which the individual had volitional control. Some behaviours were not completely under the control of the individual and therefore would not be well predicted by the model. The perceived behavioural control element took account of differences in abilities, skills, access to resources, confidence etc. between individuals. It is derived from Rotter's 1966 theory of perceptions of control, from Bandura's (1977) self efficacy theory and from the facilitating and inhibiting factors of Triandis's model of choice (1977)[1]. Ajzen uses control to mean both internal and external constraints. However, it certainly seems possible that these may not be the same and therefore would not form one construct. Internal constraints seem closer to perceptions of self efficacy and perceived costs of behaviour which may be anticipated obstacles affecting the formation of intentions, whereas external constraints are perhaps more likely to be factors which may potentially prevent a person from translating their intention into action. Indeed, Terry and O'Leary

[1] Triandis' theory is conceptually very similar to the TPB including intentions, consequences (attitudes towards the behaviour), and social influences. However, it also includes an explicit measure of habit and argues that intention decreases as habit increases.

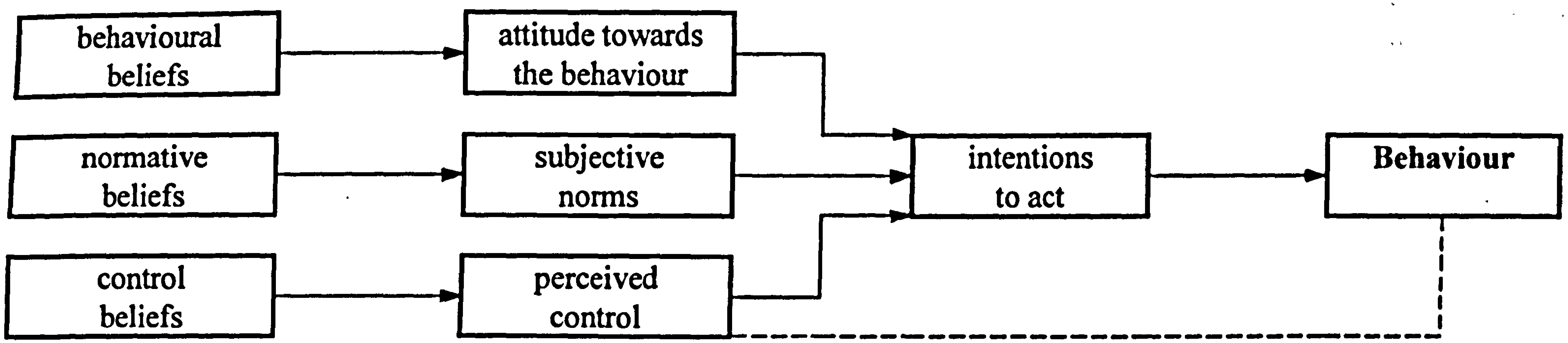
(1995) found that although perceived behavioural control (using only external control items) and self efficacy were correlated, they performed as independent constructs in a predictive model of intentions to use condoms. The possibility that the constructs are distinct is explored in study 2 of this thesis. The addition of the element of perceived behavioural control to the theory has been found in several studies to add to the prediction of behaviour (e.g. Ajzen and Driver, 1992; Beale and Manstead, 1991) although, notably, these are not applications of the theory to preventive health behaviour.

Perceived behavioural control was argued to be an additional proximal determinant of intentions whereby individuals would only intend to perform behaviours which they felt they had a reasonable chance of successfully carrying out. In circumstances where behaviour is not under volitional control and where the perceived control is a realistic perception of actual control over a behaviour the element is postulated to directly predict behaviour and not to be mediated by intentions (Ajzen and Madden, 1986). However, actual control is difficult to measure as external factors preventing behaviour occurring may be unanticipated and the absence of personal skills etc. may not be evident until after the person has tried to carry out the behaviour (Terry and O'Leary, 1995). Therefore actual control and perceived control are likely to be the same only in circumstances where the behaviour is not new to the individual.

Perceived behavioural control is measured by an overall assessment of control over a behaviour and a series of control beliefs where individuals judge the likely existence of relevant facilitating and inhibiting conditions and how far these would effect the likelihood of them carrying out a behaviour. These control beliefs are multiplied and then summed.

The TPB is applied to uptake of cervical screening in study 2 of this thesis. Figure 3.2.2 gives a diagrammatic representation of the theory.

Figure 3.2.2 Diagrammatic representation of the Theory of Planned Behaviour



3.2.4. Social cognitive theory and stage theories

Social cognitive theory was developed by Bandura (1977) and expanded on by Schwarzer (1992). It includes three elements which are postulated to be important in health decisions. Situation outcome expectancies are perceptions of what will happen without any input from the individual; action outcome expectancies are perceptions of the results of individual action and perceived self efficacy, as already discussed, is a belief in being able to perform an action to reach a desired outcome. Social cognitive theory argues that people would, for example, attend for screening if they believe that ill health will come from their current behaviour and that behaviour change will reduce the threat, and also that they are personally capable of adopting the (new) behaviour. This theory, then, is very much framed in terms of a detrimental behaviour such as smoking and a belief that stopping would be a good thing and that this would be possible. Therefore it is arguably not so readily applicable to screening behaviour.

Outcome expectancies and self efficacy are believed to lead to an intention formation and then to behaviour, (or an attempt to perform the behaviour - which will not always be successful). In 1992 Schwarzer extended the static social cognitive theory into a more dynamic model, the Health Action Process Approach (HAPA). The HAPA divides the adoption of a health behaviour into two phases: a motivational phase, where intentions are formed, and a volitional phase where planning to carry out the behaviour occurs. He suggests that outcome expectancies are important for forming an intention but that they are less important for carrying out the behaviour; whereas self efficacy is important at both stages. Self efficacy may be particularly pertinent in studies of self-initiated behaviours.

In contrast to other social cognition theories which do not specify the relative importance of their elements for predicting behaviour, Schwarzer specifies that outcome expectancies are important for intention formation regarding novel behaviour and that self efficacy is more important when the individual has experience of the behaviour and consequently some evidence on which to base their perceptions of self efficacy. The HAPA also extends outcome expectancies to include a particular class of these - social outcome expectancies. Essentially these are the subjective norms and normative beliefs of the TRA/TPB.

The HAPA is therefore a form of stage theory, involving the concept of individuals progressing towards a behaviour with different cognitions influencing their decision at different stages. Other examples of stage theories are the Precaution Adoption Process of Weinstein (1988) and the Transtheoretical model of change devised by Prochaska and DiClemente (1983, 1984) and Prochaska *et al* (1992). These theories essentially include the same cognitions as those theories discussed above, for example vulnerability and outcome expectancies, but in addition they incorporate a number of stages into the health decision. Individuals may be in pre-contemplation when they are not carrying out the behaviour and do not intend to start; in contemplation when they are thinking about acting in a given time period; in preparation when they are taking the first basic steps to change behaviour; in action where behaviour change has been initiated; and in maintenance where there is sustained change showing a long term commitment. As can be seen from these descriptions of the stages, they are focused mainly on behaviour *change*. In fact, Prochaska and DiClemente first developed their theory in a clinical setting to explain stages in smoking cessation and the Precaution Adoption Process has tended to focus on the adoption of new behaviours or behaviour which involves lifestyle changes, for example, dietary changes (see Weinstein and Sandman, 1992 for a review). The theory is arguably particularly applicable to novel behaviours or behaviours which involve a number of actions for successful completion. Attending for screening is a discrete event carried out every few years and therefore is not so readily applied to such theories (although see Rakowksi *et al*, 1992; 1993; 1996, who discuss considerations for extending the Transtheoretical model to uptake of screening mammography). Stage models have met with little empirical support, as it has been observed that people very rarely progress through the stages in order (see Sutton, 1996 for criticisms of such models).

3.2.5 Past behaviour

In addition to the social cognitions discussed above, past behaviour can be seen as an important construct. The role of past behaviour on future behaviour has been of central concern in applications of the TPB but only a few studies have examined this and its relationship to the constructs in the model using other social cognition models such as the HBM and PMT.

The idea that past behaviour should be included in research as an independent, additional predictor of future behaviour has been suggested (Bentler and Speckhart 1979; Fredericks and Dossett, 1983). Bentler and Speckhart (1979) found that for alcohol and drug users their past behaviour had an independent effect on their future behaviour over their intentions. Other research has also shown that when a behaviour is not new to an individual past behaviour may drive the future behaviour (Sutton, 1994). However, this direct influence of past behaviour on future behaviour would be affected by the type of behaviour under study. Some behaviour is habitual or routine where conscious deliberation about whether or not to carry it out may be minimal and performing the behaviour is instead automatic. If a direct effect on future behaviour of past behaviour is observed then this may, therefore, be the result of habit: novel behaviours being governed by intentions whereas repeated behaviours are governed by habit. Habitual behaviour is not seen to require the mediation of social cognition variables.

Having no experience with the behaviour has also been found to be an important influence on future behaviour. Sutton (1994) suggests that an appropriate term for this type of 'habit' is inertia - not doing something and continuing not to do it - as habit would imply the presence of behaviour. For example, many women who refuse to attend for a smear test have never had one (e.g. Standing and Mercer, 1984; Vuori *et al*, 1972).

Other than the role of habit a small direct influence on behaviour unmediated by intentions may also be the result of common method variance between measures of past and future behaviour (Ajzen, 1991).

However, screening attendance is cyclical, sporadic and infrequent and past behaviour of this nature may have a different effect from habitual behaviour on future behaviour. In this case past behaviour may be seen as a variable which is mediated by attitudes in that, for example, attending for screening may lead to a positive attitude to screening which in turn would be related to an intention to be screened which would predict actual behaviour. This way of looking at past behaviour is suggested by Ajzen (1988) and in the HBM stemming from the assertion that the elements specified in these models are sufficient to explain behaviour. It has been argued that systematic processing of information is likely to occur in novel situations (and, arguably, infrequent situations) which lead to thoughtful and effortful processing of information whereas if behaviour has been carried out before simplified decision making rules may be used which would not involve social cognitions (e.g. Ronis *et al*, 1989). It is also possible that with this type of cyclical or periodic behaviour that a negative behaviour - behaviour relationship may show. This is because if the behaviour has been carried out very recently it is less likely to be done again. Therefore in order to make sense of data it is necessary to ensure that people are due to be screened.

Prior experience with behaviour is thought to be an 'enabling factor' in the HBM. There may, however, be an interaction between the quality of the previous experience and uptake, in that past attendance at screening would lead to future attendance - but only if the previous experience was positive (e.g. Jepson and Rimer, 1993). Bandura's Social Learning Theory (1986) would suggest that experience with a novel behaviour would be an important determinant of repetition of the behaviour. So for women who had only been screened on one occasion the quality of this experience would be important for determining their future intentions.

Recently (e.g. Marteau, 1993; Norman and Conner, 1996) it has been argued that past behaviour may also be viewed as a 'moderator variable', moderating the relationship between social cognitions and behaviour. It is plausible to imagine that the predictors of behaviour for women who have previously been screened may be different from those which predict the behaviour of women who have never been screened. Marteau (1993) suggests that screening is not an homogeneous behaviour but rather a group of behaviours each with its own predictor variables. Indeed, Jepson and Rimer (1993) found that beliefs accounted for considerably more variance in the intentions of women who had never had a mammogram compared with women who had.

3.2.6 Comparison of theoretical perspectives

As can be seen from the above descriptions of the main social cognition models there is considerable overlap among them in the components they include, indicating a consensus as to which factors are important in decision making. This has been noted amongst others by Sutton (1987) and Weinstein (1993).

The models all make an assumption of sufficiency in that demographic, social and structural influences on intentions and behaviour are all external to the main part of the models. In the HBM these variables are included as modifying factors influencing perceptions of susceptibility, severity, benefits and costs. In PMT the variables are believed to influence behaviour indirectly via their influence on coping or threat appraisal and in the TRA/TPB the variables are considered to be more distal predictors of behaviour, and all mediated by cognitions.

The HBM and PMT were developed specifically to predict health behaviour whereas the TRA/TPB is more general. However, the driving force behind the models is the same: that anticipation of negative (health) outcomes and the wish to avoid these outcomes is a motivation to (intend to) act for self protection. There is also the assumption in the models that people are rational decision makers.

Perceptions of the threat posed by a disease is included in the HBM (susceptibility and severity), PMT (severity and vulnerability) and SCT (situation outcome expectancies). It may arguably also be represented in the TRA/TPB if looked at indirectly via the likelihood/evaluation of behavioural beliefs. The models all examine the perceived consequences of behaviour. Beliefs about the advantages and disadvantages of individuals' acting are included in the HBM (benefits and costs), PMT (response efficacy, costs and advantages of maladaptive behaviour), SCT (positive and negative action outcome expectancies), and TRA/TPB (behavioural beliefs and control beliefs). Self efficacy beliefs are arguably included in the TPB in the form of perceived behavioural control and in SCT and PMT explicitly. The HBM elements of costs could also be conceptualised to include elements of this concept, e.g. 'having a smear test is difficult for me'. The role of others in influencing intentions and behaviour (i.e. normative beliefs) is explicit in the TRA/TPB and SCT. It is also included in the HBM, although external to the main components of the model and conceptualised instead as a cue to action.

An intervening stage between cognitions and behaviour is included in PMT (protection motivation), TRA/TPB (behavioural intentions) and SCT (intention formation). For the HBM intention to comply (with a recommended health action) is hypothesised to be a motivational factor which is influenced by demographic and social factors and not as a direct predictor of behaviour (Becker and Maiman, 1975). Intentions tend to be better predicted than actual behaviour and the social cognition models stop at the intention to act (if this included) without specifying how intentions will be translated into actions. The HAPA goes some way to shifting the focus from motivational to volitional processes, but on the whole the models do not account for the gap between intentions and behaviour. This issue is particularly pertinent for behaviours which require sustained effort, e.g. taking up exercise, giving up smoking. Gollwitzer (1993) has devised implementation intentions and Bagozzi and Warshaw (1990) have developed the theory of trying to explore the gap and explain how intentions may be sustained and implemented, in order to achieve behaviour.

Combinational rules for the model elements are explicit in the TRA/TPB where the rules are multiplicative and in the PMT where they are additive. However, with the HBM there is no consensus. All the theories can be assessed using questionnaire measures. Multi-item scales should be used to increase the reliability of the measures and reduce the chance of random errors. The principle of correspondence should not be violated, i.e. similar words should be used to measure each element and refer exactly to the same behaviour. Attitudes and behaviour should both be assessed at the same level of generality or specificity in terms of action, target, context and time as general measures of specific behaviours lead to weaker predictions (see Ajzen and Timko, 1986 for a review). In addition, single instances of behaviour are determined by a unique set of factors and are therefore unreliable measures of behavioural tendencies (Epstein, 1979). This is perhaps a more pertinent point with frequent behaviour such as exercise whereas screening for cancer is fairly infrequent occurrence and therefore the use of multiple indicators becomes impractical. However, past behaviour can be examined in order to give an indication of a behavioural tendency.

The application of some of these models to uptake of screening is explored in the following section.

3.3 Empirical investigations of uptake of screening

3.3.1 Introduction

Studies which have examined screening uptake using some of the theoretical frameworks described in the previous section are described below. Health beliefs sometimes only account for a small amount of variance in behaviour but generally fare better in predicting behaviour than demographic factors (which are described below in section 3.4). The studies which are included below have operationalised at least some constructs of the models and given details of the reliability of the measures they have used. Some studies, although stating that they apply a theory to the prediction or explanation of behaviour, have employed inadequate measures (e.g. Fulton *et al*, 1991), and their results concerning social cognition variables are not reported here. However, these studies are included in later sections of the review if they are informative in terms of other factors which may influence behaviour.

As the following review will show, there are very few studies about uptake of cervical screening which based their research design or the interpretation of their findings on a social cognition model (only Hill *et al*, 1985; Hennig and Knowles, 1990; Murray and McMillan, 1993; Orbell *et al*, 1996; Peters *et al*, 1989) and few of these use multivariate statistics to explore their data. Most of the studies in this area are simply community surveys with self reports of behaviour, and are mainly retrospective. None aims to predict actual behaviour, being either retrospective or only reporting intentions as an outcome measure.

In fact, studies examining breast screening uptake tend to dominate the literature. As there are so few studies on cervical screening uptake, the review of important predictive variables concentrates mainly on breast screening which has been very well researched and which is arguably a comparable behaviour.

So, as stated, both retrospective and prospective methods have been used to examine uptake of screening. Retrospective studies have measured the participants' health beliefs and behaviour (past or current health behaviour) concurrently. However, this assumes that the beliefs pre-dated the behaviour that they are supposed to predict. In fact, taking part in screening could, in itself, alter an individual's opinions of that behaviour, particularly if the behaviour was new to the individual. So behaviour may instead produce beliefs, for example by leading to a more positive attitude towards it, or a decreased feeling of susceptibility to disease. Interpretation of retrospective studies is not straightforward. For example, in the case of perceived susceptibility, a high score may be associated with uptake but equally a low score could be associated with uptake if an individual attended for screening because they felt susceptible to a disease but having been screened they no longer feel susceptible. This would probably be affected by the time which had elapsed between behaviour and the assessment of beliefs where measures taken just after the behaviour may show this effect but after some time susceptibility may increase again as the feeling of protection afforded by the test reduces.

Prospective studies collect data about beliefs and then examine subsequent behaviour. This allows more confident conclusions to be drawn concerning the relationship between cognitions, demographic variables, intentions and behaviour to be traced. Prospective studies are necessary in order to infer causality.

However, even prospective studies can be flawed as the behaviour may have been carried out in the past and therefore beliefs may have been modified. As most behaviour of interest to health psychologists will not be novel the effect of past behaviour should be controlled for (Calnan, 1984). Indeed, determinants of regular use of screening are of interest as it is regular use of screening which helps to reduce the incidence of disease. In addition, if past behaviour is taken into account, exploring the factors associated with patterns of behaviour is more readily accomplished as the number of times screening has been undergone and the recency of screening can be assessed and related to cognitions. Many studies, however, do not explore the relationship between past and future behaviour.

A prospective study using behaviour as an outcome measure may only explain why people do or do not attend on a particular occasion. Therefore, some studies have focused on attempts to predict repeat use of a screening test. The reasons for attendance on a particular occasion can be quite idiosyncratic and therefore it is advisable to explore multiple chances of attendance, although as mentioned above, with infrequent behaviour such as cancer screening this becomes impractical. Increasingly there is a belief that predictors of multiple attendance at screening may be different from predictors of first time or once only screening (e.g. Jepson and Rimer, 1993). This type of analysis is more readily carried out with uptake of breast screening as this has been available for a shorter time than cervical screening and therefore women can be followed up from the time they become eligible for screening to explore what predicts their behaviour over subsequent opportunities.

A problem with comparing the results from studies is that they vary in terms of the population they examine, the method they use for recruiting participants, the method of invitation to screening and the measures used to assess health beliefs. A few exceptions to this last point are Hill *et al* (1985) and Hennig and Knowles (1990) who use identical measures, and the widespread use of items developed by Stillman (1977) and Champion (1984). Postal questionnaires have been the main method of data collection but telephone interviews and face to face interviews have also been used. Few studies have employed more than one method. An exception to this is Sutton *et al*, (1994) who found broadly similar results using an interview or questionnaire method to collect data.

Response rates to participating in these studies tend to be higher for individuals who attended for screening than those who did not. Missing data of this nature can be a problem as it impedes the chances of obtaining a representative sample of non-attenders. Respondents have been divided into different sub-groups on the basis of their screening status for the purposes of analysing predictors of behaviour e.g. whether they have ever been screened, or screened on a particular occasion, or a particular number of times, or during a particular period of time, or at their own request rather than in response to an invitation.

Finally, a number of studies using social cognition models to explain and predict uptake of screening have used some or all measures which only included a single item to assess a health belief (e.g. Hennig and Knowles, 1990; Hill *et al*, 1985). Such measures are likely to be unreliable as using a single item increases the chance of random measurement error, as mentioned above, where chance factors have influenced the response given (Singleton *et al*, 1993). Other studies (e.g. King, 1987) have used multi-item scales to assess health beliefs but do not report whether or not these were found to be reliable measures of the health beliefs. However, a composite measure containing more items will normally be more reliable than a composite measure having fewer. This is because random errors deviate on each side of the 'true' value so with more items such errors will tend to cancel one another out. Some studies of this nature are included in this review.

If reliable measures are not used this reduces the likelihood of identifying a significant relationship between social cognitions and uptake of screening as the measure does not have consistency and dependability. An additional problem is that an unreliable measure cannot be valid (i.e. measure what it is intended to measure). Furthermore, the use of measures with unestablished reliability reduces the certainty with which it can be concluded that any significant findings show a genuine difference between the beliefs of individuals who attend for screening and those who do not, rather than being the result of random measurement error.

Studies which have explored the role of cognitions in uptake of population screening for cancer are discussed below. The use of reliable measures, multi-item scales, and multivariate statistics was used to give weight to the findings of some studies over others in this review. The discussion has been divided into the role of perceptions of threat and perceptions of the efficacy of screening, social influences, cues to action and past behaviour. Table 3.3.1 summarises the research. Much of the research on population screening for cancer, where a particular theoretical background has been used, has been based upon the principles of the Health Belief Model with some studies using elements of the Theory of Reasoned Action/Planned Behaviour or Protection Motivation Theory.

Table 3.3.1 Alphabetical list of studies which have applied social cognition models to the prediction and explanation of uptake of screening for cancer

Author & Date	Theory/ Model	Type of behaviour	Design - Measure	Sample details
Aiken *et al* (1994a)	HBM	Mammogram within ACS guidelines	Retrospective - questionnaire	615 (response rate not given)
Beaulieu *et al* (1996)	HBM	Mammogram within 2 months of opportunistic invitation	Retrospective - telephone interview	149/171 (87%)
Boer *et al* (1993)	PMT	Mammogram in national programme	Prospective - questionnaire	261/386 (68%) all women had had at least one mammogram
Calnan (1984)	HBM	Mammogram in national programme	Prospective - interview	654/854 (77%)
Champion (1992)	HBM, TRA (norms)	Age appropriate number of mammograms in past 5 years	Retrospective and intentions - questionnaire (only retrospective data reported)	322/757 (43%)
Champion (1994)	HBM, TRA	Age appropriate number of mammograms in past 5 years and in last year	Retrospective - interviews	581/1404 (41%). The 1404 had expressed an interest
Fischera & Frank (1994)	HBM	Mammogram within guidelines defined by the ACS	Retrospective - questionnaire	145/220 (66%). All nurses
Friedman *et al* (1995)	HBM	Annual mammogram and clinical breast examination	Retrospective and intentions - questionnaire	312/493 (63%) hospital employees who were eligible for worksite screening
Hennig & Knowles (1990)	HBM, TRA	Cervical screening	Intentions - questionnaire	144 (response rate not given)
Hill *et al* (1985)	HBM, TRA	Cervical screening, BSE (results not reported)	Intentions - questionnaire	123 volunteers
Hyman *et al* (1994)	HBM	Mammogram among women who had been referred	Prospective - questionnaire	82 (response rate not given)
Jepson & Rimer (1993)	HBM, TRA	Mammogram	Intentions - questionnaire	151 prior screenees 222 prior non screenees (response rate not given)
King (1987)	HBM	Cervical screening	Prospective - interview	62/117 (53%)
Mandleblatt *et al* (1992)	HBM	Mammogram or smear test ever	Retrospective - questionnaire	445/647 (68%)
Mandleblatt *et al* (1993)	HBM	Mammogram and cervical screening offered opportunistically	Prospective - questionnaire (data from 1992 study)	271 of the 445 from 1992

Table 3.3.1 continued

Author & Date	Theory/ Model	Type of behaviour	Design - Measure	Sample details
Montano & Taplin (1991)	TRA, elements of Triandis' theory	Mammogram following a personal invitation	Prospective - questionnaire	639/939 (72%)
Murray & McMillan (1993)	HBM, MHLC and emotional control	Cervical screening, BSE (results not reported here)	Retrospective - questionnaire	757/1162 (65%). (391 women)
Orbell *et al* (1996)	HBM	Up to date cervical screening	Retrospective - interview	337/507 non attenders (66%). 339/376 attenders (90%).
Ronis & Harel (1989)	HBM, SEU	Clinical breast examination in last year and number of examinations in last 5 years. BSE (results not reported here)	Retrospective-interview	619 probability sample
Rutledge *et al* (1989)	HBM	Mammogram in work place	Retrospective - questionnaire	882/1495 (59%)
Seibold & Roper (1979)	TRA, Triandis's theory	Cervical screening intentions in the next year and in the future	Intentions - questionnaire	93 (response rate not given)
Seydel *et al* (1990a)	HBM, PMT	Mass screening for cancer (and other health behaviours)	Intentions - questionnaire	358 volunteers for a health education class
Seydel *et al* (1990b)	HBM, PMT	Intentions to have a smear test every 3 years and screening in the past	Intentions - questionnaire	132 volunteers responding to an advertisement
Stein *et al* (1992)	HBM	Mammogram ever	Retrospective & intentions - telephone interviews	1057/1620 (65%)
Sutton *et al* (1994)	TRA, SEU	Mammogram in national programme	Prospective - interview and questionnaire (2 separate groups)	731/977 (75%) interviewed, 570/1600 (36%) completed questionnaire
Vaile *et al* (1993)	TPB, HBM (susceptibility)	Mammogram in national programme	Prospective - questionnaire	2060/3160 (65%)

<u>Key</u>

Theories: HBM- Health Belief Model; MHLC - Multidimensional Health Locus of Control; PMT - Protection Motivation Theory; SEU- Subjective Expected Utility; TRA - Theory of Reasoned Action; TPB - Theory of Planned Behaviour.

Behaviour: ACS- American Cancer Society; BSE - breast self examination

3.3.2. Perceived susceptibility

As detailed in the previous section, this element is included explicitly in the HBM and PMT. It has been conceptualised in a number of ways, such as the perceived probability of a disease, or possibility of disease. In addition, susceptibility can be judged to be a general susceptibility or a susceptibility under certain conditions, e.g. age or lifestyle.

Studies suggest that there is no marked difference between perceptions of susceptibility to breast cancer and cervical cancer, despite the fact that one (breast cancer) is much more prevalent than the other. This shows how perceptions are important rather than actual risk. Feelings of susceptibility to cancer has been cited in several reports as a significant factor affecting behaviour. Calnan (1984), using the framework of the HBM, found evidence for the existence of a univariate positive relationship between perceptions of susceptibility to breast cancer and attendance for screening for breast cancer. Women who attended for breast screening felt more vulnerable to breast cancer and were more concerned about it. Calnan's study also shows how including a measure of intentions is useful in the application of the HBM. In a discriminant function analysis to examine predictors of intention, perceived vulnerability to breast cancer, of 33 other variables, was found to be the best predictor of intentions. However, in the analysis to predict actual uptake of screening perceived vulnerability did not feature, indicating that its influence on uptake may be entirely mediated by intentions. It has been suggested that only in those cases where an individual learns about a new previously unknown threat, is threat appraisal (i.e. perceived susceptibility and perceived severity - to be discussed) important for predicting intentions (e.g. Rogers, 1983). The findings from Calnan's study would contradict this as some of these women *had* been screened in the past and susceptibility was still an important variable. However, the measures used by Calnan were not without their problems. Only two items were used to measure vulnerability and concern and these were treated separately. It is not specified what scale they were on although the degrees of freedom in the chi square analysis indicates that there were three categories for vulnerability and a five point scale for concern. A Mann Whitney test may therefore have been a more appropriate statistical test.

Consistent with Calnan's findings, Stein *et al* (1992) found that perceptions of susceptibility was the most highly related variable to intentions to be screened for breast cancer ($\beta = 0.45$, $p<0.001$), whereas, although related to past behaviour the relationship was weaker and it was found that physician cue was the most important variable. Hill *et al* (1985) using constructs based on the HBM in a multiple regression, found that women who felt more personally susceptible to cervical cancer were more likely to intend to be screened, although perceptions of the psychological effects of attendance were the most important in predicting intentions. These results have been replicated using the same measures with older women (Hennig and Knowles, 1990). It can be seen that although these studies were applying the HBM, they in fact used intentions as the outcome variable despite it not being explicitly mentioned in the model as an outcome measure.

When perceptions of susceptibility have been assessed following attendance for screening, a relationship has been found with regard to screening for breast cancer (e.g. Aiken *et al*, 1994a; Champion, 1992; Champion, 1994; Mandleblatt *et al*, 1992; Ronis and Harel, 1989; Stein *et al*, 1992) and cervical screening (Orbell *et al*, 1996). Attenders, or women who are up to date with screening, in these studies perceived themselves to be more susceptible to the disease than did non-attenders, and women who had never been screened.

In their study of elderly, poor, black women Mandelblatt *et al* (1992) found that those who had the highest perceived susceptibility to breast and cervical cancer were over four times as likely to have ever had a smear test. Using a LISREL path analysis technique Ronis and Harel (1989) showed that perceptions of susceptibility to breast cancer were causally related to having attended for a clinical breast examination. This perception was more important (as indicated by a larger beta weight) than perceptions of the benefit of the examination.

Champion (1992) found that perceptions of susceptibility to breast cancer were positively correlated with being up to date with mammograms and, in addition, susceptibility was a significant predictor when examined in a discriminant function analysis with other cognitions. Champion had also examined the relationship between susceptibility and reported intentions to have a mammogram in the next year. However, included in her 'intentions' scale were 'four items which tapped feelings about intent'. In fact these four items appeared to be global attitudes to behaviour measures, as operationalised in applications of the TRA, asking whether having a mammogram in the next year would be foolish - wise; uncomfortable - comfortable; good - bad; useless - useful. The analysis therefore confounds the attitude measure with the intention measure. Indeed, the main predictors of intention in a multiple regression were HBM derived benefits and costs which is unsurprising in view of the intentions measure including items worded in a 'benefits-costs' way.

Some studies, however, have found that other variables are more important than perceptions of susceptibility when beliefs have been looked at in a multivariate analysis. For example, Sutton *et al* (1994), whilst finding that perceptions of risk of developing breast cancer were significantly greater among women who attended for a mammogram, also found that in a logistic regression analysis this variable was not significantly predictive of behaviour. Both Aiken and colleagues and Stein and colleagues found that a cue from a GP was a more important predictor than susceptibility when examining data in multivariate models. Both of these studies were retrospective so it is possible that an alternative interpretation of these findings is that those women who comply with screening recommendations are more likely to report that their GP recommended a mammogram.

Seydel and colleagues in the Netherlands carried out two studies based on PMT of intentions to carry out a variety of behaviours including mass screening for cancer (Seydel *et al*, 1990a) and having a cervical smear test (Seydel *et al*, 1990b). Their results were not consistent with the theory. In their first study they found that perceptions of susceptibility to cancer were in fact negatively related to intentions to take part in mass screening for cancer where those who felt less susceptible were more likely to intend to take part. Perceived susceptibility was not related to whether women had taken part in the past. In their second study they specified intentions and past behaviour more specifically and found the converse, i.e. that perceptions of susceptibility *were* related to past uptake of cervical screening, but *not* related to reported intentions to have a smear test. However, these results should be treated cautiously as the belief measures were general whereas the behaviour was specific, and the scales used had low reliability. In a later study of actual uptake of mammography among women who had attended when screening was first available, again based on the PMT and by the same group, Boer *et al* (1993) found that perceived susceptibility was not related to uptake. However, the measure used consisted of two items on a three point scale which correlated at only 0.4. This scale is therefore perhaps not reliable. In addition, the three points were labelled yes, no, don't know, which perhaps implies that there is a correct answer, which may also have compromised the result.

Other research, too, has found that perceptions of susceptibility to breast/cervical cancer did not predict intentions to have a mammogram or smear test, uptake of mammography or a smear test (Boer *et al*, 1993; Friedman *et al*, 1995; Hyman *et al*, 1994; Seydel *et al*, 1990b) or explain past attendance in a given time period (Beaulieu *et al*, 1996; Fischera and Frank, 1994; Murray and McMillan, 1993; Rutledge *et al*, 1988) or ever (Mandelblatt *et al* 1992). It has been suggested (e.g. Kash *et al*, 1992) that perceptions of susceptibility may not predict screening behaviours which are likely to lead to an increase in anxiety. Susceptibility may, under these circumstances, not initiate intentions and behaviour but instead increase fear and act as a deterrent to behaviour.

There are also possible reasons for these non-significant findings beyond this variable not being important for behaviour. For example, Hyman *et al* (1994) did not examine the intervening variable of intentions and it may have been found that susceptibility was related to this, and that this in turn may have predicted behaviour, although it should be noted that retrospective studies do not measure intentions and have achieved significant results. Rutledge *et al* (1988) found a difference between non-attenders who had just been screened and other non-attenders, the former feeling more susceptible. This study demonstrates that it is important to ensure that individuals are actually due for a test in order to establish which variables may distinguish between those who act and those who do not.

Some of the non-significant findings have come from studies which have problems with their design or the way in which perceptions of susceptibility have been measured. For example, for the purposes of analysis, Murray and McMillan (1993) divided participants into active attenders (women who requested the test or who attended because they were advised to) and other women (non-attenders and passive attenders, such as women who underwent a routine smear test). No examination was made of whether there were differences between non-attenders and attenders, incorporating both passive attenders and active attenders. It remains possible that both sets of attenders would have been shown to feel more susceptible to cervical cancer than the non-attenders had the analysis been carried out in this way. In addition, their measures referred to susceptibility to cancer in general rather than specifically cervical cancer, which would be likely to weaken any relationship (Ajzen and Timko, 1986) This last point was also a problem in another study which failed to find support for perceptions of susceptibility (King, 1987). King examined the relationship between perceived susceptibility to various illnesses including cervical cancer, intention to attend for cervical screening and later attendance. However, assessing perceived susceptibility in relation to other diseases as well as to cervical cancer and using this global rating to predict cervical screening, violates the compatibility principle and would reduce the correlations between this variable and behaviour.

The items used by Friedman *et al* (1995) to assess susceptibility requested women to select a risk category and the majority (75%) of women underestimated their risk as 1 in 25 or less. The one item used was therefore not phrased in explicit terms of the likelihood or possibility of the woman developing cancer but more in terms of making an accurate assessment, which may not therefore influence the woman's behaviour and may explain the non-significant findings.

The current literature exploring the influence of susceptibility on uptake of cancer screening tests is unable to shed light on how important this perception may be for someone carrying out a behaviour for the first time. The studies do not explore their data in terms of first time users, possibly because it can be difficult achieve a sample of these participants if the screening has been available for some while.

Whilst unrealistic optimism, as discussed earlier, is a well known phenomenon in health psychology (Weinstein, 1982, 1983, 1984) - where on the whole individuals may perceive themselves to be less vulnerable to the disease than other people - several studies carried out by Weinstein (1980, 1982, 1983, 1984, 1987) showed that when asked about susceptibility to an (unspecified) cancer, unrealistic optimism was not displayed. Weinstein (1980) suggests that this may be because optimistic bias is particularly strong for risks which are judged to be controllable by personal action - and cancer is not. In fact, Weinstein (1987) found that if lung cancer was specified (a cancer which does have an element of personal control by action - i.e. not smoking) then unrealistic optimism was apparent. It is unlikely therefore that unrealistic optimism can explain the non-significant findings for susceptibility and cancer screening. Few studies, however, ask for a comparative judgement of susceptibility and therefore it is not possible to judge whether this optimism shows for cervical or breast cancer.

There does seem to be a body of evidence to suggest that perceptions of susceptibility to a disease can influence uptake of screening, indicating that this construct may be useful in explaining behaviour. However, generally more predictive relationships to intentions have been found so it is important to explore the relationship between susceptibility and intentions as well as its relationship to behaviour. Indeed the non-significant findings tend to have come from retrospective studies. The HBM simply argues that if people feel personally susceptible to a disease they are more likely to attend for screening for the presence of that disease. However, it is likely that it is not this straightforward. The current literature indicates that perceived susceptibility is often mediated by reported intentions and does not directly predict behaviour. In addition, whether or not the behaviour is new to the individual may be important. No study operationalising social cognition models have examined first time behaviour. The current study will explore this by examining the relationship between perceived susceptibility and intentions and behaviour in women who have never had a smear test as it may discriminate more for these women than for previously screened women whose decision may be based on perceptions of the costs and benefits of screening.

In the present study it is hypothesised firstly that women who report a greater intention to attend for screening or who do attend will perceive themselves to be more susceptible to cervical cancer than women who report a lesser intention to attend or who do not attend. Secondly, it is predicted that perceptions of susceptibility will be more strongly related to intentions than behaviour. Thirdly, for women who have never been screened perceptions of susceptibility will discriminate more between intenders/non-intenders and between attenders/non-attenders than for women who have been screened in the past.

3.3.3 Perceived severity

An examination of the relationship between perceived severity of a disease and attendance for screening has often been omitted from studies because researchers have tended to assume that perceptions of the severity of cancer will be similar for all respondents in that everyone would perceive cancer to be very serious (e.g. Kegeles *et al*, 1965; Stein *et al*, 1992). This assumption seems rather ill advised. The term 'cancer' can encompass many types of cancer some of which are likely to be perceived as more serious than others. This can be related to how familiar the types of cancer are. In addition, other predictor variables may be found to be related to perceptions of severity. For example, perceptions of the costs of screening in that these may be seen as higher if a disease is considered to be very severe. For first time users of screening, judgements of disease severity, as for perceived susceptibility, may be more important for decision making than for individuals who are familiar with the tests. Studies which have included an assessment of this element are reviewed below.

Whilst some studies have found significantly different perceptions of the severity of cancer between women who attend for screening and those who do not, the findings have not always been in line with the predictions of the theoretical models. Champion (1992) found that those women who perceived breast cancer as more severe were more likely to be up to date with mammograms. This variable was also a significant predictor in a discriminant function analysis to classify women into groups. However, in a later wave of data collection (1994) in the same longitudinal study no bivariate relationship was found either between perceptions of severity of breast cancer and compliance with mammography in the last five years or in the last year. However in a logistic regression predicting compliance in the last year only among women over 50 years old, it was a significant predictor. It is possible that more variant responses were obtained with older women, for whom breast cancer is perhaps more relevant.

Seydel *et al* (1990a) found that perceptions of the severity of cancer were related to intentions to participate in mass screening for cancer with those who perceived it as severe being more likely to intend to attend. However, it was not related to reported past behaviour. In a second study when the researchers specified intentions and behaviour more specifically, perceptions of severity were found to be predictive in a multiple regression of past attendance at cervical screening. However, those women who perceived it as more severe were *less likely* to have been previously screened. This is interpreted as 'defensive avoidance' coping by the researchers but could be the result of unstable measures in that the scale consisted of just two items which were correlated at r=0.48. A later study of actual uptake of mammography by the same group (Boer *et al*, 1993) among women (none of whom were first time attenders) found that perceptions of breast cancer severity did not distinguish between women who had participated in the past and did so again and those who had participated in the past and did not attend on the occasion under study. However, again, the three items used to measure severity did not form a reliable scale (α=0.35) and, moreover, a reliable 'fear of breast cancer' scale (α=0.95) adapted from Kuttschreuter *et al* (1984) *did* distinguish between attenders and non-attenders, with those women who attended showing more fear of breast cancer. This could reasonably be interpreted as a perception of breast cancer as being severe.

A number of studies have found no relationship between perceived severity of breast and/or cervical cancer and uptake of mammograms, clinical breast examinations or smear tests. Non-significant results have been found in relation to past attendance for a smear test (Murray and McMillan, 1993; Orbell *et al*, 1996); past attendance at mammography or clinical breast examination (Aiken *et al*, 1994a; Beaulieu *et al*, 1996; Fischera and Frank, 1994; Friedman *et al*, 1995; Rutledge *et al*, 1988); intentions to attend for a smear test (Hennig and Knowles, 1990; Hill *et al*, 1985; King, 1987); screening mammography or clinical breast examination (Friedman *et al*, 1995); and later attendance for a smear test (King, 1987).

A possible explanation for this lack of relationship is that perceptions of severity may be more relevant when symptoms are currently being experienced (Becker and Maiman, 1975) or if the individuals have had prior contact with the diseases. The lack of relationship may also be explained by methodological weaknesses: either the studies were retrospective or measures with unestablished reliability were used. For example, Hill *et al* (1985) used only one item against several for other constructs.

It is arguable, as mentioned in Section 3.2, that severity may be a more distal determinant of intentions and behaviour, and may in fact be related to beliefs about screening. This may explain non-significant findings for perceptions of severity in many studies where data have not been explored in this way. Ronis and Harel (1989) examined the relationship between health beliefs and having undergone a clinical breast examination in the past year. They hypothesised that perceptions of severity would not be directly related to uptake but instead would be mediated by perceptions of the benefits and costs of the examination. Specifically they suggested that severity should be conceptualised as the severity of breast cancer under conditions of inaction - not treated promptly - and under conditions of action - treated promptly. It is perhaps curious that they did not assess perceptions of severity under conditions of attending and not attending for an examination which in turn could lead to prompt or delayed treatment. For the purposes of their study they developed four scales reflecting the differences in time of treatment and type of outcome, conceptualised as social outcomes e.g. effect on sex life; or clinical outcomes e.g. death or types of treatment. They found, using a LISREL path analysis technique that whilst no direct effect on behaviour was observed for perceptions of severity, a mediating role of benefits and costs was found. Perceptions of the severity of breast cancer in clinical terms if not treated promptly was positively related to perceptions of benefits (which was related to behaviour). However, perceptions of the severity of breast cancer in clinical terms if treated promptly, was negatively related to benefits. Perceptions of the severity of breast cancer in social terms if treated promptly was positively related to costs. The direct effects on behaviour of perceptions of benefits and costs are explored in greater depth below.

The relationship between perceptions of severity and uptake of cervical screening is re-examined in the present study. The study aims to avoid the problems of some previous studies where no variation in perceptions of severity was achieved, by relating the severity of cervical cancer to various aspects of life. For example, the possible effect of cervical cancer on a woman's sex life rather than asked directly 'is cervical cancer serious?', where it is possible that no variation would be apparent. In addition, the relationship between severity and other cognitions will also be explored, for example, as mentioned above, it is possible that it is not independent of costs where a disease is believed to be very severe then this would increase the costs of attending for a test to discover its presence.

It is predicted that women who report a greater intention to attend for screening or who attend will perceive cervical cancer to be more severe than those who report a lesser intention to attend or who do not attend. In addition, perceptions of severity are expected to be positively correlated with perceptions of the costs of screening. Thirdly, for women who have never been screened perceptions of the severity of cervical cancer will discriminate more between intenders/non-intenders and between attenders/non-attenders than for women who have been screened in the past.

On the whole, although risk appraisal, i.e. perceptions of susceptibility and severity, have been found, in some studies, to be related to intentions to act and to behaviour, more substantial effects and better predictions of behaviour have come from an examination of outcome expectancies of a particular course of behaviour, i.e. its costs and benefits. These elements are included in all social cognition models and their effects on intentions and behaviour as regards cancer screening are discussed below.

3.3.4 Perceived benefits

How beneficial a screening test is perceived to be has been consistently shown to be important, both for predicting future uptake of screening and for explaining past attendance. The benefits most often examined are the role of screening in providing reassurance and in detecting any sign of disease at its earliest stage when treatment is most likely to be successful.

When examining the univariate relationship between perceived benefits of screening and uptake, positive relationships have been found with people who perceive greater benefits being more likely to intend to attend for screening (Calnan, 1984; Hill *et al*, 1985; Hennig and Knowles, 1990; Stein *et al*, 1992) and to attend at a later date (Hyman *et al*, 1994; King, 1987; Sutton *et al*, 1994; Vaile *et al*, 1993). Calnan (1984) found that attenders were more likely than non-attenders to believe that the benefits of breast screening outweigh the costs, and in a discriminant function analysis perceived costs and benefits were found to be predictive of intentions but not of actual attendance, indicating that the influence of these beliefs is probably mediated by intentions, in view of the fact that a univariate relationship was found. However, it should be noted that Calnan confounded the measures of costs and benefits by including them both in one scale.

Hill *et al* (1985) using measures derived from both the HBM and the TRA, found that an 'attitude' measure based on the TRA was the most important predictor of intentions to have a smear test. This was a measure based on behavioural beliefs and evaluations including measures of 'costs'. A one item measure of benefits assessed as per the HBM was not predictive of intentions, but was arguably unreliable. Hill *et al* (1985) also examined which beliefs were functionally related to intentions and past behaviour. They found that a belief that the smear test detects cancer in the early stages was the most important item for predicting intentions, and they found that a belief that screening provides a sense of relief was most important for explaining past screening behaviour. All beliefs, however, were positively correlated with intentions and all but 'reassures about cancer' and 'means cancer would be curable' were positively correlated with past behaviour.

Montano and Taplin (1991) explored the ability of an 'expanded' TRA to predict intentions and behaviour regarding mammography use. Whilst the study design had some difficulties (e.g. a letter was sent inviting women to attend for a mammography then a questionnaire was completed comprising the prospective design; items specified behaviour in the next year but assessment of actual behaviour took place at six months), it nonetheless showed that attitude to behaviour was predictive of intentions and later behaviour. The authors included what they describe as an additional scale of 'affect' but in fact this consisted of two items very like those used to measure a global attitude (i.e. attending for a mammogram would be good-bad, beneficial-harmful). This 'scale' was also predictive of intentions and behaviour.

These studies show that whether benefits are assessed by likelihood/evaluation or likelihoods alone they have been found to be predictive of intentions and behaviour. It is arguable, then, that with relevant outcomes for screening attendance whether these are positive or negative is obvious and therefore to include an evaluation of the outcomes is superfluous.

Retrospective studies have also found that perceptions of the benefits of screening can, in part, explain previous use of screening services (e.g. Aiken *et al*, 1994a; Champion, 1992; Rutledge *et al*, 1988). For example, Rutledge *et al* (1988) found that women who had previously attended for a mammogram perceived significantly more benefits to breast screening than women who had not attended. Ronis and Harel (1989) using a structural linear relation analysis found that, together with perceptions of costs of screening and susceptibility to breast cancer, perceiving a clinical breast examination to be beneficial was causally related to having attended for such an examination in the past year. Mandleblatt *et al* (1992) found that perceptions of the benefits of screening made a striking difference to behaviour finding that women who believed in the benefits of early detection were three times as likely to have ever had a smear test and twice as likely to have had a mammogram than women who did not perceive such benefits.

Other studies, whilst giving results consistent with theory, are flawed in some way, which makes interpreting their results difficult. For example, Seydel *et al* (1990b) using the PMT found that perceptions of benefits were related to intentions. However, the intention measure they used and the outcome expectancy measures seem to be confounded, i.e. "with a view to the early detection of cervical cancer, I will have a pap test made every three years", this would have artificially inflated the relationship.

Some studies have found that whilst perceptions of benefits are important, other variables are more important in explaining intentions and behaviour when examined in a multivariate analysis. Using a path analysis Stein *et al* (1992) found that there was a positive association between perceptions of the benefits of mammography and intentions to be screened. However, this was not the strongest predictor, and perception of susceptibility to cervical cancer was more important. Hennig and Knowles (1990) found that for women over 40 years old, attitude to cervical screening was a significant predictor of intentions, although a measure of subjective norms was more important. Friedman *et al* (1995) found that perceptions of the efficacy of mammography and clinical breast examinations were correlated with past attendance and future intentions but that in a multiple regression with other social cognitions, efficacy was only significantly related to intentions to carry out these behaviours.

Orbell *et al* (1996) found a relationship between the perceived benefits of the smear test to give peace of mind and previous attendance for cervical screening – with attenders perceiving the test to be more beneficial. However, in a multiple regression analysis perceptions of susceptibility to cervical screening and perceptions of the costs of screening were more strongly related to screening status. In addition, Orbell *et al* (1996) found that one item measuring the benefits of screening in terms of the cancer being found when it is curable was not related to screening status. It is possible that as this study specifically aimed to include women who had never been screened, perceptions of susceptibility to cervical cancer were particularly important in distinguishing between groups.

Other research has also found that perceptions of the benefits of screening do not distinguish between women who attend for screening and those who do not. A study by Murray and McMillan (1993) found that women who had requested a smear test themselves perceived the test as more beneficial than those who attended for a routine smear or did not attend at all. This study highlights that attendance for screening, itself, is not an homogeneous behaviour, as discussed earlier, and that different beliefs may predict behaviour carried out for different reasons.

Fischera and Frank (1994) found no differences in beliefs about the benefits of breast screening between women who had previously undergone a mammography and those who had not. The researchers explain this by the fact that the items used to measure perceptions of benefits tended to evoke negative associations, such as a mammogram decreasing one's chances of dying and therefore did not conjure up mammography as a beneficial procedure.

Seibold and Roper (1979) found that attitude to cervical screening as measured by evaluation and likelihood of behavioural beliefs (incorporating both costs and benefits) was not a significant predictor in a regression of intentions to be screened, neither for a community sample of women, nor college women. However, this result may be due to the use of a potentially unreliable scale (α=0.52).

Stein *et al* (1992) found no relationship between perceptions of the benefits of mammograms and past behaviour. Instead, the variance in past behaviour was explained by whether or not a woman's GP had suggested she have a mammogram. This is contrary to their findings for reported intentions, mentioned above. Seydel *et al* (1990a) did not find that a positive outcome expectancy of attendance for a mass screening for cancer was related to past attendance or that a positive outcome expectancy of pap smear attendance was related to previous use of cervical screening. However, only one item was used to assess these expectancies. Later, in a prospective study, a similar item did not distinguish between participants and non-participants in mass screening for breast cancer (Boer *et al*, 1993). Similarly, Beaulieu *et al* (1996) in Canada found that responders to an opportunistic offer of a mammogram did not perceive treatment to be significantly more beneficial than non-responders. However, the benefits of *screening* were not assessed directly, but instead the benefits of *treatment* were. Therefore, the compatibility principle was violated which may have compromised the results.

There is, therefore, good evidence that perceiving a screening test as a beneficial procedure is positively associated with previously having attended for screening, with future intentions to be screened, and with actual later uptake. Inconsistent results have come from retrospective studies, with the exception of Seibold and Roper's findings. The one study (King, 1987) to examine prospectively the relationship between perceptions of the benefits of the smear test and actual uptake of cervical screening demonstrated an association between the two.

> *In the present study it is predicted that women who intend to attend for a smear test will perceive the test as more beneficial than those who do not intend to be screened and in addition those who actually attend for a smear test will perceive the test to be more beneficial than those women who do not attend for screening.*

3.3.5 Perceived costs

Many studies have examined the relationship between perceptions of the costs of screening and behaviour. The costs of screening in the studies reviewed below include the pain, embarrassment, fear and inconvenience of screening. Similar costs are often assessed in relation to different types of screening. There are some exceptions, for example, with mammograms a fear of radiation may be a relevant cost to assess and for cervical screening a fear of internal examination may be pertinent. Much of the research does not, however, include a comparison of attenders and non-attenders for screening and therefore no conclusions can be drawn about whether the costs have a causal influence on (lack of) uptake (e.g. Hodes, 1972; McKie 1993a and 1993b; Nathoo, 1988), or if comparisons are made no statistical tests are reported (e.g. Sansom *et al*, 1975). Research carried out by McKie (1993a and 1993b) highlights how it is difficult to draw conclusions. She reports that non-attenders for screening experienced fear and embarrassment about the smear test but, in a subsequent paper detailing the views of attenders for screening, she notes that these women too expressed these feelings. Whether the perceptions were more acute for non-attenders and whether the beliefs were causally related to behaviour therefore remains unclear.

Some studies, however, have clarified why perceptions of costs may be important for influencing behaviour. It has been demonstrated that embarrassment alone can be a powerful deterrent to attendance for a smear test. Cockburn *et al* (1991), exploring motivations for uptake of screening, found that women who were embarrassed about having a smear test were nearly seven times more likely to be overdue for a test than women who did not feel embarrassed. The sources of embarrassment seem to be the nature of the test, in that it requires an internal examination, and also the circumstances under which the test is performed where, for example, women may feel that they do not have enough privacy. Focus groups carried out with predominantly working class women in the north east of England revealed that, for these women, embarrassment about the test also seemed to arise because they associated promiscuity with cervical cancer (Gregory and McKie, 1991). The women therefore felt that if they attended for a test and subsequently received a positive result this would indicate that they have had many sexual relationships. Other studies have found that in addition to embarrassment, women who did not attend for screening reported that they were either too afraid of the test itself (the behaviour) or too afraid of the results (the consequences of the behaviour) to attend (Garrett *et al*, 1986; Gregory and McKie, 1991; Meadows, 1987; Murray and McMillan, 1993; Orbell *et al*, 1996; Standing and Mercer, 1984). However, the problem of a post hoc justification of behaviour applies to these studies.

It has been suggested that fear of the results of a smear test arises from a perception that there are only two possible outcomes of the test: cancer or no cancer. Gregory and McKie, 1991) found that the women they questioned were not aware of the various stages of cervical abnormality and many assumed that a positive result meant that they would die. In a qualitative study by Leathar and Roberts (1985) it was found that the main reasons for non-participation in breast cancer screening amongst the women who participated in their focus groups was the fear of finding something wrong which would ultimately lead to morbidity. Fear of the screening tests themselves was found to be mainly associated with their potential to cause pain.

Regarding studies based more formally on social cognition models (although some of the above studies were also based on these models), a relationship has been shown to exist between the perceived costs of a screening test and previous attendance at screening and between perceived costs and intentions to attend. Some evidence exists to show that the psychological costs of screening may be more important than the practical costs for explaining behaviour. For example, Murray and McMillan (1993) found that these two types of costs were conceptually different, being distinguishable in a factor analysis. In addition, these variables had different relationships to behaviour. Whilst both the interpersonal and emotional costs of screening and the practical problems with availing oneself of the test were correlated with screening status, in a logistic regression it was the perceptions of the psychological effects of attendance that were most important.

Orbell *et al* (1996) explored the health beliefs and social characteristics of women who after repeated invitations had never been screened with those who were up to date with their screening. The study was based on the HBM although the measures employed were perceived likelihoods of the cost occurring multiplied by the likelihood of it preventing attendance. Psychological costs included five items to measure aversiveness of the test and two to measure aversiveness of the results. Practical costs were assessed by asking whether a particular potential cost existed for the women (e.g. do you have difficulty with transport to the clinic?) and if yes, the likelihood of this stopping women attending. Whilst it may be informative to assess whether a cost would stop someone from attending, it may be obvious and therefore be of little extra explanatory value. In addition, the phrasing of the question implies that women were primed to attend, it is, of course, possible, that the cost exists, and it would not stop a women from attending, but that she has no intention of doing so. In fact intentions were not assessed in this study as it was retrospective. In addition, some of the items were phrased neutrally 'do you have a job?' whereas others were valued 'would it take too long to get to the clinic?'. It was found that aversiveness of the test and of the result were related to screening status with those who had never been screened rating these factors higher. These accounted for most of the variance in uptake, along with perceived susceptibility and benefits in terms of peace of mind. However, consistent with the findings of Murray and McMillan (1993), practical costs to attendance were not related to screening status.

Other studies, which do not explicitly distinguish psychological and practical costs, have also found that individuals who perceive high costs to attending for a smear test or a mammogram are less likely to intend to be screened or to be screened (Calnan, 1984; Hennig and Knowles, 1990; Hill *et al*, 1985; King, 1987; Stein *et al*, 1992; Sutton *et al*, 1994). Hill *et al* (1985) found that both an overall global attitude to cervical screening and 'costs' as derived from the HBM, made independent contributions to predicting intentions in a multiple regression. It is possible that the cost measure would represent a more considered response whereas the global attitude taps an immediate 'gut' reaction, hence both are important in predicting intentions. Concerning the influence of the particular costs of the smear test on intentions, Hill *et al* (1985) found that fear and embarrassment, indignity, physical unpleasantness, and worry about results were functionally related to intentions and were therefore especially important in explaining failure to intend to attend.

Perceived costs have also been found to be related to having been screened previously (Aiken *et al*, 1994a; Fischera and Frank, 1994; Friedman *et al*, 1995; Ronis and Harel, 1989; Stein *et al*, 1992). Ronis and Harel used a LISREL analysis to show that perceptions of costs were causally related to attendance, with those women experiencing more costs being less likely to attend. Fischera and Frank (1994) found that perceptions of the costs of screening was the most important variable in a logistic regression of

HBM variables to explain compliance amongst their participants. Friedman *et al* (1995) found that perceptions of the costs of attending for a mammogram and clinical breast examination, including both practical costs e.g. inconvenience and emotional costs, e.g. embarrassment, were significantly negatively correlated with past attendance. In a multiple regression perceptions of costs was the most important variable in explaining past attendance at mammography. Aiken *et al* (1994a) found that women who were up to date with mammography perceived fewer costs to the procedure in terms of radiation risk and inconvenience than women who were not up to date. It is notable that costs in terms of embarrassment and pain were not assessed in this study. The measure they did use had low internal consistency but nonetheless proved to be an important predictor of compliance in a logistic regression.

Beaulieu *et al* (1996) found that women who did not respond to an opportunistic invitation to be screened for breast cancer perceived more fear and time costs to screening than responders, but that in a logistic regression a GP cue was the most important variable. The study demonstrates that for behaviours which are dependent on a physician to carry them out, variables such as being asked to attend can swamp the contribution of individual motivations, if they are not controlled for.

Other studies have used alternative labels for the measures they use. Montano and Taplin (1991), for instance, found that 'facilitating conditions' which were conceptualised from Triandis' (1977) model but essentially were potential practical costs of carrying out the behaviour of attending for mammography, were the most highly predictive of uptake. However, it would have been informative to see if these conditions were mediated by intentions and more highly related to intentions than behaviour.

Seydel *et al* (1990a and 1990b) using a PMT framework found that including a measure of what they termed 'self efficacy' in a series of multiple regressions to explain past attendance for a smear test and to predict intentions to have a smear test, increased the variance explained. They argue that as self efficacy was important beyond risk appraisal variables (perceived susceptibility and perceived severity) this demonstrates that the PMT is a better model of health behaviour than the HBM. However, no measure of costs was included in the application of the HBM, only susceptibility, severity and (positive) outcome expectancy (i.e. perceived benefits), so therefore the PMT would be likely to fare better as perceptions of costs have consistently been found to be important predictors of behaviour in applications of the HBM.

Contrary results have also been found for the influence of perceived costs on behaviour. For example, Champion (1992) found that women who had not had a mammogram in the last five years did not perceive breast screening to be more costly than women who were up to date with their screening. However, this may be because the 'non-compliers' included women who were 35-40 years old who would not have been asked to attend for a mammogram but who may have perceived few costs to attending and would have attended if asked. This shows how it is important to relate screening behaviour to age for mammogram uptake and additionally, how it is important when exploring intentions and uptake for infrequent screening that women are actually due for a test. Indeed, in a 1994 paper Champion reports that women who had the correct number of mammograms in the previous five years perceived breast screening to be more costly than women who had not. This group of women were all over 50 years old and therefore the problem of not being invited for screening is removed. This element of costs to screening also proved to be an important predictor of screening status using a logistic regression.

In 1993, looking at subsequent uptake of breast cancer screening in previous attenders, Boer *et al* (1993), found that a multi-item measure of self efficacy (α=0.70) did not distinguish between participants and non-participants for breast screening, although it had distinguished between women who had attended in the past and those who had not, and distinguished those with differing levels of intention to attend. However, the self efficacy measures used were phrased rather like cost items; e.g. 'it is difficult for me to participate because I am nervous of the examination and because the examination is carried out during working hours'. It seems that the way in which they have operationalised self efficacy is adding little beyond the costs element as used in the HBM.

To conclude, it would appear that if the costs of screening are perceived to be too high, screening will not be undertaken or women will not intend to be screened. Costs have been measured in a variety of ways and on the whole, women who do not attend for screening perceive more costs whether these are assessed before or after screening.

It is predicted in the present study that the perceived costs of cervical screening will be important in predicting intentions and uptake of cervical screening with intenders and attenders envisaging fewer costs to having a smear test than non-intenders and non-attenders.

3.3.6 Relative importance of social cognitions

The HBM suggests that all model components will be important for predicting and explaining behaviour. However, it is possible that components will not be equally as important. Indeed as the above review shows, when multivariate analyses have been carried out perceptions of the costs of screening seem to be the most important variable, both for retrospective and prospective studies. A meta-analysis carried out by Janz and Becker (1984) of 46 studies using the HBM, 24 of which used the model to explain preventive health behaviour, found that perceptions of costs was the most powerful construct. They calculated significance ratios (the number of statistically significant findings for the construct divided by the total number of studies reporting significance levels for that construct) and found no difference between prospective and retrospective studies regarding the variables that were most important. Harrison *et al* (1992) were stricter in their inclusion criteria than Janz and Becker and calculated mean effect sizes for the constructs in 16 studies. This takes into account the influence of sample size which the Janz and Becker review did not. Harrison *et al* (1992) found a difference between prospective and retrospective studies with mean effect sizes being larger for benefits and costs and lower for severity in retrospective studies in comparison with prospective studies. Studies on all health behaviours were included in this analysis. For studies which were concerned with uptake of screening, perceived costs was the most important variable, followed by perceived susceptibility, benefits and severity in descending order. Dividing the studies by whether they were retrospective or prospective it was found that in retrospective studies perceived costs was again the most important then perceived benefits, susceptibility and severity. For prospective studies, susceptibility was the most important followed by costs, benefits and severity. The use of multivariate techniques in the present study will enable the relative importance of the constructs in predicting intentions and behaviour to be estimated.

It is predicted that perceptions of the costs of screening will be especially important in predicting intentions and behaviour

3.3.7 Subjective norms

A woman may be influenced by her social environment when undertaking health behaviour. For example, a partner, friends and family provide 'guidelines' about acceptable conditions under which a GP should be consulted (e.g. Calnan, 1984; Koos, 1954). Beliefs about what other people do and what they would approve of the individual doing have been found to be important for influencing behaviour (Ajzen, 1991). For example, Houghton (1968) found that more attenders for cervical screening reported having discussed cervical screening with their partners than non-attenders, and Vuori *et al* (1972) found that more attenders for screening reported that their husband viewed screening as very important than did non-attenders. Partners' actual, rather than perceived, attitudes may also influence women's uptake of cervical screening. For example, in a qualitative study, Gregory and McKie (1991) reported that one woman failed to attend for a smear test as her partner had accused her of "going to be felt up". Another woman said of her ex-husband: "every time I went for a smear... he would suggest, in a sort of jokey way, that I enjoyed showing my genitals to all and sundry. His perception seemed to be that having someone insert a speculum was a sexual experience for me".

Some studies have specifically explored perceptions of pressure from GPs. Non-attenders for screening are significantly less likely than attenders to believe that their GP wants them to attend (e.g. Orbell *et al*, 1996). This variable was a significant predictor in a multiple regression to predict screening status. Similarly, Beaulieu *et al* (1996) found using a logistic regression that a willingness to accept a physician's advice was the most important predictor of mammography uptake. Hennig and Knowles (1990) found that an item specifying, 'my doctor does not believe I need one' was significantly correlated with an intention not to have a smear test. Among women who had never had a mammogram 'normative and social support' variables including whether a GP, family or friends recommend that the woman have a mammogram and the importance of a woman's GP's opinion to her, were significantly predictive of intentions to be screened. However, these variables were not important in predicting intentions of women who had had at least one mammogram (Jepson and Rimer, 1993).

Calnan (1984), however, found no relationship between attendance for breast screening and women's reports of whether or not they were encouraged to attend. However, women's perceptions that they ought to have their breasts screened more regularly than they currently did was found to be related to intentions to attend. Calnan takes this as a measure of normative pressure and in fact it could be conceptualised as a type of 'moral norm' (e.g. Sparks, 1994).

Few studies have used a theory based application of the influence of such variables and those that have provide conflicting results. Some studies have used belief based measures weighted by motivations to comply with the individual concerned whereas others have used a more general measure of normative pressure. Champion (1992) found no relationship between a 'social influence' scale and being up to date with mammograms. The scale was based on the subjective norms element of the TRA including six referents. Motivation to comply was conceptualised as the influence the referents have on the individual woman. There are possible problems with the choice of referents and it is not clear how these were selected. For example, physician and nurse are both included and it is possible that women do not have both. The scale may have failed to tap the subjective norms of these women if it included irrelevant referents. However, in 1994, Champion found that for women under 50 years old the social influence variables *were* associated with compliance in the past year with screening recommendations and this variable was also found in a logistic regression to be an important predictor of uptake. Similarly to Champion's earlier study, Boer *et al* (1993) found no difference between participants and non-participants in breast cancer screening for a variety of single item 'social support' (as they termed it) measures, e.g. other women receiving an invitation and people being in sympathy with women's feelings about screening. However, a better measure might have included an assessment of whether or not other women attended for mammograms.

Seibold and Roper (1979) found that subjective norms measured by a normative belief score calculated from the perceived beliefs of specific referents multiplied by the strength of a woman's motivation to comply with these people was the most significant predictor of intention to have a smear test. This result was robust and applied to different age groups, educational levels and ethnic groups. Likewise, Vaile *et al* (1993) using a global subjective norm measure found that women who believed that other people wanted them to attend were more likely to have a mammogram than those who did not.

Some studies have found that when included with other variables, subjective norms are less important than other variables. For example, Montano and Taplin (1991) found that whilst a measure of subjective norms was significantly correlated with intentions and past behaviour and a significant predictor of intentions to attend for a mammogram, it did not add to the explained variance in a model to predict actual behaviour when attitudes and facilitating conditions (conceptualised in a similar fashion to costs) were included. Similarly, Hill *et al* (1985) found that whilst a measure of normative beliefs about cervical screening significantly predicted intentions to attend for a smear test, in a multiple regression, attitude to screening was more important.

However, Hennig and Knowles (1990) found that a global measure of subjective norm (rather than the belief based measure used by Hill *et al*, 1985) was *more* important in a multiple regression than attitude for predicting intentions to attend for a smear test but that normative beliefs were not found to be predictive of intentions. The authors explain this finding by stating that many of the referents did not apply to the older women in their sample. However, presumably they could have calculated a mean score for women or, more importantly, used referents who did apply to the women in order to ensure that modal salient referents were used in their application of this model.

It remains unclear how important social influence variables may be when used in models with other social cognition variables. Indeed, it has been suggested that these are simply part of an attitude to a behaviour. If, for example, a woman's husband disapproves of her attending for a smear test then this may lead to a more negative attitude to smear tests and could therefore be adequately represented by a perception of the costs of screening. Current studies have conceptualised subjective norms in various ways and multivariate statistics are not always carried out to establish the relative importance of this variable. In the HBM, social influence variables are taken to be modifying factors in influencing the likelihood of behaviour and expected to influence social cognitions. In the current study both this relationship and the direct influence of these factors on intentions and behaviour will be examined.

> *In the present study it is predicted that women who report a greater intention to attend for a smear test or who do attend will perceive more normative pressure to do so than those who report a lesser intention to attend or who do not attend. It is predicted that normative beliefs will be*

positively correlated with perceived benefits (in that a high normative belief will lead to a more positive attitude) and negatively correlated with perceived costs (in that a higher normative belief score will lead to perceiving fewer costs to attending for screening).

3.3.8 Cues to action

The impact of cues to attend for screening on subsequent behaviour has not been systematically studied. These may be internal or external to the individual. With retrospective studies, the difficulty is that cues may have been of little intrinsic importance to the individual and therefore easily forgotten. Thus an enquiry some while after the event would be unlikely to produce reliable data (Rosenstock, 1974b). For example, those people who underwent screening as a result of the cue would probably be more likely than those who did not undergo screening to remember it, giving an overestimate of the importance of the cue. Indeed, Boer *et al* (1993) found that more participants than non-participants in a second round of mammography screening (when they had all attended the first time) remembered receiving an invitation letter.

Recommendation by a GP that an individual should undergo a screening test has been found in a number of studies to be one of most influential predictors of behaviour (e.g. Aiken *et al*, 1994a; Bailie and Petrie, 1990; Beaulieu *et al*, 1996; Celentano *et al*, 1982; Champion, 1992 and 1994; Cockburn *et al*, 1991; Friedman *et al*, 1995; Fulton *et al*, 1991; Harlan *et al*, 1991; Mamon *et al*, 1990; Rutledge *et al*, 1988; Stein *et al*, 1992; Wilcox and Mosher, 1993). For example, Mamon *et al* (1990) found that reliance on a GP to carry out screening in the absence of women requesting a test, was related to inadequate screening. Hennig and Knowles (1990) found that a GP recommendation was the most important cue to uptake of cervical screening and more important to women than knowing someone who had cervical cancer, being reminded by friends, seeing their own reminder (for instance on a calendar), or seeing an advertisement. Those papers which have analysed the influence of variables in a multiple regression give stronger evidence because it shows that influence of a GP recommendation is important on its own and also in combination with other variables (e.g. Celentano *et al*, 1982; Mamon *et al*, 1990). Friedman *et al* (1995) found in a multiple regression that the strength of the recommendation by a GP was the best predictor of past attendance for a clinical breast examination (and also related to past attendance at mammogram although perceptions of barriers explained more variance) and it was related to future intentions to have a mammography and clinical breast examination.

Recommendation by a GP leading to differential uptake should not be a problem in a national screening programme where everyone who is eligible is invited to attend. However, the type of communication between GPs and patients is also a crucial determinant of uptake (Haran *et al*, 1991). Factors such as the amount of information given and the way in which it is presented influence women's decisions about whether or not to attend for screening. For example, in the UK, invitation letters to attend cervical screening from the FHSA generally include information which is deemed to be accurate yet reassuring. Some FHSAs include an accompanying leaflet with the letter which explains the purpose of the test and what it entails. The form the letters and leaflets take has been found to be important for uptake of screening in that they should clearly specify how the screening is relevant to the individual concerned and attempt to deal in advance with anxieties about the test which should then increase the chances of uptake of screening (Eardley *et al*, 1985).

The focus of this thesis is on what predicts screening uptake after a written invitation. It has been suggested that an important cue to uptake of screening in general, which could equally apply to population screening for cancer, is the method by which individuals are invited to attend. Kegeles (1983) reviewed the effectiveness of various external cues to attend for screening including mass communications, group communications, individual contacts or behavioural techniques (e.g. postcard reminders, calendars), and concluded that individual contacts are the most effective means of achieving both an initial visit and follow ups. These individual contacts may range from a written invitation with an appointment time, to an open invitation, to an opportunistic verbal request to be screened at that time or at a later date. If letters are used, it has been found for both breast and cervical screening that uptake can be improved if the letters come from the woman's GP (e.g. Hurley *et al*, 1994; Wilson and Leeming, 1987; review of uptake of breast screening by Vernon *et al*, 1990).

Other research has found that attendance for screening is greater if screening is presented as routine, if it is offered to those already undergoing care, and if the invitation is in person (Marteau, 1993). One possible explanation for this pattern is that it is more difficult to refuse a test being offered in person by a doctor than simply to ignore a letter. Moreover, it is usually more convenient not to have to come back to the surgery for a further appointment. Indeed, in addition to the national screening programme GPs will sometimes take the opportunity to offer a smear test to a woman who they believe is due for one when she has consulted him or her about another matter, such as for contraceptive advice. As mentioned previously, many women undergo screening on the advice of a GP in these circumstances when they may not otherwise have done so. For example, one study in Australia showed that 50 per cent of women due for screening attended for a smear test within six weeks of an opportunistic invitation from their GP (Cockburn *et al*, 1990) and Clasen *et al* (1994) found that more than half the GPs they questioned recommended or performed screening during a general physical check-up visit.

However, it is insufficient to look at the influence of these cues in the absence of beliefs about risk and the behaviour in question. Some studies have found differences in terms of beliefs and social class between women who 'self refer' and those who respond following a cue in the form of an invitation (e.g. Hobbs *et al*, 1980; Murray and McMillan, 1993). This suggests that different methods of invitation may led to attendance by different types of women.

Internal cues such as symptoms even if not currently being experienced can also act as an important cue. For example, Champion (1994) found that having a 'medical problem with the breast' in the past was the best predictor of screening status in women below 50 years old. Rutledge *et al* (1988) found that women with a personal history of breast disease were likely to have been screened. Fink *et al* (1968) found that women who reported ever having felt a lump in their breast were more likely to have a mammogram. However, in countries with a national screening programme an invitation letter is sent and therefore people do not have to rely solely on bodily symptoms.

It has been found that knowing someone else who has suffered from the disease in question can act as a cue to uptake of screening. A number of studies have examined the influence of family history of disease and breast symptoms on uptake of breast screening and found that this can lead to an increased likelihood of attendance (Bastani *et al*, 1991; Donato *et al*, 1991; Fink *et al*, 1972; Rimer *et al*, 1991; Sutton *et al*, 1994). Sutton *et al* (1994) found that knowing someone who had had breast cancer was a significant predictor in a logistic regression of women attending for a mammogram.

In the UK, population screening for cancer involves personal written invitations. The method adopted for the present study ensured that all women received the same cue, i.e. a letter from their Health Authority inviting them to attend for a smear test. However, it is of interest to explore whether it is the case that experience of others having cervical abnormalities can encourage uptake as cervical cancer is not associated with a family history and therefore may not increase awareness in the same way as experience of breast cancer.

It is predicted that women who report a greater intention to attend for a smear test or who actually attend will be more likely to have had cervical abnormalities themselves or know someone else with cervical abnormalities.

3.3.9 Knowledge and misconceptions

Mass media campaigns and health promotion literature are based on the premise that an increase in knowledge will translate into a higher chance of adopting a healthy lifestyle. Indeed, O'Brien and Lee (1990) increased their participants' knowledge of cervical screening by the use of a video and found that this increase in knowledge was related to a greater likelihood of future uptake of cervical screening. However, health beliefs and demographic factors were not assessed in this study and these may have had a confounding influence.

A variety of misconceptions about cancer and screening have been found to influence uptake of screening. The HBM conceptualises knowledge as a modifying variable directly influencing the likelihood of taking action. However, for the current study it is reconceptualised as a variable which may influence behaviour via its association with social cognitions. Some studies have found that knowledge can be related to beliefs, for example, some women do not understand that the aim of cervical and breast screening is to detect signs of cancer early (Bailie and Petrie, 1990; Davidson and Clements, 1971; Garrett *et al*, 1986; Meadows, 1987) and because of this misunderstanding a positive smear test result or an undiagnosed breast lump can be interpreted as indicating the presence of a fatal illness (McKie, 1993a). This may lead to women not attending for screening for fear of discovering in themselves a life threatening disease (Davidson and Clements, 1971).

Furthermore, some women fail to attend for cervical screening because they think they are not eligible (Beardow *et al*, 1989; Cockburn *et al*, 1991; Elkind *et al*, 1987; Gregory and McKie, 1991; Meadows, 1987). The reasons women give for believing themselves to be ineligible include a lack of symptoms, their age, no longer being sexually active, only having had one sexual partner and a belief that tests are not required after the menopause. This suggests that women's knowledge about the procedure and the purpose of screening is inadequate. To some extent national programmes should help with this because women are invited so they may therefore be persuaded that, contrary to their beliefs, they are eligible for screening. One factor which has been found to trigger women who have never been screened to request a smear test or mammogram is the presence of symptoms (McKie, 1993a; Leather and Roberts, 1989) showing that for some women, at least, symptoms must be present before they seek health care. This belief would impede uptake of cancer screening in a national programme which is aimed at asymptomatic women. A number of studies (e.g. Cockburn *et al* 1991; White, 1995) have found that individuals do not consider attending the GP surgery when they feel well. For example, a logistic regression model showed that women who believed that if they feel completely healthy there is no need to undergo screening were six times more likely to be overdue for a smear test than women who did not hold this belief (Cockburn *et al*, 1991).

Understanding that regular screening is needed can also influence uptake (e.g. Fajardo *et al*, 1992). For example, 26 per cent of women in a study by Schwartz *et al* (1989) had only had one smear test and believed that this was sufficient. The belief that only one test is required can be exacerbated by the fact that women may have a smear test as part of another medical service, such as ante-natal care, and the significance of the test as a separate procedure is not made clear (Gregory and McKie, 1991).

Beliefs about the nature and causes of cancer can be influential for affecting uptake. For example, McKie (1993a) carried out focus groups and found that promiscuity was given as the most likely cause of cervical cancer among women who did not attend for screening and this belief may have influenced their behaviour. Whereas, Costanza *et al* (1992) and Fajardo *et al* (1992) found that those women who knew that increasing age and a family history of breast cancer were risk factors for developing breast cancer were *more* likely to attend for a mammogram.

Other studies highlight the problem of not controlling for social class when exploring the influence of knowledge on intentions and behaviour (e.g. Mamon *et al*, 1990;

Rutledge *et al*, 1988). Rutledge *et al* (1988) found that women with the best knowledge of breast cancer were more likely to have participated in work site screening than non-participants. However, this finding may be confounded by social class, in that there were more professional and highly educated women in the group of attenders, and this was not controlled for.

Some studies have examined the influence of knowledge on behaviour in multivariate analyses finding that such things as knowing the purpose of the screening test and the frequency with which they should it be undergone can be significantly predictive of behaviour (e.g. Champion, 1992 and 1994; Jepson and Rimer, 1993; Mandleblatt *et al*, 1992; Peters *et al*, 1989). However, whilst Champion (1992) found that women who were up to date with screening had better knowledge about breast cancer and that this was a significant predictor of attendance for screening, the result may be confounded by socio-economic status which was also significantly predictive of group membership.

Some studies have found no effect of knowledge, for example, Boer *et al* (1993) found no difference in levels of knowledge about breast screening or breast cancer among participants and non-participants in breast screening. Whilst, Aiken *et al* (1994a) found that knowledge was correlated with the use of breast screening, knowledge levels did not significantly predict compliance with mammogram recommendations when examined with health beliefs and demographic variables in a logistic regression.

The findings from some studies imply that it is not actually knowledge per se which is important but that both knowledge and behaviour may be related to another variable, for instance, a positive attitude to screening. For example, Friedman *et al* (1996) found that level of knowledge was the best predictor of having had a mammogram in the past year. However, some of their knowledge items were closer to perceptions of the benefits of screening, for example, 'breast cancer can be cured if it is found early enough', 'mammograms may find breast cancer early', 'most breast lumps are found by a doctor'.

So perhaps it is greater benefits that are associated with behaviour rather than knowledge.

Examination of the influence of knowledge on uptake of screening in previous studies has been incidental to a (usually retrospective) examination of screening attendance. Previous studies have failed to include reliable scales to measure knowledge and have not related knowledge to social class and controlled for associations with health beliefs. In addition, knowledge of cancer or knowledge of screening have been assessed but not usually both. Knowledge of these may be related in different ways to health beliefs and behaviour. The present study aims to overcome these shortcomings by including a reliable and valid scale to assess knowledge of cervical cancer and the smear test. Supplementary analyses will be carried out between knowledge levels and social class and health beliefs in order to establish why women with greater knowledge are more likely to attend. It is conceivable that level of knowledge may be related to uptake of screening due to better knowledge leading to a more positive attitude to screening.

It is predicted that women who report a greater intention to attend for screening and those who attend will have better knowledge of cervical cancer and of cervical screening than women reporting less intention and non-attenders. It is also predicted that greater knowledge will be associated with a more positive attitude towards screening.

3.3.10 Past behaviour

There is empirical evidence that past attendance for screening can be the best predictor of future attendance (e.g. Beaulieu *et al*, 1996; Fulton *et al*, 1991). For example, in Spain, Rodriguez *et al* (1995) found that the strongest predictors of mammogram use were having had a mammogram, or a smear test, or other non-breast cancer screening. In fact, using a multivariate regression analysis having had a mammogram in the past was shown to be more highly related to uptake of mammography screening, than attitudes, knowledge and demographic characteristics, with the exception of age where younger women were more likely to attend.

As attendance for screening is an infrequent behaviour and there are recommended intervals between screenings, when examining actual uptake of screening it is important to take past screening behaviour into account. The recency of this behaviour is important as non-attenders may recently have been screened and do not attend for this reason as they are not due to be screened. Therefore attempts to explain their behaviour by exploring their beliefs may not be useful. Indeed both Calnan (1984) and Sutton *et al* (1994) found that one of the strongest predictors of uptake of breast screening was *not* having been screened in the past one or two years (i.e. not being due). A study which shows how, under these circumstances, behaviour and beliefs may not be congruent by Rutledge *et al* (1988) found that women who had recently been screened (and therefore did not participate in screening) perceived themselves as more susceptible to breast cancer than other non-attenders. So their perceptions of susceptibility may have led them to attend for screening but as they had already been screened they did not attend. Incidentally, this also shows that susceptibility is not reduced by screening.

Montano and Taplin (1991) examined the role of 'habit' and whether or not this would predict uptake of breast screening. The rather poor measure used was having undergone a mammogram in the last five years - by definition 'habit' would imply a repeated behaviour. There was no relationship to intentions or to later behaviour with a simple correlation. However, an interaction term (intentions x habit) was found to make a significant, although small, contribution to the prediction of behaviour. Contrary to the authors predictions, those women who had had a mammogram were less likely to re-attend. It would be necessary to know how long ago the mammograms were carried out in order to interpret this finding. It is possible that the 28 per cent of women who had ever been screened had been screened very recently and therefore were not due to be screened again. Also, Montano and Taplin failed to look at how habit may be mediated by attitude to explore whether it is associated with a negative attitude which may explain the finding. Jepson and Rimer (1993) in fact found that reported intentions to be screened in the future were significantly higher among women who had previously had a mammogram than among those who had never been screened. Women also differed in that previous 'screenees' had better knowledge of screening, believed that asymptomatic women should have mammograms, and reported more normative pressure to attend. A multivariate analysis was not, however, carried out to examine whether past experience was causally related to these variables.

Some studies have found that previous experience of another type of cancer screening can be related to uptake of screening (e.g. Boer *et al*, 1993; Calnan 1984; Champion 1994; Montano and Taplin, 1991; Murray and McMillan, 1993; Rodriguez *et al*, 1995; Rutledge *et al*, 1988; Sutton *et al*, 1994; Vaile *et al*, 1993). It is likely that similar beliefs may predict mammography and smear test uptake. Use of multivariate statistics would enable an exploration of this to examine whether both types of screening are in fact related to the same beliefs. For example, a positive attitude to health screening.

Consistent with Bandura's theory that experience with a novel behaviour determines future behaviour, Baines *et al*, (1990) found that for first time users of mammograms the distance to the screening clinic and the pain suffered was significantly associated with an intention to have another mammogram. This type of finding may also hold true for women who had been screened on more than one occasion (as they are infrequent occurrences) and the most recent experience they had may have an impact on their intentions and behaviour.

Some research assessing the impact of previous experience of screening (e.g. Sansom *et al*, 1975) has relied on women's reports after they had failed to attend for a recent cervical smear test. It is possible that these women reported previous screening as unpleasant to justify their later non-attendance. The present study assesses past experience of screening *before* an invitation to attend for a smear test is sent. In addition, the experience of screening is assessed with a reliable multi-item scale rather than a single item. In addition, all women will be due for screening so negative behaviour-behaviour relationships should not be apparent for this reason.

Many of the current studies of screening behaviour examine a particular opportunity to be screened without taking into account past behaviour. The current study will explore the influence of past behaviour in two ways. Firstly, predictors of behaviour of women who have never been screened and predictors of behaviour of women who have been screened in the past will be examined separately. Secondly, to explain the effects of past behaviour it is useful to explore how social cognitions may mediate the influence of past behaviour on future intentions and behaviour. As past behaviour and future behaviour are measured in different ways (i.e. self report and examination of cytology records respectively) common method variance will be avoided (Ajzen, 1991). Therefore any direct relationship between past and future behaviour cannot be attributed to this.

> *It is predicted that women who report a greater intention to attend for screening or who do attend will be more likely to have attended in the past than those women who report less intention or who do not attend. This relationship will be mediated by perceived costs and benefits of screening in that those women who have attended in the past will have a more positive attitude to screening. It is also predicted that those women who report a greater intention to attend for screening or those who do attend will report their previous experience of cervical screening as less negative than those women who report less intention or non-attenders.*

3.3.11 Impact of screening on subsequent attitudes

As well as identifying factors associated with uptake of screening a second aim of the first study in this thesis is to examine the impact of screening behaviour on beliefs about cervical cancer and cervical screening for first time users and for those women who have been screened in the past. Belief change following behaviour has been infrequently examined despite the fact that it has theoretical implications.

Reassessing beliefs after the opportunity to be screened has implications for the interpretation of retrospective research. If beliefs are found to change significantly then this demonstrates that it is inadvisable to use perceptions measured after a behaviour to explain that behaviour. For first time users of a behaviour it is reasonable to expect that beliefs will change because, at the second assessment of their beliefs, the women will have actual experience on which to base these beliefs. Accurately predicting the behaviour of these women (who are at risk through lack of screening) is particularly important, therefore prospective research is necessary. In addition, prospective research gives the opportunity of assessing reported intentions and using these to predict behaviour. As detailed in this chapter, intentions are often the best predictor of behaviour. However, beliefs may remain relatively stable for women who have carried out a behaviour in the past.

A small number of women will receive a positive result from their smear test and it is likely that the attitudes of these women may alter. It is anticipated, however, that in the current study there will be too few women in this position to carry out an analysis comparing changes in their beliefs with those of women receiving a negative result. Women whose smear test result is positive will therefore be excluded from the analyses assessing belief change.

> *It is predicted that significantly greater change in beliefs will occur between the two phases of the current study for women carrying out the behaviour for the first time than for women who are not screened (whether or not they have been in the past) and those who have been screened and who attend again. Exploring health beliefs multivariately it is predicted that for women who have been screened in the past, predictions from prospectively assessed beliefs and from retrospectively assessed beliefs will be similar, in terms of*

which variables are important and the variance in behaviour these beliefs explain. However, for women who have never been screened, belief measures assessed before the behaviour will better predict behaviour in a multiple regression than belief measures taken after the behaviour.

3.4 Socio-demographic influences on uptake of screening

3.4.1 Introduction

Together with the psychological factors mentioned in the previous section, research has shown that a number of social characteristics and environmental influences are associated with compliance with screening. This section describes variables, other than health beliefs, which have been found to be related to uptake of screening. The review mainly focuses on uptake of cervical screening and it also includes studies which are not based on social cognition models but which highlight the importance of different demographic variables for explaining behaviour. As mentioned in Section 3.2. social cognition models suggest that the influence of such variables on intentions and behaviour will only be exerted via cognitions. According to social cognition models, then, in a multivariate analysis only the indirect effects of social and demographic variables should be significantly related to intentions and behaviour. However, it is possible that demographic variables will show direct effects too and may also reduce the weight of the direct social cognitive effect (e.g. Chen and Land, 1990). Whether or not health beliefs can explain the impact of sociodemographic variables on uptake of screening is therefore explored. The findings from the research reviewed below are examined to establish how far this seems to be the case or whether an independent effect on intentions and behaviour of the social and demographic variables is apparent.

However, many studies do not employ multivariate statistics which are essential in order to examine the relative importance of social and other variables. In fact, many of the studies below are descriptive, observing various socio-demographic differences between attenders and non-attenders for screening, or simply describing the characteristics of non-attenders. Very few studies are based on a theoretical model and those which are do not explore the possible mediating role of cognitions in explaining the influence of social characteristics on behaviour. The studies look at whether or not women intend to be screened, are screened on a particular occasion, the frequency with which they are screened, the recency of screening, and whether or not they have ever been screened. If studies are not based on social cognition models this does not, of course, invalidate their findings, but it makes interpretation of the reasons for any demographic and social differences, difficult to interpret.

A further point to note is that demographic factors can be related to one another, e.g. social class and ethnic origin; social class and marital status; age and income. This can influence the effect that these variables have on intentions and behaviour. Indeed, Kleinman and Kopstein (1981) found an interaction between age and income and the influence of these variables on uptake of screening. Income level was important for women aged under 65 years old but less important for women older than 65. Therefore it is important that these possible confounding effects are explored in a multivariate analysis in order to establish which factors are the most important.

There are therefore three types of studies. In many studies there is simply the observation that, for example, the older a woman is the less likely she is to attend for screening. Other studies explore the influence of say, age, as a predictor variable with other variables in a multivariate analysis. These studies have the advantage of showing how influential a woman's age is for explaining intentions and behaviour once the impact of other predictor variables have been taken into account. The third, and arguably most informative, type of study explores the role of a variable, for example, age, in a multivariate analysis and traces how social cognitions may mediate its effect on intentions and behaviour.

3.4.2 Age

A considerable body of research has found that younger women are more likely to report having attended for a smear test, and/or a mammogram or to report that they intend to attend (e.g. Aiken *et al*, 1994a; Bailie and Petrie, 1990; Beardow *et al*, 1989; Calnan, 1985; Celentano *et al*, 1982; Cockburn *et al*, 1991 and 1992; Coulter and Baldwin, 1987; Davidson and Clements, 1971; Fajardo *et al*, 1992; Hennig and Knowles, 1990; Hill *et al*, 1985; Harlan *et al*, 1991; King, 1987; Kleinman and Kopstein, 1981; Mamon *et al*, 1990; Peters *et al*, 1989; Shelley and Irwig, 1988; Vuori *et al*, 1972). A point to note about these studies is the way in which age is measured. Some studies use women's actual age whereas others divide the sample into age categories. Sometimes this division seems arbitrary and at other times based on screening recommendations and how often different groups should have been screened (e.g. Champion, 1994). However, whether chronological age or ordinal variables representing age categories are used, it is generally found that the older women or groups are less likely to be screened.

Studies which have explored health beliefs in addition to demographic variables, for example, those of Calnan (1984) and Hennig and Knowles (1990) have found that whilst the oldest age groups of women reported significantly less intention to be screened in the future, the influence of age was not significant when explored in a multivariate analysis and belief measures were more important.

However, other studies which have used multivariate analyses provide compelling evidence that age is related to intentions and behaviour as regards uptake of cervical and breast screening. Two studies which did not use social cognitions in addition to demographic variables found that age was a significant, if moderate, predictor of mammography and smear test uptake (Calle *et al*, 1993; Howe and Bzduch, 1987) and

Mamon *et al* (1990) found age to be the most important predictor of uptake of screening. Champion (1992) also found age to be the most important variable even with the addition of health beliefs. Similarly, Montano and Taplin (1991) found that women aged over 60 years old were the least likely to attend for breast screening and that the addition of a woman's age in a multiple regression added to the variance already explained by attitude variables.

There are difficulties with some studies. For example, Champion (1994) found that for screening compliance in the past five years and the past year women below the age of 50 were more compliant. However, due to the way in which this was assessed, women between 35 and 40 years old were judged to be compliant even if they had not been screened as mammograms were not recommended until women were over 40 years old. Therefore it may have been useful to exclude women below 40 years old from the analysis. Mandleblatt *et al* (1992) found using a logistic regression analysis that in their sample of elderly women, the older women were less likely to have ever been screened for cervical cancer. However, as their sample top age was 104 years old this is probably also due to availability of screening and organisational factors as screening was not available until after these women passed 65 years old.

Not all findings relating to age are consistent and some studies find no difference between different age women as regards screening uptake (e.g. Fischera and Frank, 1994; Lerman *et al*, 1990; Mandleblatt *et al,* 1992; Mandelblatt *et al*, 1993; Rutledge *et al*, 1988; Sutton *et al,* 1994) and others find that older women are more likely to intend to, and actually, attend for screening (Jepson and Rimer, 1993; Shroff *et al*, 1988; Wilson and Leeming, 1987). The higher rate of screening among older women found by Wilson and Leeming (1987) and Shroff *et al* (1988) was following a personalised letter to all non-attenders giving an appointment time. It is possible therefore that younger non-attenders may have made an active decision to not attend for a test whereas older women had perhaps not been asked to attend. For Jepson and Rimer (1993) this result was only found among women who have never had a mammogram and age was not predictive of intentions among women who had had a mammogram in the past.

The reasons for this age difference in screening uptake remain unclear although a number of possible explanations have been suggested, some based on an exploration of data using multivariate statistics including path analysis. Differential attitudes to screening and risk have been suggested as influences. Bailie and Petrie (1990) found that older women were more likely than younger non-attenders to say that they would be embarrassed by cervical screening. Aiken *et al* (1994a) found that age was significantly negatively correlated with perceptions of susceptibility to breast cancer and its severity. However, the interaction between age and these beliefs was not significant in a logistic regression predicting compliance. Orbell *et al* (1996) found that the attitudes of older women could explain their lower level of uptake of cervical screening. Older women felt less susceptible to cervical cancer and were less likely to believe that the smear test would give them peace of mind and lead to any problems identified being able to be cured. They also viewed the prospect of obtaining a positive result more negatively. Vernon *et al* (1993) found that age was inversely related to women's perceived susceptibility to breast cancer. Taplin and Montano (1993) found that in their prospective study women over 65 years old, who were less likely to attend for a mammogram were more likely to believe that mammogram would expose them to excess radiation. Causal attributions for cervical cancer may also affect behaviour. King (1987) found that some older women view cervical cancer as a 'dirty' disease and are therefore more resistant to having a smear test for fear that it would imply that they are promiscuous.

However, the age differences may, in part, be related to the way in which screening programmes are run and access to services has also been suggested as an influence. For example, Celentano *et al* (1982) examined differences among women of different ages to explore why screening recency may be related to age. The reason seemed to be one of differential access to services in that younger women tended to have a usual GP and to attend a obstetrician or gynaecologist more frequently than older women. Younger women were therefore more likely to have the test as part of another procedure, for example an ante-natal check-up. In addition, other studies suggest that poorer mobility may make travelling to the clinic more difficult for older women (Elkind *et al*, 1988).

The smear test is now more widely available than at the time of the early studies when many of the older women would not have had the opportunity to be screened. Research has found no age difference in uptake when examining response to opportunistic screening (e.g. Beaulieu *et al*, 1996; Pierce *et al*, 1989). This type of screening invitation would not be influenced by screening policy. This suggests that when older women are offered screening in person they may be as likely to accept as younger women.

The present study examines the influence of a woman's age on her uptake of screening in order to address the question of why older women may be less likely to attend for a smear test. The relationships between age and health beliefs, will be investigated. The association between age and other social circumstances which may affect uptake will also be explored.

> *It is predicted that women who report a greater intention to attend for screening and women who attend for cervical screening will be significantly younger than women reporting less intention to attend and non-attenders. The predicted differences are expected to be related to a feeling of lack of susceptibility to cervical cancer and a more negative attitude towards the smear test among older women.*

3.4.3 Ethnic origin

Non-white women are less likely to undergo population based screening for cancer than white women (Burack and Liang, 1989; Calle *et al*, 1993; McAvoy and Raza, 1988; Majeed *et al*, 1994; Vernon *et al*, 1990; Wilcox and Mosher, 1993). In most studies however the sample is predominantly white unless a point is made to target other ethnic groups. This can make it difficult to explore the relative influence of the effect of ethnic origin on screening uptake.

In North America, data from the national Health Interview Survey shows that women of Hispanic origin are significantly less likely to have a cervical smear test than black or white women. Harlan *et al* (1991) found that this was related to being a non-English speaker. Asian[2] women are particularly unlikely to attend for a smear test and it has been found that only 35 per cent of Asian women in the UK have ever been screened (McAvoy and Raza, 1991; Lancaster and Elton, 1992).

Some studies have controlled for the fact that ethnic origin and other demographic factors which may influence behaviour can be related. For example, Kleinman and Kopstein (1981) found that controlling for age, income and residence black women remained the least likely to have had a smear test. Likewise, Calle *et al* (1993) found that when the influence of ethnic origin was examined in a multiple logistic regression with other demographic predictors of uptake it was one of the strongest predictors of use of mammography and cervical screening with Hispanic women being the most infrequently screened.

One explanation for why a woman's ethnic origin should influence attendance for screening is, as for age, service provision, in that the service may be insensitively presented and some groups of women are simply not aware of the programme (McAvoy and Raza, 1991; Naish *et al*, 1994; Harlan *et al,* 1991). Also, information leaflets may be in a language which is not the first language of the women concerned (Harlan *et al,* 1991). Translated leaflets may be difficult to understand or unobtainable. However, many Asian women, for example, do not read their native language so that even when leaflets and letters are translated, this can of be little help in encouraging attendance (McAllister and Farquhar, 1992). Indeed, in focus groups carried out in the UK, Naish

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[2] Women of Indian sub-continent descent.

and colleagues (1994) found that language was the primary barrier to attendance for the ethnic minority women and that these women were not resistant to attending for cervical screening per se.

Another explanation is the influence of the attitudes held by women. For example, it has been found that Asian women are particularly reluctant to be examined by a male doctor and their husbands sometimes object to this (McAvoy and Raza, 1988). Some qualitative studies have attempted to explore the influence of ethnic background on screening uptake and have identified fatalistic views. Gregg and Curry (1994) in their research into uptake of cervical screening in low income African-American women explored the 'explanatory models of disease', i.e. attributions for the causes of diseases, in 99 women. They found that the women believed that if a cancer could be detected by screening then it would be too late to be treated and, therefore, they believed that screening was pointless. The women's definition of cancer was that it was necessarily fatal and therefore outside the realm of doctors' abilities. Women undergoing screening with these beliefs, then, believed that they would discover a disease which would ultimately kill them - a powerful deterrent to attendance. Similarly, in New Zealand, White (1995) found that Maori women believed that by the time cancer is found it will be terminal.

Current studies have a number of problems, in that they do not always relate ethnic background to other demographic factors and do not take into account acculturation. For example, younger women from ethnic minorities are likely to be born in the UK and therefore language problems would not be likely to explain differences in uptake of screening. Neither is the influence of social cognitive variables examined in a systematic way. The present study will explore the effect of ethnic background on uptake of screening and also any belief differences between women of different ethnic backgrounds. It is anticipated that women who do not classify themselves as white will be in the minority in the study which may compromise the depth of the analyses which can be conducted. No hypotheses are made about the influence of ethnic background on intentions and behaviour.

3.4.4 Marital status

There is little consensus as to what may be important about marital status and the categories used for comparison often vary with each study. Usually, however, married women are compared to women in various categories of unmarried status which imply having no partner, e.g. separated, divorced, widowed, although this is often not made clear and some women in these categories may have a partner. Most women with a partner are married but it is important to also include those living in de facto relationships. Bearing these points in mind, studies have found that married women are more likely to attend for cervical screening (Baile and Petrie 1990; Bostick *et al*, 1994; Howe and Bzduch, 1987; Murray and McMillan, 1993; Vuori *et al,* 1972) and breast screening (Calnan, 1984; Fink *et al*, 1968; 1972; Vaile *et al*, 1993) than unmarried, divorced, separated or widowed women. However, Donato *et al* (1991) found in Italy that widowed women were as likely to be screened for breast cancer as married women in comparison with single, separated and divorced women. Sutton *et al* (1994) found that married or single women were more likely to have a mammogram than divorced, separated or widowed women. This result was only found for data collected by postal questionnaire, not by personal interviews. Other studies have found that never married women are the least likely to have ever had a smear test (e.g. Charny *et al,* 1987; Houghton, 1968) or a mammogram (Calle *et al,* 1993) or the most likely to be overdue for screening (Cockburn *et al*, 1991; 1992).

Multivariate analyses provide evidence that marital status is an important influence on behaviour when other variables are also taken into account (e.g. Harlan *et al*, 1991). Calnan (1985) found, using a discriminant function analysis, that being married was a predictor of having been screened for cervical cancer. Calle *et al* (1993) found for cervical screening that marital status (together with ethnic background) was the strongest predictor in a multiple logistic regression with other socio-demographic variables of having been screened. Wilcox and Mosher (1993) found that women who were not sexually active were significantly less likely to have been screened for breast and cervical cancer than married women and sexually active unmarried women and that this factor was a strong predictor of being screened in a logistic regression.. However this group comparison implies that the married women are necessarily sexually active.

Two studies have included social cognitions as well as demographic variables in a multiple regression and are also the only two studies to trace pathways for possible reasons for greater uptake of screening among married women. Orbell *et al* (1996) found that women who had never had a smear test were more likely to be single than married, divorced, separated or widowed. Unscreened women were also more likely than screened women to have never had sexual intercourse. In a path analysis it was found that the influence of marital status on uptake was mediated by an association with number of sexual partners and the association of this with perceived susceptibility (greater with more partners), aversiveness of test procedure (less with more partners), perceived benefits (more with more partners), and a cue to attend from a GP. However, both marital status and number of sexual partners also had a direct effect on screening status which was not mediated by the beliefs in the model.

Peters *et al* (1989) found in a study including social cognitions but not based on a particular social cognition model, that whilst married women were more likely to have been screened for cervical cancer more recently and frequently than unmarried women, marital status was, in fact, related to other factors. From the results of a logistic regression, they conclude that it was a marker for these other factors, including experiencing fewer cognitive barriers to screening; knowing the screening interval; having more pregnancies in the last five years and fewer pregnancies without pre natal care.

Other studies found no marital status difference in uptake of screening and these conflicting results are more common with mammogram uptake (e.g. Bostick *et al*, 1994; Beaulieu *et al*, 1996; Mamon *et al*, 1990; Rutledge *et al*, 1988). However, some studies have problems with their classifications, for example, Aiken *et al* (1994a) who found that being married was not associated with uptake of mammography. However, the women in this study may have had a partner but unless they were actually married they were classified as single. The current literature suggests that the influence of marital status is about having a partner and not about the institution of marriage.

It seems then that marital status is particularly important for uptake of cervical screening. Few studies have included an examination of social cognitions, together with marital status, for example beliefs about the costs of screening, and those which have, are retrospective.

> *It is predicted in the current study that women who report a greater intention to attend for screening or who attend will be more likely to have a current partner than women reporting less intention to attend or who do not attend. It is also predicted that having a partner will be associated with a more positive attitude to cervical screening and a greater perception of susceptibility to cervical cancer.*

3.4.5 Social status

Occupational status, education level and income have all been used as indicators of a woman's socio-economic status. How this is measured, of course, may affect the results obtained when associations with uptake of screening are examined. On the whole though, a woman's socio-economic status has been found to be related to whether or not she will attend for cancer screening. Users of screening services in the past and those who intend to use them tend to be better educated, earn higher incomes and be from a higher social class (usually measured by occupation of head of household and less frequently by the occupation of the woman herself) than non-users. Such findings are common to the USA, Australia, the UK and other parts of Europe (e.g. Allman *et al,* 1974; Bostick *et al,* 1994; Cockburn *et al,* 1991 and 1992; Coulter and Baldwin, 1987; Fulton *et al,* 1991; Gillam, 1991; Houghton, 1968; Hurley *et al,* 1994; Kegeles *et al,* 1965; Kleinman and Kopstein, 1981; Majeed *et al,* 1994; Marsh and Channing, 1986; Orbell *et al,* 1996; Peters *et al,* 1989; Richards, 1989; Rosenstock, 1966; The Research Unit in Health and Behavioural Change, 1989; Rutledge *et al,* 1988; Townsend and Davidson, 1982; Vuori *et al,* 1972). These studies have been largely descriptive in nature.

Other studies have found social class and educational differences among women when the data have been examined in multivariate analyses (e.g. Aiken *et al,* 1994a; Calnan, 1985; Champion, 1992; Harlan *et al,* 1991; Wilcox and Mosher, 1993). Mandelblatt *et al* (1992) found using a logistic regression that those women with over 11 years of education were 2.5 times as likely as those women with fewer years of education to have ever had a smear test. Mamon *et al* (1990) found that women who had not been screened the number of times they should have considering their age, were less educated, and earned less. However these variables were found to be associated with age (which as mentioned above also differed between screened and unscreened women) with younger women being found to be wealthier and more educated. So whether it was the influence of age or social class that was the most important is not clear. This shows how it is important to explore associations between demographic variables before reaching conclusions. In 1994 Champion also found that SES was associated with past attendance for a mammogram. For women over 50 years old it was also a significant predictor in a logistic regression. However, education was also included in this model - and was predictive of screening behaviour - and moreover, education was used to calculate an SES score so its inclusion in the logistic regression would have lead to multicollinearity and possibly compromised the results of the analysis.

In some studies using multivariate techniques, education has been found to be the most important variable for explaining behaviour (e.g. Calle *et al*, 1993) or one of the strongest (e.g. Wilcox and Mosher, 1993). For example, Calle *et al* (1993) found that women with less than 12 years of education were less likely to have had a mammogram or a smear test and this was (together with ethnic origin) the strongest predictor of screening status in a multiple logistic regression, although belief variables were not included.

When health beliefs have also been examined in a multivariate analysis, some research has found that social class and education are not important for explaining uptake of mammograms (e.g. Calnan, 1984) or smear tests (Murray and McMillan, 1993). Montano and Taplin (1991) found that education and income were correlated with having had a mammogram and that adding education to a multiple regression increased the variance explained although attitude variables remained the most important predictors of behaviour. This point is worth highlighting. If attitude variables have also been assessed in studies then these tend to outweigh the influence of demographic variables and, in fact, it is most important to look at how the demographic variables may be mediated by the attitude variables.

However, conflicting results have also been reported where no educational or social class differences between attenders and non-attenders for screening are apparent (e.g. Beaulieu *et al*, 1996; Fischera and Frank, 1994; Mandleblatt *et al*, 1993; Sutton *et al*, 1994). Some studies failed to include a wide range of educational level. For example, in the Beaulieu *et al* study sample there was little variation, most women having only elementary school education and in the Fischera and Frank (1994) study all women were highly educated. This restricted range would reduce the chances of finding significant differences.

A number of explanations have been offered for the observed social class/socio-economic differences in uptake. Practical considerations may be involved such that women from lower social classes may have less access to child care facilities making attending for screening difficult (Cook, 1987; Rundall and Wheeler, 1979; Townsend and Davidson, 1982). In North America financial cost is a factor where screening is not free which may explain why a lower income is associated with lack of screening.

Non-attendance where there are call programmes in operation may result simply from not having been asked and this may be a particular problem among women from the lower social classes. Lower class women move house more frequently than women from higher social classes (e.g. Sansom *et al*, 1975) and inner city areas where uptake of screening is lower are particularly prone to the problem of high mobility. Some features of the health care system may also discourage use by less affluent women. Those individuals with a low income are less likely to be registered with a doctor and therefore they use services where there are long waits for attention, treatment is impersonal, and there is little continuity of care. Having no regular doctor may ultimately lead to a lack of faith in the health care available and a disinclination to use it. As will be discussed below, access to health care has been found by some studies to be an important factor for determining attendance for screening (e.g. Peters *et al*, 1989; Rundall and Wheeler, 1979).

Alternative explanations relate to attitude differences. It has been suggested that people from lower social classes may place less importance on good health, consider the future less and be more concerned with immediate gratification than those from higher social classes (Rosenstock, 1966). In fact it has been found that less affluent women have worse general health which could influence them to believe that testing for the potential development of cancer in the future is irrelevant to them in the face of poor health currently being experienced (Elkind *et al*, 1988). In addition, uptake of screening is in the unique position of being a behaviour which could lead to the discovery of bad news. Indeed, Sansom *et al* (1975) found that women in social class five were significantly more likely than women in social class one to believe that cancer was not curable. Other research suggests that women from lower social classes may feel less in control of their health than women from higher social classes. It has been found that people in social classes four and five are more likely to mention social factors, such as income and housing as influences on their health, than those in social classes one and two (Coulter, 1987). Therefore, they may not attend for screening feeling that their actions have no bearing on their health. Additionally, those with a low income perceive themselves to be less in need of preventive health care than high earners (Rundall and Wheeler, 1979).

Only a few studies explore associations between social circumstances and other predictor variables in order to explain why differences in uptake might exist. For example, Peters *et al* (1989) found that the influence of income and education on screening status was mediated by positive associations with knowledge of the recommended screening interval and years of use of oral contraceptives and negative associations with number of pregnancies with no prenatal care. Stein *et al* (1992) found no direct link between SES and prior mammogram use and future intentions. However, using a path analysis they show that a higher SES (higher income, higher education and an English speaker) was associated with reduced barriers to screening which in turn was related to previous screening and also, but to a lesser degree, to intentions to attend. Orbell *et al* (1996) found, using a series of hierarchical multiple regressions, that the influence of social class on screening status was mediated by an association with perceptions of susceptibility and aversiveness of the smear test. Women from lower social classes felt less susceptible to cervical cancer and perceived the smear test, and a positive result, more negatively than did women from higher social classes.

Previous studies examining the influence of social class on uptake of screening have, with the exceptions mentioned above, been descriptive in nature and have generally found that more women who are educated and from higher social classes had been screened than less educated women and those from lower social classes without showing why this was the case. The present study will examine the relationship between a woman's social class and her behaviour by exploring the mediating role of health beliefs such as her perceived susceptibility to cervical cancer and her attitudes to screening. This will give a fuller explanation of how social class may influence uptake of screening.

It is predicted that, women who report a greater intention to attend for a smear test or who attend for screening will be from a higher social class than women reporting less intention and non-attenders. In addition it is predicted that women from the lower social classes will perceive themselves as less susceptible to cervical cancer and will have a more negative attitude to screening.

3.4.6. Characteristics of screening service: access and providers

In countries other than the UK, for example, the USA, New Zealand and Australia, factors associated with uptake of screening include having a primary caregiver, having regular check ups and currently receiving care from a gynaecologist. These factors have been found to be relatively more important where no national programme exists and where opportunistic screening is therefore important. The influence on behaviour of a GP recommending a screening test has been discussed above in section 3.3.8, this section is concerned with the influence of an individual simply having access to a screening programme.

Having a regular source of gynaecological care or a regular doctor has been found to be related to cervical screening frequency and recency (Peters *et al*, 1989) and to having had a breast examination and mammogram (Fulton *et al*, 1991). Celentano *et al* (1982) carried out a multiple regression analysis on reasons for women having been screened. They found that together with age these 'access' variables were more important in predicting behaviour than perceptions of the benefits of screening, perceptions of susceptibility to cancer, knowledge, attitudes towards cancer and income. A recent gynaecological visit was the most important variable in the multiple regression.

Behaviour can also be related to the recency and frequency of contact with health professionals. Simply having visited a GP in the past year was found by Bostick *et al* (1994) to be a significant predictor of having undergone a variety of screening examinations for cancer. Similarly, Fink *et al* (1968, 1972) found that participants in breast screening were more likely to have visited a doctor in the last year than non-participants. Mamon *et al* (1990) found that not having received breast screening (enough times) was associated with fewer visits to the doctor in a year. One study in the UK by Meadows in 1987 found similar results in that women who were overdue for screening contacted their GP less often than those who were up to date.

Direct measures of contact with health care providers, for example, having a chronic illness, having a venereal disease or urogenital disease, being pregnant or using oral contraceptives have been found in a number of studies to be related to screening uptake, and to recency and frequency of screening (e.g. Bailie and Petrie, 1990; Bostick *et al*, 1994; Howe and Bzduch 1987; Mandleblatt *et al*, 1993; Peters *et al*, 1989). In a multiple regression analysis carried out by Howe and Bzduch to explore recency of cervical screening among 25 - 74 year olds in New York, medical care use was the strongest predictor of recency of screening, although no social cognition variables were included in the model.

In contrast, Beaulieu *et al* (1996) found no difference between attenders and non-attenders for mammography for whether they had a regular gynaecologist. This can, perhaps, be explained by the fact that this study examined uptake following an opportunistic invitation and therefore access variables were not important for predicting this behaviour as all the women had the same opportunity.

Access factors are controlled for in the present study in that all women who are involved will be registered with a GP (as FHSA lists are used to identify participants) and in addition, all women will have the same 'access' to the screening.

The sex of a woman's GP may also affect whether or not she attends for a smear test in that it has been shown that women with access to a female GP are more likely to have had a smear test than women whose GP is male (Bailie and Petrie, 1990). In some studies, sex of doctor has been conceptualised as a cost of screening, in that to have a male GP would make attendance for a test more costly. Hennig and Knowles (1990), for example, found that for the women over 40 they questioned, the sex of their GP was significantly correlated with their intentions to attend for a smear test, with female GPs being preferred. Moreover other studies have found that believing that they would be examined by a man discouraged some women from attending (Elkind *et al*, 1987). Even women who have never had a test, and who are therefore not basing their beliefs on experience, have been found to be influenced by considerations such as the sex of the health professional who would carry out the procedure (Cullum and Savory, 1983; McKie, 1993a; Standing and Mercer, 1984).

This preference for sex of GP may be related to the fact that female GPs tend to be younger than male GPs and therefore have usually had more training in preventive care (Lurie *et al*, 1993). In addition, many more smear tests and mammograms are performed by female than male health professionals, making the expectation that a female will be carrying out the procedure more salient (e.g. Bentham *et al*, 1995; Lurie *et al*, 1993; Majeed *et al*, 1994).

In addition, women have been found to believe that female GPs have a better understanding of their problems, take more time with them and are more caring. Female GPs are consequently preferred for cervical and breast screening as having a woman perform these procedures is perceived by the patients to be less embarrassing (Elkind *et al*, 1988; Gregory and McKie, 1991; Nichols, 1987; Waller, 1988). Women, may however, prefer to be screened by a familiar person irrespective of their sex (Cullum and Savoury, 1983; Elkind *et al*, 1988; McKie *et al*, 1990; Pierce *et al*, 1989).

Most previous studies were not based on social cognition models and few used multivariate statistics to explore how these variables may influence intentions and behaviour. In the present study the sex of a woman's GP and the sex and professional status (i.e. their GP or another health professional) of the person who performed the woman's last smear test will be established. Any differences in attitudes towards cervical screening among women with a male or female GP and among women who were screened in the past by a male or female health professional will be examined. These analyses will be exploratory and no hypotheses are made.

3.5 Psychological and social influences on uptake of cervical screening: the present study

As the above review shows, data from disparate groups have identified the social, cognitive and demographic factors which are important for predicting intentions and behaviour as regards screening uptake. The literature provides reasonably good evidence that these are robust effects and it is important to examine exactly why differences might exist.

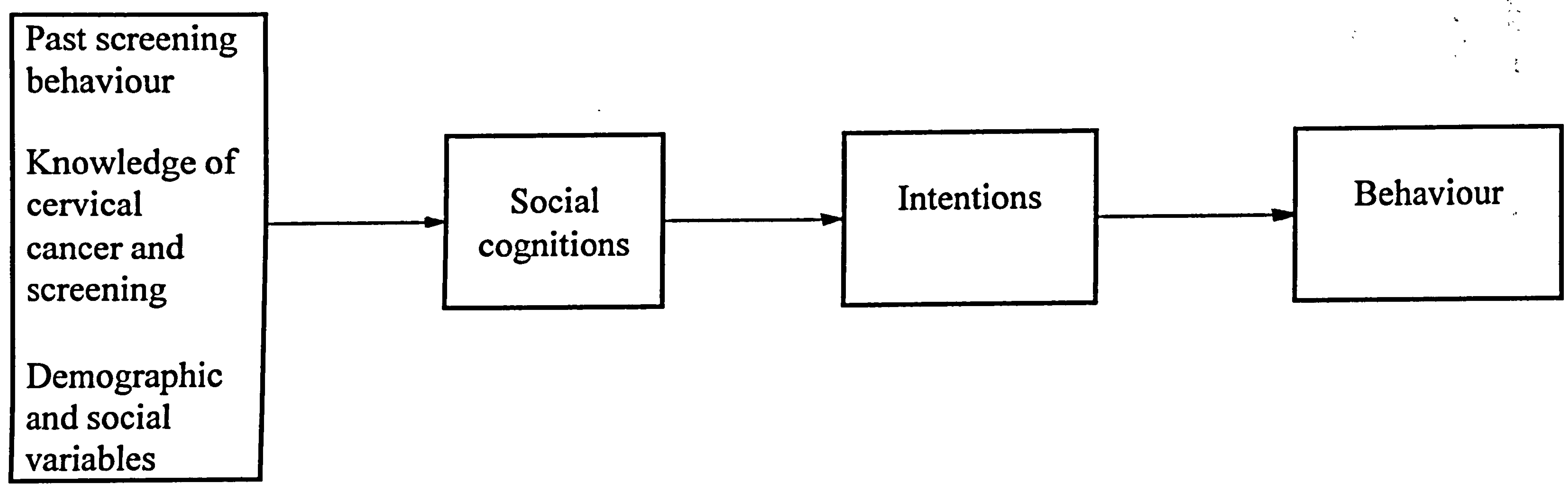
The HBM has been widely used and appears to offer a potentially useful framework for investigating influences on screening uptake, incorporating as it does threat perceptions, outcome expectancies, demographic and social influences. Screening for cancer is not part of a daily routine, and therefore individuals are unlikely to undergo it without some conscious deliberation. Applying the social cognition model of the HBM may identify beliefs which can predict this behaviour. Other theories applied to explaining use of screening have given broadly similar results. There is evidence to demonstrate that cognitions derived from the HBM are capable of predicting and explaining screening behaviour although research to date has had a number of limitations.

Thus the present investigation aims to examine the explanatory value of the HBM in relation to uptake of cervical screening. The study uses a prospective design to examine the role of women's health beliefs and social and demographic characteristics in predicting intentions to be screened and later uptake of cervical screening. Figure 3.3.1 shows the hypothesised relationships between different classes of variables to be used in the present study. The way in which these are operationalised is discussed in greater depth in the following chapter. As can be seen, the intervening variable of a reported intention to act is included in the model and also some of the modifying variables as detailed in the HBM are reconceptualised as variables which will be mediated by the core social cognitions.

It appears from previous research that perceptions of the benefits and costs of cervical screening are particularly important in influencing both intentions to attend for future screening and actual uptake, and for explaining previous attendance. Whilst perceptions of susceptibility to cervical cancer have also been found to influence attendance, these perceptions have been more highly related to reported intentions to attend for a smear test in the future rather than behaviour. Perceiving cervical cancer to be severe has not thus far distinguished between women who attend for cervical screening and those who do not. However, the influence of these HBM variables has yet to be tested rigorously in a prospective study, including reported intentions to be screened and an objectively verifiable measure of behaviour. In addition, social factors affecting uptake are measured in the present study and their relationship to one another and to intentions and behaviour is explored. The prospective design of the present study overcomes the problems associated with interpreting retrospective studies by allowing data on health beliefs to be obtained *before* women attend or do not attend for a smear test. In this way stronger conclusions can be drawn about causality.

Existing studies demonstrate little consistency in the method of assessment of health beliefs. This may be partly due to a lack of consensus about how to operationalise the elements in social cognition models, particularly the HBM. For example, if general

Figure 3.3.1 Theoretical relationships between variables as operationalised in study 1



health questions are presented together with questions which are specific to one disease or one health behaviour, the resulting scale violates the principle of compatibility and does not always measure a single construct (Jette *et al*, 1981) and therefore its reliability is reduced. To overcome this difficulty the present study assesses beliefs about perceived susceptibility, perceived severity, perceived benefits and perceived costs, specifically in relation to cervical cancer and cervical screening and relates these to intentions and later uptake of the smear test. Additionally, in order to overcome the problems associated with the unreliability of measures, a questionnaire measure of beliefs about cervical cancer and cervical screening, with high reliability, was developed for the present study.

Very few studies examined uptake of screening in a national programme which has the advantage of controlling for differential access to the service (which may 'swamp' the effect of other variables). Exceptions to this are studies of uptake of breast screening (Boer *et al*, 1993; Calnan, 1984; Sutton *et al*, 1994; Vaile *et al*, 1993) and cervical screening (King, 1987; Orbell *et al*, 1996).

A major drawback of research in this area is that there are very few prospective studies. Whilst some of the existing studies of uptake of cervical screening have relied upon reported intentions to attend for screening as the outcome variable they have not also examined how these intentions may predict behaviour (for example Hennig and Knowles, 1990; Hill *et al*, 1985). In the present study, therefore, whilst reported intentions to attend for a smear test before being invited to do so are examined and is expected to be predicted by social cognition variables and mediate these effects, actual behaviour is also assessed and its relationship to social cognitions explored. Additionally few studies have used an objectively verifiable measure of screening uptake, sometimes relying on self-report which can be open to bias.

Finally, beliefs about health and health screening are unlikely to be the sole determinants of screening uptake. Socio-demographic variables such as age, marital status and social class may play a part in determining the likelihood that a recommended preventive action will be taken. An exploration of the influence on screening behaviour (whether it is direct or mediated by cognitions) of these factors is included in the present study.

Thus the advantages of the present study over existing research on psychological factors associated with uptake of cervical screening are as follows:

- the use of a prospective design
- the use of social cognition measures with demonstrated reliability and which are specific to cervical screening and cervical cancer
- the addition of a measure of 'intention'
- the use of multivariate analysis to identify factors which predict intentions and screening uptake, the relative importance of these factors and how the effect of some variables may be mediated by others.
- the control of differences in service provision which may be responsible for some of the observed socio-demographic differences in uptake.

3.6 Summary of hypotheses

Study 1 therefore aims to test the following hypotheses:

Hypothesis 1: The relative contribution of the HBM elements in predicting intentions will be greater than the contribution made by demographic and social variables.

Hypothesis 2: Those women who attend for a smear test will have reported a greater intention to do so than those women who do not attend for a test.

Hypothesis 3: The influence of all attitude and social variables on behaviour will be mediated by reported intentions.

Hypothesis 4: All social cognition variables will be more highly related to intentions than to behaviour.

Hypothesis 5:

(a) those women who report a greater intention to attend for screening will perceive themselves to be more susceptible to cervical cancer than those women who report less intention.

(b) those women who attend for screening will perceive themselves to be more susceptible to cervical cancer than those women who do not attend.

(c) for women who have never been screened perceptions of susceptibility will discriminate more between intenders/non-intenders and between attenders/non-attenders than for women who have been screened in the past.

Hypothesis 6:

(a) those women who report a greater intention to attend for screening will perceive cervical cancer to be more severe than those women who report less intention.

(b) those women who attend for screening will perceive cervical cancer to be more severe than those women who do not attend.

(c) perceived severity of cervical cancer will be positively correlated with perceived costs of cervical screening.

(d) for women who have never been screened perceptions of the severity of cervical cancer will discriminate more between intenders/non-intenders and between attenders/non-attenders than for women who have been screened in the past.

Hypothesis 7:

(a) those women who report a greater intention to attend for screening will perceive cervical screening to be more beneficial than those women who report less intention.

(b) those women who attend for screening will perceive cervical screening to be more beneficial than those women who do not attend.

Hypothesis 8:

(a) those women who report a greater intention to attend for screening will perceive cervical screening to be less costly than those women who report less intention.

(b) those women who attend for screening will perceive cervical screening to be less costly than those women who do not attend.

(c) of the social cognition variables, perceived costs is expected to make the greatest contribution to the prediction of intentions and behaviour.

Hypothesis 9:

(a) those women who report a greater intention to attend for screening will be more likely to have personal experience of cervical abnormalities or know someone else who has than those women who report less intention.

(b) those women who attend for screening will be more likely to have personal experience of cervical abnormalities or know someone else who has than those women who do not attend.

Hypothesis 10:

(a) those women who report a greater intention to attend for screening will perceive more normative pressure to attend than those women who report less intention.

(b) those women who attend for screening will perceive more normative pressure to attend than those women who do not attend.

(c) normative belief measures will be positively correlated with perceptions of the benefits and of screening and negatively correlated with the costs of cervical screening.

Hypothesis 11:

(a) those women who report a greater intention to attend for screening will have better knowledge of cervical cancer and cervical screening than those women who report less intention.

(b) those women who attend for screening will be more likely to have better knowledge of cervical cancer and cervical screening than those women who do not attend.

(c) knowledge will be positively correlated with perceptions of the benefits of cervical screening.

Hypothesis 12:

(a) those women who report a greater intention to attend for screening will be more likely to have attended in the past than those women who report less intention.

(b) those women who attend for screening will be more likely to have attended in the past than those women who do not attend.

(c) this relationship will be mediated by perceived costs and benefits of screening in that those women who have attended in the past will have a more positive attitude to screening.

Hypothesis 13:

(a) those women who report a greater intention to attend for screening will report their previous experience of cervical screening as less negative than those women who report less intention.

(b) those women who attend for screening will report their previous experience of cervical screening as less negative than those women who do not attend.

Hypothesis 14:

(a) those women who report a greater intention to attend for screening will be younger than those women who report less intention.

(b) those women who attend for screening will be younger than those women who do not attend.

(c) the relationship of age to intentions and behaviour will be mediated by social cognitions in that older women will feel less susceptible to cervical cancer and have a more negative attitude towards screening.

Hypothesis 15:

(a) those women who report a greater intention to attend for screening will be more likely to have a current sexual partner than those women who report less intention.

(b) those women who attend for screening will be more likely to have a current sexual partner than those women who do not attend.

(c) the relationship of having a partner to intentions and behaviour will be mediated by social cognitions in that women with a partner will have a more positive attitude towards screening and feel more susceptible to cervical cancer.

Hypothesis 16:

(a) those women who report a greater intention to attend for screening will be from a higher social class than those women who report less intention.

(b) those women who attend for screening will from a higher social class than those women who do not attend.

(c) the relationship of social class to intentions and behaviour will be mediated by social cognitions in that women from the lower social classes will perceive themselves to be less susceptible to cervical cancer and will have a more negative attitude towards screening.

Hypothesis 17: The social cognitions of women who are screened for the first time will show more change following screening than the beliefs of attenders or non-attenders who have previously been screened or non-attenders who have not.

Hypothesis 18: For women who have been screened in the past, the amount of variance in screening behaviour explained by beliefs measured prospectively or retrospectively will be similar.

Hypothesis 19: For women who have never been screened the amount of variance in behaviour explained by beliefs measured prospectively will be significantly greater than the amount of variance explained by beliefs measured retrospectively.

Chapter 4

Study 1: measures and methodology

4.1 Design

The first study in this thesis is prospective and designed in two phases. The participants were women living in the area covered by one London Health Authority. The first phase of the study was carried out before the women were invited to attend for cervical screening. Open invitations to women to attend for screening are sent, rather than a specific appointment date and time being offered. This makes the application of social cognition models to predicting intentions and behaviour particularly appropriate as under such circumstances one would expect a greater depth of decision making rather than the simple heuristics which may occur if an appointment time is given, i.e. for those who attend a positive decision to act may be made rather than attendance simply representing a compliant behaviour (e.g. Marteau, 1993; Norman and Conner, 1993). The current study examined the women's social cognitions about cervical cancer and cervical screening, as well demographic factors, associated with uptake of screening. The design of the study allowed a prospective examination of the influence of these factors on subsequent uptake of cervical screening. These were explored using multivariate statistics in order to establish which factors are most important for predicting intentions and behaviour.

The second phase of the first study, eleven months later, reassessed the beliefs of the same women after the opportunity to attend for screening had passed and women had either attended or not attended. This enabled an examination to be carried out of the impact of screening on women's beliefs about cervical cancer and cervical screening, particularly among women who attended for a smear test for the first time.

4.2 Development of the questionnaire: pilot study

4.2.1 Participants

The pilot study participants were 161 women, comprising the following groups: 95 university employees, 28 postgraduate students studying for an MSc in Health Psychology, 22 undergraduate students studying Nursing and Psychology and 16 acquaintances of the researcher's colleagues. The university employees were selected because their age range and social class were expected to be representative of the population of women for the main studies. The Health Psychology students were selected as they were expected to have a more sophisticated knowledge of cervical screening and cervical cancer than university staff of an equivalent educational level. Their questionnaire responses were therefore later compared with responses from staff and used to assess the criterion validity of the questionnaire measuring knowledge of cervical cancer and cervical screening. The Nursing and Psychology undergraduates were chosen as they were available on two separate occasions in order to assess the test-retest reliability of the questionnaire. The acquaintances of the researcher's colleagues were chosen to represent women who were not currently working outside the home, being either retired or unemployed.

The 161 participants were aged between 18 and 62 years old (mean=34.9, sd 11.1). Eighty eight per cent described themselves as white, 41 per cent were married and the majority were in social classes one, two or three (non-manual) (see Appendix 2 for social class categories) or they were students. Social class was based on the woman's current or previous occupation.

4.2.2 Measures

The questionnaire consisted of five sections and included a page for comments (see Appendix 4).

Social and demographic variables which had been shown in previous studies to have an effect on uptake of cervical screening were assessed in section 1. Women were asked to state their date of birth, marital status, ethnic origin, and current and previous occupations. This 'traditional' measure of SES was chosen as it has been found to be strongly linked to morbidity and mortality, in general, and also in relation to cervical cancer. In addition, it can represent both years of education and income, which on the whole both increase in line with social class.

Potential influences on uptake of screening and on beliefs about screening were assessed in section 2. Women were asked whether they did not intend, probably intended or definitely intended to attend for a smear test in the future; and whether or not they knew anyone who had had cervical abnormalities or cervical cancer or had suffered themselves from these. They were also asked to specify the sex of their GP and the sex of the person who performed their most recent smear test (if any).

Subjective norms were also assessed in this section to explore the role of perceived social pressure to attend or not attend for cervical screening (Theory of Reasoned Action/Planned Behaviour; TRA/TPB). The decision was taken to only assess global descriptive norms and also to ask about perceived beliefs of the woman's sexual partner. Women were asked whether or not their friends and family attend for screening (descriptive social norms) and whether or not the woman's partner believes cervical screening to be beneficial. A composite variable was produced from the descriptive norm items. A score of 1 was given if most family members attended for screening, -1 if not and 0 if the woman ticked that she didn't know. The item was recorded as missing if the woman had no female relatives. A score of 1 was given if the woman's friends attend for screening regularly, -1 for no and 0 if the woman didn't know. These variables were summed to give a range of scores from -2 to 2. A score of 1 was given if a woman's partner believed cervical screening to be beneficial, -1 if not and 0 if the woman did not know. If the woman did not have a partner this variable was recorded as missing.

Also included in section 2 was an assessment of the woman's past experience of cervical screening. Women were asked whether or not they had ever had a smear test and those who had previously been screened were asked the date of their last test. For this last test women had to indicate how painful, embarrassing, quick, simple, reassuring and worrying it had been. Each item was rated on a five point scale ranging from 'not at all' (1) to 'extremely' (5). These items were then summed, (with three items being reversed to avoid acquiescence bias: simple, reassuring and quick) to form a scale with a possible range of scores from 5 to 30. A higher score indicated a more negative previous experience of cervical screening.

Knowledge of cervical cancer and cervical screening was assessed with eleven multiple choice questions in section 3. The items were derived from current knowledge about the topic. A pre-pilot version was administered to nursing students to ensure that the complexity was pitched at the correct level to avoid 'ceiling' and 'floor' effects. The items consisted of four options, including a 'don't know' option. A correct response obtained one point and the item scores were summed to give a total score with a range of between 0 and 11, with a higher total score indicating greater knowledge.

The value that respondents' placed on their health was assessed in section 4 to examine general health motivation. The section consisted of two existing questionnaires. Part one was a four item scale assessing health value designed by Lau, Hartman and Ware (1986). Responses were made on a seven point scale, the end points of which were 'strongly disagree' (1) and 'strongly agree' (7). The item scores were summed to give a total score for each respondent ranging from 4 to 28 where a higher score indicated greater value placed on health in general. Part two comprised the Rokeach Terminal Value Survey (1967) including the additional value of 'health' as used by Kristiansen (1985). Women were asked to rank, in order of value to them, 18 aspects of life, for example a sense of accomplishment, health, salvation and national security. The rank order of health indicated by each woman was noted. This could range from 1 (most important) to 18 (least important).

Section 5 consisted of 40 items based mainly on cognitions specified in the Health Belief Model (HBM). Ten items were designed to measure perceived susceptibility to cervical cancer, ten to measure perceived severity of cervical cancer, ten to measure perceived benefits of cervical screening and ten to measure perceived costs of cervical screening. Half of the items were worded positively and half negatively in order to avoid acquiescence bias. Items were either adapted from a widely used reliable questionnaire by Champion (1984) designed to examine the relationship between health beliefs and performing breast self-examination, or were written specifically for this questionnaire to ensure that items could apply to a health professional dependent behaviour such as cervical screening. Both psychological and practical costs of attending for screening were included in the 'costs' scale; for example embarrassment and giving up time, as both aspects of costs have been found to be important in influencing behaviour. The responses were made on a five point scale labelled strongly agree (5), agree (4), uncertain (3), disagree (2) and strongly disagree (1).

4.2.3 Procedure

Ethical approval was obtained for the pilot study from the Senate Ethical Committee of City University. Women were either posted questionnaires or handed them during a tutorial. A covering letter was enclosed with the posted questionnaires explaining the purpose of the study and that participation was voluntary. Women who were posted questionnaires were given two weeks in which to respond. The overall response rate for participation in the pilot study was 59 per cent, with some variation between sub-groups[1].

All university staff and Health Psychology students who had been sent a questionnaire were subsequently sent a letter thanking them for their participation which provided them with the correct answers to the knowledge questionnaire (Questionnaire 3).

4.2.4 Results

A principal components factor analysis was performed for the HBM items (section 5) in order to establish whether the items formed four conceptually distinct scales as designed and therefore to test the construct validity of this measure. Questionnaires from all (n=161) respondents[2] were used for this procedure. The result of a principal components analysis using varimax rotation was a solution with 40 items loading on four factors accounting for 41 per cent of the variance in responses. Table 4.2.1 shows the amount of variance accounted for by each factor and the individual item loadings on each of the four factors.

The factors corresponded to the four HBM elements of perceived susceptibility, perceived severity, perceived benefits and perceived costs and were labelled accordingly. Perceived costs accounted for the most variance (16 per cent) followed by perceived benefits (10 per cent) and perceived susceptibility (8 per cent). Perceived severity accounted for the smallest amount of variance (7 per cent). Items which had loadings of less than 0.4 on the factors were deleted. These items are marked in table

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[1] It was the intention that the test-retest reliability of the scales assessing previous experience of cervical screening, and the HBM scales of perceived susceptibility to, and perceived severity of, cervical cancer and perceived benefits and costs of cervical screening be established using data from Nursing students, 13 of whom completed the questionnaires on two occasions, one week apart. Not every woman fully completed the HBM questionnaire and therefore the number of cases available to assess each scale was 13 or less. This was considered too small a number to make the reliability analysis viable. It was also found that only five of the 22 women had had a smear test in the past, thus making an assessment of the reliability of the scale relating to the quality of previous experience impossible. However, it was possible to assess the internal consistency of the questionnaire scales.

[2] Including the first completed questionnaire from the 13 Nursing and Psychology students

Table 4.2.1: Result of a principal components analysis showing the four Health Belief Model components and individual item loadings.

Questionnaire item	Factor 1 Costs	Factor 2 Benefits	Factor 3 Suscept -bility	Factor 4 Severity
Costs (16% of the variance)				
The way a smear test is performed causes me distress	0.86	0.02	0.02	0.05
I am flustered whenever I have a smear test	0.73	-0.08	0.08	0.05
I am rarely embarrassed when I have a smear test (R)	0.70	-0.03	-0.00	0.07
I am never made to feel uncomfortable when having a smear test (R)	0.69	0.02	-0.17	0.23
I find that smear tests are painful	0.67	-0.00	0.12	0.06
I am very afraid of having a smear test	0.59	-0.11	0.17	0.03
Getting a smear test does not interfere with my other activities (R)	0.52	-0.51	0.07	0.02
I don't mind giving up my time to have a smear test (R)	0.52	-0.40	-0.10	-0.31
Getting a smear test is time consuming	0.45	-0.33	-0.05	-0.01
Having a smear test is too inconvenient for me	0.44	-0.47	-0.06	-0.18
Benefits (10% of the variance)				
I believe that a smear test will only find evidence of cervical cancer when it is too late to treat it (R)	0.04	0.71	-0.08	-0.15
Cervical smear tests can detect abnormal changes before I would notice any symptoms	-0.08	0.67	-0.05	-0.16
Cervical smear tests are no good at detecting cervical cancer in its early stages (R)	0.02	0.63	-0.13	-0.09
I have a lot to gain by having regular smear tests	-0.22	0.56	0.36	0.11
I would be reassured about cervical cancer if I had smear tests regularly	-0.09	0.56	0.19	-0.06
There is nothing I can do to detect cervical cancer (R)	0.17	0.54	-0.05	0.09
If I have regular smear tests cervical cancer will be found before it is advanced	-0.07	0.47	-0.09	-0.19
Having regular smear tests is not a good idea (R)	-0.25	0.46	0.12	0.13
Having a smear test would not give me peace of mind (R)	-0.07	0.45	-0.02	0.07
Having smear tests prevents future problems for me	-0.16	0.21*	0.03	-0.32

Table 4.2.1 continued

Questionnaire item	Factor 1 Costs	Factor 2 Benefits	Factor 3 Suscept -bility	Factor 4 Severity
Susceptibility (8% of the variance)				
I believe that my chances of getting cervical cancer are high	-0.06	-0.11	0.79	-0.12
My chances of getting cervical cancer are small (R)	-0.17	-0.02	0.71	-0.01
There is a good possibility that I will get cervical cancer	-0.05	-0.05	0.71	0.02
I do not see myself getting cervical cancer in the next year (R)	0.11	0.02	0.64	-0.02
My physical health makes it likely that I will get cervical cancer	0.09	-0.04	0.60	-0.03
With my family history I am unlikely to get cervical cancer (R)	0.19	0.26	0.55	-0.12
I do not think that I am the sort of woman who would get cervical cancer (R)	0.05	0.40	0.53	-0.17
I worry a lot about getting cervical cancer	0.19	-0.12	0.49	0.09
My lifestyle makes it likely that I will get cervical cancer	-0.09	-0.04	0.42	-0.05
My age makes it unlikely that I will get cervical cancer (R)	-0.14	0.19	0.21*	-0.04
Severity (7% of the variance)				
If I got cervical cancer I would have problems which would last a long time	-0.03	-0.17	-0.11	0.74
If I got cervical cancer my whole life would change	0.08	-0.21	0.05	0.73
Getting cervical cancer would not be a problem for me (R)	0.15	0.09	-0.04	0.68
My feelings about myself would not change if I got cervical cancer (R)	0.15	0.02	-0.05	0.65
Getting cervical cancer would interfere with my sex life	0.05	0.08	-0.10	0.63
I think that cervical cancer is no more serious than other diseases (R)	-0.22	0.03	-0.05	0.39*
Having cervical cancer would not endanger my marriage/intimate relationship (R)	0.24	-0.25	0.06	0.35*
Cervical cancer is not a hopeless and incurable disease (R)	0.34	-0.59	0.14	0.23*
My friends and family would treat me negatively if I got cervical cancer	0.28	-0.09	-0.08	0.14*
I am afraid to even think about cervical cancer	0.10	-0.19	0.18	0.02*

Key: R = reversed item; * = deleted item following factor analysis

4.2.1 with an asterisk. This gave four scales; perceived costs (10 items), perceived benefits (9 items), perceived susceptibility (9 items) and perceived severity (5 items).

The scores for whether or not a woman's family attend for smear tests and whether or not her friends do, were correlated to confirm that these could be summed to form a composite variable. However, the value of Cronbach's alpha was too low at 0.32 (n=154) to make this possible. It was found that the remaining scales used throughout the questionnaire had good internal consistency. For the scale measuring previous experience of cervical screening the Cronbach alpha score was 0.96 (n=150). The four HBM scales, i.e. perceived susceptibility to, and perceived severity of, cervical cancer and perceived benefits and perceived costs of cervical screening, had Cronbach alpha scores of 0.79, 0.72, 0.76 and 0.84 respectively (n=122).

The knowledge questionnaire was analysed to establish its criterion validity. As stated, it was expected that the women studying for the MSc in Health Psychology (n=26) would score highly on this scale and their scores were therefore compared with those of a sub-group of university staff participants (n=21) thought to be of comparable intellectual level (librarians or senior administrative staff). Total knowledge scores were significantly different between groups ($t=3.35$, $p<0.05$) with MSc students obtaining higher scores on this scale (mean=9.8, sd 1.7) than university staff (mean=8.5, sd 1.6). This indicated that the questionnaire had acceptable criterion validity in that it differentiated between those with a good knowledge of health related issues and those who would not be expected to have a high level of knowledge in this area.

4.2.5 Amendments to the questionnaire

Following the above analyses, and consideration of the comments made by participants after completing the questionnaire, some changes were made to the questionnaire. It transpired that many participants did not have a particular GP, but visited a surgery or health centre with a policy of shared patient lists where they may see either a male or a female doctor. In view of this, 'group practice' was added as an option for 'sex of doctor'. This term was used as the women had added this option to the questionnaire to describe the type of practice they attended; i.e. a practice with a policy of shared patient lists rather than personal patient lists.

It was decided to calculate two knowledge sub-scale scores for each participant to enable an examination of any difference between women's knowledge of cervical cancer and their knowledge of cervical screening. The responses to the six questions concerning the cervical smear test were summed to form a score of knowledge of cervical screening and the responses to the four questions concerning cervical cancer were summed to form a separate score of knowledge of cervical cancer for each participant. The question concerning the position of a woman's cervix was deemed to fit neither into the smear test nor the cervical cancer group of items and was therefore excluded from the sub-scales.

The four item health value scale (Lau *et al*, 1986) was deleted as many respondents found the items to be too broad, making the scale difficult to complete. The ranking scale of aspects of life was retained but the number of items was reduced from eighteen to ten because many participants commented on the difficulty of ranking a large number of items. The final items included were the top ten chosen most often by all respondents. These were a sense of accomplishment, health, freedom, a comfortable life, mature love, family security, self respect, happiness, inner harmony and wisdom.

4.3 Methods: phases I and II

4.3.1 Participants

Participants in study one were selected from women within the geographical area covered by the Croydon Family Health Services Authority (FHSA). These women were selected because they were due to be invited to attend for a routine cervical smear test in

January 1992. Women were excluded from the study if they were suffering from carcinoma in situ or invasive carcinoma of the cervix. The criteria for eligibility to participate in this study were that a woman was able to complete the questionnaire (e.g. be English speaking, literate) and that she was due for a smear test in January 1992.

4.3.2 Procedure: phase I

Ethical approval for the study was obtained from the Croydon Local Medical Committee. Each month the Croydon FHSA produces a computer generated list of names and addresses of women due to have a cervical smear test. For the present study the list of women due for screening in January 1992 was used. This list is normally checked by GPs in order to reduce inaccuracies. However, in order to allow enough time for women to complete the questionnaires before they received invitations to attend for a cervical smear test the unchecked list had to be used.

On the 1 or 2 November 1991, the FHSA sent a letter requesting participation in the study to women thought to be eligible and whose complete address was on the list (see Appendix 5). The FHSA sent the letters instead of the researcher as in order for the researcher to have access to the names and addresses, the FHSA requested that this information be provided voluntarily by the women themselves.

The purpose of the study was briefly explained in the letter and the women were assured that any information provided would be confidential. A return form was attached with a stamped addressed envelope. Women who agreed to take part in the study were asked to provide their name, address and telephone number and those who did not wish to take part in the study were asked to acknowledge receipt of the letter. The letter requested a response within ten days and gave a telephone number for further information about the study, if required.

Women who agreed to take part were sent the questionnaire with a covering letter requesting its return within a week. Again a telephone number was given for further information or in the event of a query. As the women were to be sent a letter from the FHSA towards the end of December 1991 inviting them to attend for a smear test, no further questionnaires were sent after 10 December. As it was essential, owing to the prospective nature of the study, that the questionnaire was completed before the letter of invitation to attend for screening was received, any questionnaires completed after 15 December were not included. If the questionnaire had not been returned within three weeks the woman was reminded by telephone or letter and sent a further one. Participants who had requested a questionnaire in December 1991 and had not returned it within three weeks were not reminded as this would have been too late to include their responses in the study.

4.3.2.1 Response to request to participate in the study

One thousand letters were sent to women on the FHSA's list. Forty seven (4.7 per cent) were returned by the Royal Mail stating that the woman no longer lived at that address. Four hundred and thirty-seven women did not respond to the letter requesting their participation (43.7 per cent). Of the 516 women who did respond, 360 (70 per cent) agreed, and 156 (30 per cent) refused, to take part (see figure part a of 4.3.1).

4.3.2.2 Eligibility for the study

Eligibility could not be determined prior to the request to participate in the study and some women who responded were subsequently found to be ineligible. Of the 1,000 women sent a letter requesting participation, 190 were ineligible. Three of these women were unable to complete the questionnaires, either because they could not understand English (n=1) or because they could not read (n=2). The remaining 187 women were not eligible to have a smear test in Croydon in January 1992 and therefore no outcome variable would be available for them. There were a number of reasons for their ineligibility. Forty-seven women no longer lived at the address on the list (as mentioned above) and a further 15 women advised that they had moved out of the Croydon area. Eleven women had had a hysterectomy and were medically exempt from screening and one woman had died. Ninety-three women were named on the list who were not subsequently invited for a cervical smear test[3]: 86 women were found not to be due for a smear test because they had recently been screened and seven women were deemed by their GP to be too old. Twenty women could not be traced on the FHSA records and as it could not be established whether or not they had been invited for a test, they were excluded from the study. Therefore, of the 1,000 women who were sent a letter requesting their participation, 810 women were eligible to take part.

Determining eligibility subsequent to the request to participate therefore meant that 56 of the 156 women who refused to take part and 134 of the 360 women who agreed to take part were in fact ineligible for the study. There were therefore 226 women who were both eligible for the study and who agreed to participate.

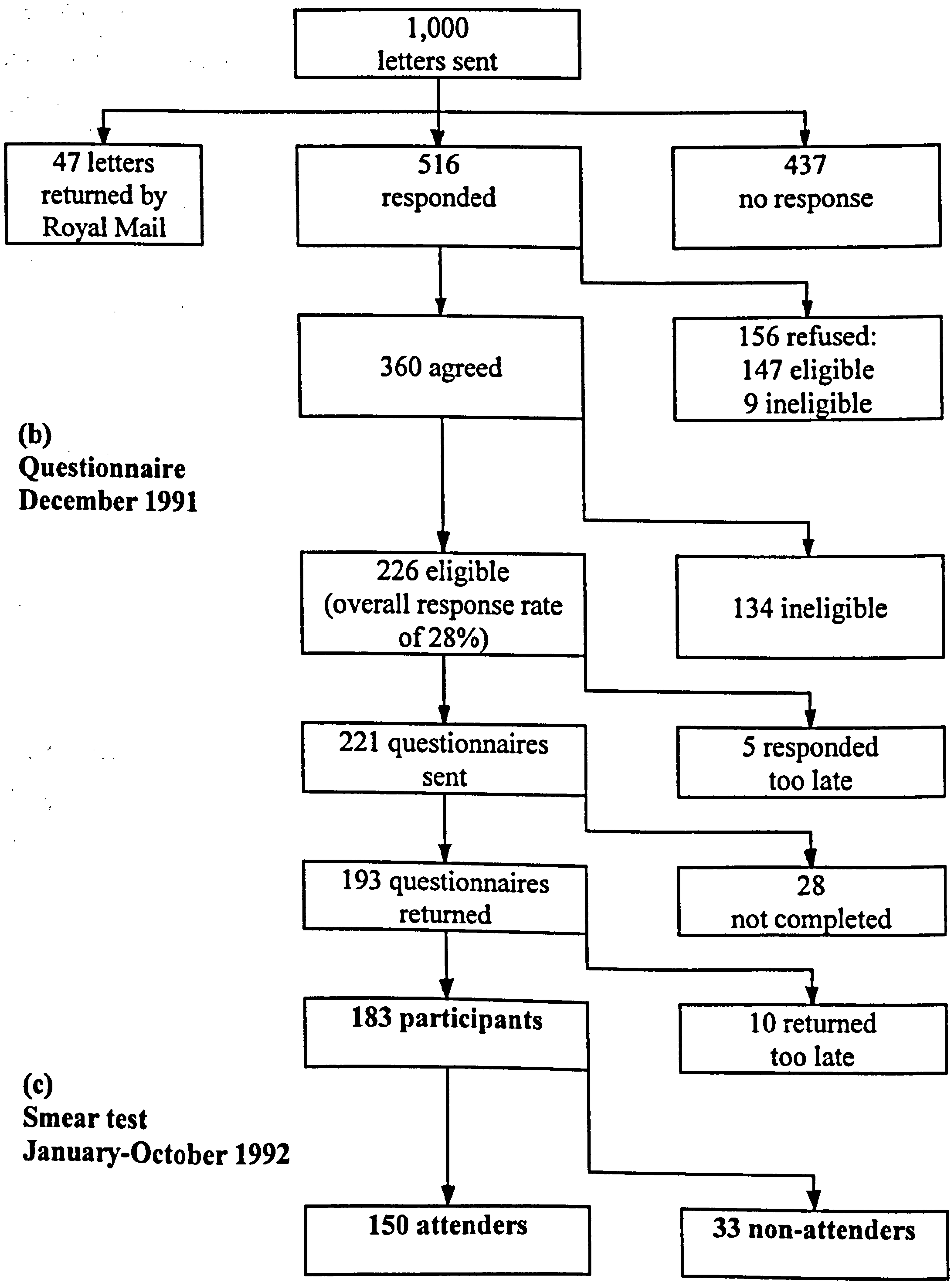
4.3.2.3 Response to completing questionnaire

Of the 226 eligible women, five requested a questionnaire too late (after 10 December), 221 were therefore sent. One hundred and ninety three women (87 per cent) completed and returned their questionnaire and 183 (83 per cent) of these were completed by 15 December 1991. Twenty-eight questionnaires were not completed: four women (two per cent) returned the questionnaire blank and 24 women (11 per cent) made no response to receiving the questionnaire (see part b of figure 4.3.1).

[3] One reason for this large discrepancy is that the Croydon FHSA operates a five yearly call and recall system whereas many of the GPs in the area operate a three yearly system. Consequently some women had attended for a smear test before the FHSA invited them for one. This discrepancy would only be picked up when GPs had checked the FHSA list.

Figure 4.3.1 Diagrammatic representation of the sample for phase I of study 1

(a) Study participation
November 1991



4.3.3 Attendance for cervical screening

The FHSA records were subsequently checked to establish whether or not the women had attended for a smear test. Using this information participants were divided into a group who attended (n=150) and a group who did not attend for cervical screening (n=33). (see part c of figure 4.3.1).

4.3.4 Procedure: phase II

Phase II of study 1 was carried out eleven months after phase I. During the last week of October 1992, every woman who had participated in phase I was contacted by letter (see Appendix 6). Participants were reminded of the original study and asked to complete a questionnaire, which was enclosed. The questionnaire was identical to the HBM questionnaire used in phase I (section 5 of the questionnaire). A stamped addressed envelope was included and a telephone number provided for any queries. Women were requested to return the questionnaire as soon as possible. If the questionnaire had not been returned within three weeks the women were reminded by telephone or letter and sent a further questionnaire.

One hundred and eighty-three questionnaires were sent. Eight were returned by the Royal Mail indicating that the women had moved. The 151 questionnaires that were completed and returned represented a response rate of 86 per cent. Twenty-four women (14 per cent) did not respond.

At this time the FHSA was also contacted to establish the results of the women's smear tests in order to exclude those with positive results from the analyses of change in beliefs (see Chapter 3, section 3.3.11).

Chapter 5

Study 1: Results

5.1 Phase I

This section reports on the findings from the first wave of data collection of women due for a smear test in Croydon during January 1992. The characteristics of the women are described, followed by details of the main comparative analyses of participants dividing them on the basis of their reported intentions to attend for a smear test, and by dividing them by their behaviour. A series of hierarchical multiple regressions are used to examine which variables predict intentions and uptake of screening, and to explore how influences of non social cognition variables are mediated by social cognitions.

5.1.1 Demographic profile of the women

The mean age of the women in study 1 was 42.3 years (sd 11.6). Eighty per cent had a partner and 70 per cent of those with a partner were married. Most of the women (55 per cent) were from social class three (non-manual) [classified according to their current or previous occupation]. Eighty-seven per cent of the women described themselves as white. The majority of the women (72 per cent) worked outside the home and over three quarters (76 per cent) had children.

5.1.2 Introduction to univariate comparative analyses

To investigate the relationship between social cognitions and reported intentions and behaviour, and between demographic variables and reported intentions and behaviour, a number of analyses were carried out. Initially intentions and behaviour were correlated with other variables in order to explore associations. Following this, the group was divided in two ways. Firstly, in order to examine differences among women by their reported intentions, three groups were created:

(a) women who did not intend to attend for a smear test (n=12)
(b) women who reported that they would probably attend for a smear test (n=32)
(c) women who reported that they would definitely attend for a smear test (n=135)

It was expected that social cognitions and demographic variables would be strongly related to reported intentions.

Secondly, analyses were carried out using behaviour as the dependent variable, for this the group was split into two:

(a) women who attended for a smear test (n=150)
(b) women who did not attend for a smear test (n=33).

The Health Belief Model (HBM) does not postulate an intervening motivational variable of intention so analyses were conducted to explore direct relationships to behaviour. Associations were not expected to be as strong as for reported intentions.

T tests of significance, one way analyses of variance (ANOVA), Kruskal Wallis one way ANOVAs, Mann Whitney U tests, and chi square tests of significance were used, as appropriate, to test for group differences for variables on interval or ordinal scales or categorical variables depending on the number of groups being compared and the type of data being analysed.

5.1.3 Correlation analyses

Pearson's product moment correlation coefficients or Spearman's rank correlations were calculated to examine associations between reported intentions, behaviour and other measured variables. The results are reported in table 5.1.1. As can be seen from this table, a number of variables were significantly related to women's reported intentions and to their later uptake of screening. For intentions, the strongest relationships were observed for whether or not the woman had ever been screened, her perceptions of the benefits and costs of cervical screening and her age. Behaviour was most strongly correlated with whether or not the woman had a sexual partner, her perception of the costs of screening and whether she had ever been screened.

5.1.4. Demographic influences on intentions and behaviour

Analyses were carried out to examine group differences for demographic variables (see tables 5.1.2 and 5.1.3). Any variables which differed between groups would subsequently be used in a hierarchical multiple regression to examine how social cognitions may mediate the effects of these variables on intentions and behaviour.

As predicted, women who reported that they did not intend to attend for a smear test were significantly older than those who reported that they would attend. A post hoc test revealed that women not intending to attend were significantly older than those women who reported a definite intention to attend (mean age of 52.5 years compared to 40.8 years). Likewise, for behaviour, a significant difference was found for age with non-attenders being significantly older. As can be seen from tables 5.1.2 and 5.1.3. However, this relationship was weaker than for intentions.

Table 5.1.1. Correlation analysis of intentions and behaviour with other measured variables.

Variable	Intentions			Behaviour			Variable	Intentions			Behaviour		
	r	p	n	r	p	n		r	p	n	r	p	n
Age	-0.27	***	178	-0.15	*	181	Family have smear tests	0.13	ns	177	0.02	ns	181
Social class	0.09	ns	176	0.12	ns	179	Friends have smear tests	0.14	ns	177	0.06	ns	181
Has partner or not	0.23	**	179	0.27	***	182	Knowledge	0.15	*	176	-0.01	ns	180
Ethnicity	-0.02	ns	179	-0.05	ns	182	Sex of GP	-0.11	ns	86	-0.04	ns	88
Health motivation	-0.05	ns	174	-0.09	ns	178	Sex of person who took last smear test	-0.06	ns	175	-0.02	ns	177
Perceived benefits	0.33	***	170	0.15	*	174	Ever had cervical abnormalities	0.06	ns	172	0.03	ns	175
Perceived costs	-0.29	***	170	-0.26	***	173	Know someone with cervical cancer or cervical abnormalities	-0.01	ns	179	-0.03	ns	177
Perceived susceptibility	0.09	ns	170	0.02	ns	166	Ever been screened	0.33	***	179	0.23	**	183
Perceived severity	-0.05	ns	170	-0.01	ns	174	Time since last test	-0.11	ns	167	-0.05	ns	169
Partner's attitude to tests	-0.02	ns	142	-0.01	ns	145	Quality of previous experience of screening	-0.24	**	158	-0.12	ns	159

* $p<0.05$; ** $p<0.01$; *** $p<0.001$. Two tailed significance levels.
Intentions and behaviour correlate at $r = 0.40$, $p<0.001$

Ethnicity was originally classified into nine groups and 87 per cent of women described themselves as white. Among the remaining 13 per cent there were insufficient numbers to make comparisons between different ethnic groups viable. Consequently this variable was reduced to two categories: white and non-white. No significant differences were found between different intention groups for proportions of white and non-white women. In order to achieve an expected value of more than five in over 20 per cent of the cells in the chi square analysis, the group categories to examine these ethnic differences were collapsed into non-intenders and those reporting that they definitely or probably intended to attend for a smear test, and a Fisher's exact test was carried out. The value of Fisher's exact was not significant and the result was the same as that shown in table 5.1.2. No ethnic differences were found for whether or not women actually attended for a smear test.

As predicted, it was found that those women who reported a definite intention to attend for a smear test were more likely to have a current sexual partner than those who did not intend to be screened. For behaviour a significant group difference was also found for whether or not the woman had a partner. More attenders (85 per cent) than non-attenders (58 per cent) had a current partner. For this variable the difference between attenders and non-attenders was actually stronger than that between intention groups. This indicates that a direct effect of having a partner on behaviour may exist. This will be explored in a multiple regression analysis.

Social class was originally classified into five groups. However, in order for sufficient numbers of women to be in each category to make statistical comparison meaningful, the variable was converted to a variable with three possible categories: women in classes 1 and 2; those in class 3 non-manual; and those in classes 3 manual, 4 and 5. No social class differences were found for reported intentions to be screened or for behaviour.

Table 5.1.2 Comparisons between groups split by intentions for demographic variables.

Variable	No intention	Probable intention	Definite intention	Significance levels
		Frequency (%)		χ^2, p
Whether or not woman has a partner				
Yes	7 (58.3)	21 (65.6)	115 (85.2)	
No	5 (41.7)	11 (34.4)	20 (14.8)	9.87, p<0.01*
Ethnicity				
White	11 (91.7)	28 (87.5)	118 (87.4)	
Non-white	1 (8.3)	4 (12.5)	17 (12.6)	0.18, ns
Social class				
1 or 2	6 (50.0)	14 (46.7)	43 (32.1)	
3 non-manual	5 (41.7)	12 (40.0)	80 (59.7)	
3 manual, 4 or 5	1 (8.3)	4 (13.3)	11 (8.2)	5.04, ns
		N mean (sd)		F, p
	12	32	134	
Age	52.5 (11.8)	45.2 (12.7)	40.9 (10.8)	7.16, p<0.01*

* women reporting no intention to attend significantly differ from women reporting a definite intention to attend

Table 5.1.3 Comparisons between attenders and non-attenders for demographic variables.

Variable	Non-Attenders	Attenders	Significance levels
	Frequency (%)	Frequency (%)	χ^2, p
Whether or not the woman has a partner			
Yes	19 (57.6)	117 (85.2)	
No	14 (42.4)	22 (14.8)	13.03, p<0.001
Ethnicity			
White	30 (90.9)	129 (86.6)	
Non-white	3 (9.1)	20 (13.4)	Fisher's exact p=0.37
Social class			
1 or 2	17 (53.1)	46 (31.3)	
3 non-manual	13 (40.6)	85 (57.8)	
3 manual, 4 or 5	2 (6.3)	16 (10.9)	5.54, ns
	N mean (sd)	N mean (sd)	t, p
	33	148	
Age	46.0 (12.2)	41.0 (11.3)	2.05, p<0.05

5.1.5 The effect of social cognitions and social influence variables on intentions and behaviour.

As predicted, reported intentions were strongly related to later behaviour, with women who intended to attend for screening being significantly more likely to do so (χ^2 = 51.75, df = 2, p<0.00001). For women who reported that they would not attend for a test, only eight per cent actually did attend; for women who probably intended to attend 72 per cent did so, and for women who definitely intended to attend, 90 per cent attended. This shows clearly how behaviour was related to the strength of the reported intentions.

Prior to testing the hypothesised differences between groups for social cognition variables, a test of internal consistency - Cronbach's alpha - was carried out on the HBM items to confirm that the items could reasonably be summed to form four scales, with this sample of women. All hypothesised scales showed satisfactory internal consistency; perceived costs α=0.79 (10 items); perceived benefits α=0.71 (9 items); perceived severity α=0.64 (5 items); perceived susceptibility α= 0.78 (9 items) (n=174).

As regards general health motivation, on a ranking scale of ten possible aspects of life, the majority of the women (86 per cent) ranked health as at least the fifth most important aspect to them. However, no differences were observed between intention groups for how important they felt their health was and non-attenders were not significantly more likely to rank the importance of health less highly than attenders. A correlation analysis was carried out between this variable and social cognition variables. No significant correlations were found. This indicates that this measure of health motivation may be a poor measure as one would expect it to be positively correlated with perceived benefits and negatively correlated with perceived costs. However, it is also possible, as argued by Fishbein and Ajzen (1975), that as health motivation was measured in general it will not be related to a specific measure.

It was predicted that a greater intention to attend for screening would be associated with a higher perception of susceptibility to, and severity of, cervical cancer and that women who actually attended for a smear test would feel more susceptible to cervical cancer than non-attenders, and feel that cervical cancer is more severe. The associations with intentions were predicted to be stronger. In addition, it was predicted that for women who had never been screened, the differences for these variables among intenders and non-intenders and among attenders and non-attenders would be greater than among intenders and non-intenders and attenders and non-attenders who had been screened in the past.

The mean perceived susceptibility to cervical cancer score for all participants was 22.6 (4.8) in a possible range of 9-45. No significant difference between groups split by intentions or by actual attendance were found for this measure (see tables 5.1.4 and 5.1.5). The correlation between intentions and susceptibility ($r=0.08$, ns) was indeed higher than the correlation between behaviour and susceptibility ($r=0.02$, ns). However, neither correlation was significant.

For perceived severity the mean group score was 15.6 (sd 3.1) in a possible range of 5-25, and no differences in perceptions of the severity of cervical cancer were identified for whether or not women intended to attend for screening and whether or not they actually attended (see tables 5.1.4 and 5.1.5). As predicted, perceptions of severity were positively correlated with perceptions of the costs of screening ($r=0.19$, $p<0.01$) with those women who perceived cervical cancer as severe also perceiving cervical screening as costly. The correlation between intentions and severity was greater ($r=-0.04$) than that between behaviour and severity ($r=-0.01$), although, as with perceived susceptibility, neither was significant.

It was the intention to then split the group of women by whether or not they had ever had a smear test in order to test the study hypotheses. However, only 6 women had never had a smear test giving insufficient power to enable these analyses to be carried out.

Regarding the smear test itself, on the whole women in the study believed that the cervical smear test was a beneficial procedure, mean=38.6, (sd 4.1) in a possible range of 9-45. As predicted, a stronger intention to attend was associated with perceiving the smear test to have more benefits. A one-way ANOVA and Scheffé test revealed that women who definitely intended to attend for a smear test perceived the test to be significantly more beneficial than women who probably intended to attend or who did not intend to attend. There was also a significant difference between attenders and non-attenders for this measure with attenders perceiving the cervical smear test to be significantly more beneficial than non-attenders. As predicted and as can be seen from tables 5.1.4 and 5.1.5, more highly significant differences were found in perceptions of the benefits of screening by dividing women by their reported intentions than by dividing them by their behaviour, indicating that reported intentions may play a mediating role in the prediction of behaviour.

Women did not view attending for a smear test to be an especially high cost activity mean=20.0 (sd 5.9) in a possible range of 10-50. However, as predicted intentions were related to perceptions of the costs of cervical screening where women who definitely or probably intended to attend perceived significantly fewer costs than women who did not intend to attend. Also as predicted, a significant difference between attenders and non-attenders was found for this measure. Non-attenders perceived significantly more costs associated with the cervical smear test than did attenders. Unlike perceptions of benefits, dividing women by their reported intentions or behaviour showed equally significant differences in perceptions of the costs of screening, although intentions were slightly more highly correlated than behaviour ($r = -0.29$ compared with $r = -0.26$).

A Pearson's product moment correlation was carried out using the items measuring the descriptive subjective norms of whether women's family and friends attend for smear tests. However, the value of alpha at 0.26 was too low to justify treating the items as a composite measure, confirming the findings of the pilot study. Subsequent analyses therefore treated them as separate items. The mean score for family attending for tests was 0.4 (sd 0.7) in a range of -1 to 1. Two women did not have any female relatives. For friends attending for screening the mean score was 0.35 (sd 0.6). Eighty eight per cent of women with a partner reported that their partner thinks smear tests are a good idea. The remainder did not know. As no one reported that their partners did not think that screening is beneficial, this variable was treated as dichotomous in subsequent analyses.

Women who intended to be screened did not obtain higher scores on these measures than those who did not intend to attend and likewise women who attended for screening did not score more highly than women who did not attend. The non significant findings for partner's attitude with intention was confirmed using Fisher's exact test collapsing the categories of definitely and probably intend to attend into one category (see tables 5.1.4 and 5.1.5).

These variables were then correlated with perceptions of the benefits and costs of screening to establish whether a higher score was related to a more positive attitude to screening. Friends attending for screening was found to be significantly positively correlated with perceived benefits ($r=0.25$, $p<0.01$) and significantly negatively correlated with perceived costs ($r=-0.24$, $p<0.01$). The items measuring partners' attitudes to screening was significantly negatively correlated with perceptions of costs ($r=-0.19$, $p<0.05$) but not significantly correlated with perceptions of benefits ($r=0.14$, ns). Family attending for screening was not significantly correlated with either belief.

Table 5.1.4 Comparisons between groups split by intentions for social cognition variables.

Variable	No intention	Probable intention	Definite intention	Significance levels
		N mean rank or mean (sd)		χ^2 or F, p
Health motivation	12	31	131	
	86.4	93.9	86.1	0.75, ns
Perceived susceptibility	9	28	125	
	21.4 (4.4)	21.9 (5.9)	22.8 (4.5)	0.62, ns
Perceived severity	10	29	131	
	14.6 (2.1)	16.7 (2.9)	15.4 (3.2)	2.61, ns
Perceived benefits	10	28	132	11.02,
	35.3 (5.1)	36.3 (3.4)	39.4 (3.9)	p<0.0001*
Perceived costs	11	27	132	9.99,
	23.3 (5.5)	23.6 (6.8)	18.9 (5.4)	p<0.0001**
Family attend for screening	12	31	134	
	0.3 (0.9)	0.2 (0.6)	0.5 (0.7)	2.68, ns
Friends attend for screening	12	31	134	
	0.3 (0.6)	0.2 (0.5)	0.4 (0.6)	2.19, ns
		Frequency (%)		
Whether or not partner thinks smear tests are beneficial				
Yes	7 (100)	18 (85.7)	101 (88.6)	1.08, ns
No	0 (0)	3 (14.3)	13 (11.4)	(Fisher's exact p= 0.38)

* women who definitely intend to attend significantly differ from women who do not, or who probably intend to attend

** women who definitely or probably intend to attend significantly differ from women who do not intend to attend

Table 5.1.5 Comparisons between attenders and non-attenders for social cognition variables.

Variable	Non-attenders	Attenders	Significance levels
	N mean rank or mean (sd)	N mean rank or mean (sd)	z or t, p
Health motivation	32 99.5	146 87.3	-1.32, ns
Perceived susceptibility	29 22.4 (4.4)	137 22.7 (4.9)	-0.29, ns
Perceived severity	30 15.6 (2.7)	144 15.6 (3.2)	-0.7, ns
Perceived benefits	30 37.2 (4.5)	144 38.9 (4.0)	-2.02, $p<0.05$
Perceived costs	30 23.4 (6.7)	143 19.3 (5.5)	3.58, $p<0.0001$
Family attend for screening	32 0.4 (0.8)	149 0.4 (0.7)	-0.26, ns
Friends attend for screening	32 0.3 (0.6)	149 0.4 (0.6)	-0.80, ns
	Frequency (%)	Frequency (%)	χ^2, p
Whether or not partner thinks smear tests are beneficial			
Yes	17 (89.5)	111 (88.1)	
No	2 (10.5)	15 (11.9)	0.03, ns

5.1.6 Cues to action

Few women in this study (11 per cent) had personal experience of cervical abnormalities. No relationship was found with intentions (a Fisher's exact test confirming the non-significant findings) or behaviour, although this variable was more highly correlated with intentions (r=0.06, ns) than with behaviour (r=0.03, ns).

Nearly half of the women (45 per cent) were aware of someone else having had cervical abnormalities or cervical cancer. This was predicted to be associated with a stronger intention to attend for a smear test and with later uptake of screening. However, there were no significant differences between women in each intention group, or for attenders and non-attenders (see tables 5.1.6 and 5.1.7).

Table 5.1.6 Comparison between groups split by intentions for cues to action.

Variable	No intention	Probable intention	Definite intention	Significance levels
		Frequency (%)		χ^2, p
Whether or not woman has had cervical abnormalities				
Yes	2 (16.7)	31 (100)	17 (13.2)	4.80, ns
No	10 (83.3)	0 (0)	112 (86.8)	(Fisher's exact p = 0.43)
Whether or not woman knows anyone who has ever had cervical cancer or cervical abnormalities				
Yes	7 (58.3)	13 (40.6)	61 (45.2)	
No	5 (41.7)	19 (59.4)	74 (54.8)	1.11, ns

Table 5.1.7 Comparison between attenders and non-attenders for cues to action.

Variable	Non-attenders	Attenders	Significance levels
	Frequency (%)	Frequency (%)	χ^2, p
Whether or not woman has ever had cervical abnormalities			
Yes	3 (9.1)	16 (11.3)	0.13, ns
No	30 (90.9)	126 (88.7)	(Fisher's exact p =0.50)
Whether or not woman knows anyone who has had cervical cancer or cervical abnormalities			
Yes	16 (48.5)	67 (44.7)	
No	17 (51.5)	83 (55.3)	0.16, ns

5.1.7 Knowledge of cervical cancer and the cervical smear test

The women in the study were quite knowledgeable about cervical cancer and the cervical smear test. The mean score for the total scale was 8.3 (sd 1.7), from a possible range of 0 to 11. The mean score for the sub-scale measuring knowledge of the smear test was 5.3 (sd 0.9) from a range of 0 to 6 and for the sub-scale measuring knowledge of cervical cancer it was 2.2 (sd 1.1) from a range of 0 to 4.

A one-way ANOVA and Scheffé test showed that women who definitely intended to attend for a smear test had significantly better knowledge than women who probably intended to attend. Surprisingly though, women who did not intend to attend for a test did not show the poorest knowledge. Exploring knowledge of cervical screening and cervical cancer separately, it was found that the significant difference between groups disappeared when comparing knowledge of cervical cancer, but for knowledge of the smear test women who definitely intended to attend had significantly better knowledge than those women who probably intended to attend (see table 5.1.8).

T tests were carried out to test the hypotheses that attenders would have better knowledge about cervical screening and cervical cancer than non-attenders. No significant differences were found between groups for the total measure of knowledge, for knowledge of the smear test or for knowledge of cervical cancer thus indicating that although knowledge levels are important for intentions they do not seem to be important for uptake of screening (see table 5.1.9).

As predicted, however, knowledge and perceived benefits were found to be significantly positively correlated ($r=0.24$, $p<0.01$). A multiple regression is carried out to examine whether the influence of knowledge on intentions may be mediated by perceived benefits (see section 5.1.13).

To examine whether there were any differences overall between women's knowledge of cervical cancer and their knowledge of cervical screening the total scores for each scale were standardised and converted to Z scores. A paired t-test showed that there was no significant difference between the two scales ($t=-0.1$, ns). Therefore subsequent analyses used the total scale score.

Table 5.1.8 Comparison between groups split by intentions for knowledge of cervical screening and cervical cancer.

Variable	No intention	Probable intention	Definite intention	Significance levels
		N mean (sd)		F, p
Total knowledge scale	12 8.3 (1.2)	31 7.5 (2.1)	133 8.5 (1.6)	5.38, p<0.01*
Knowledge of cervical screening	12 5.3 (0.8)	31 4.8 (1.1)	134 5.3 (0.8)	4.24, p<0.05*
Knowledge of cervical cancer	12 2.2 (1.0)	32 1.8 (1.2)	134 2.3 (1.1)	2.99, ns

* women who definitely intend to attend significantly differ from those who probably intend to attend.

Table 5.1.9 Comparison between attenders and non-attenders for knowledge of cervical screening and cervical cancer.

Variable	Non-attenders	Attenders	Significance levels
	N mean (sd)	N mean (sd)	t, p
Total knowledge scale	32 8.4 (1.5)	148 8.3 (1.8)	0.15, ns
Knowledge of cervical screening	32 5.3 (0.8)	149 5.2 (0.9)	0.59, ns
Knowledge of cervical cancer	33 2.2 (1.03)	149 2.2 (1.17)	-0.17, ns

5.1.8 Characteristics of screening providers

In the present study, characteristics of screening providers were not influential in affecting intentions or behaviour. Nearly half (49 per cent) of the participants were registered with a practice with a policy of personal lists, i.e. a particular GP is responsible for the patient and appointments are only made with that GP unless they are on leave when a locum would take over; about one third (34 per cent) of the women had a male GP and 15 per cent had a female GP. The remainder of women attended a practice with shared patient lists. In these practices women are allocated the next available appointment which might be with a male or a female doctor. As it was impossible to tell whether women had a male or a female GP this group was excluded from the following analysis.

Sex of GP was examined in association with reported intentions. No differences were found for whether the women had a male or a female GP (χ^2 = 1.07, ns). Due to the small frequency in some cells the analysis was repeated collapsing the groups into those women who did not intend to attend and those women who probably or definitely did. Fisher's exact tests confirmed the non-significant finding (p=0.37). Likewise for differences between attenders and non-attenders no significant differences were found for whether their GP was male or female (Fisher's exact, $p = 0.48$). Perceptions of the benefits and costs of screening were examined amongst women whose GP was male and women whose GP was female. No significant differences were found for perceived costs ($t=0.27$, ns) or perceived benefits ($t=0.97$, ns).

It was found that half (51 per cent) of the women had been previously screened by their GP and the other half by another health professional. Nearly two thirds (64 per cent) of the clinicians who performed the smear tests were female. This variable was explored in relation to reported intentions and behaviour. No differences were found for intentions ($\chi^2 = 2.29$, ns; Fisher's exact $p = 0.23$) or for behaviour (Fisher's exact, $p= 0.46$). Perceptions of the benefits and costs of screening among women who had been previously screened by a male or a female were examined. No significant differences were found for perceptions of costs ($t=-1.39$, ns) or perceptions of benefits ($t=-0.36$, ns).

5.1.9. Past behaviour

The way in which past behaviour is related to future behaviour, i.e. direct, mediated or as a moderator variable was explored (see tables 5.1.10 and 5.1.11). Most participants were familiar with the cervical smear test in that 97 per cent had had a test in the past. Whether women had ever been screened was strongly associated with their reported intentions to be screened in the future. A chi square test of significance showed that all women who probably or definitely intended to be screened had been screened in the past whereas a third of those who did not intend to be screened had never attended for a test. As the expected frequencies in over 20 per cent of the cells in the chi square distribution were less than five, the categories for 'definitely intended to attend' and 'probably intended to attend' were collapsed. The value of the Fisher's exact test indicated that significantly more women who reported that they intended to attend for a smear test had previously been screened than women who reported that they did not intend to attend.

The attendance rate for screening among women who had previously attended was 84 per cent but among those who had not attended in the past it was only 33 per cent. Exploring the effect of past behaviour on this later behaviour it was found that significantly more non-attenders had never been screened than attenders. The values of the Fisher's exact test show that the influence of past behaviour on future behaviour is probably mediated by reported intentions to be screened as it is more significantly associated with this than with behaviour.

The results indicate that it was the act of having had or not having had a test which was important, rather than the recency of this test. The recency of the women's last smear test, ranging from in the last year to over 5 years ago, was not related to reported intentions, or to later behaviour.

Overall, concerning the most recent smear test the women had undergone (if any), the experience was reported as having been generally positive in terms of the worry, pain and embarrassment it caused and how simple, quick or painless it was. The mean total score for the women was 13.0 (sd 4.3) in a range of 5 to 30. A one-way ANOVA and Scheffé test showed that, as predicted, women who definitely intended to attend for a test reported their previous screening experience as significantly less unpleasant than women who probably intended to attend in the future. The score for women who did not intend to attend fell in the middle of the other groups. A t test was carried out to test the hypothesis that non-attenders would be more likely to report previous cervical screening as unpleasant. However, there was no significant difference between groups for this variable indicating that perhaps the effect is mediated by intentions.

Table 5.1.10 Comparison between groups split by intentions for past behaviour variables.

Variable	No intention	Probable intention	Definite intention	Significance levels
		Frequency (%)		χ^2, p
Whether or not woman has ever been screened				
Yes	8 (66.7)	32 (100)	135 (100)	56.91,
No	4 (33.3)	0 (0)	0 (0)	p<0.00001
				Fisher's exact
				p = 0.00002*
		N mean rank or mean (sd)		χ^2 or F, p
Time since last test	8	32	127	
	92.3	92.3	81.4	1.76, ns
Quality of previous	6	26	126	
experience	14.0 (3.0)	15.8 (4.1)	12.5 (4.2)	7.21,p<0.001**

* women who definitely or probably intended to attend differ from women who do not intend to attend.

** women who definitely intend to attend differ from those who probably do or do not intend to attend.

Table 5.1.11 Comparison between attenders and non-attenders for past behaviour variables.

Variable	Non-attenders	Attenders	Significance levels
	Frequency (%)	Frequency (%)	Fisher's exact
Whether or not woman has ever been screened			
Yes	29 (87.9)	148 (98.7)	
No	4 (12.1)	2 (1.3)	p= 0.01
	N mean rank or mean (sd)	N mean rank or mean (sd)	z or t, p
Time since last test	29	140	
	87.9	84.4	-0.37, ns
Quality of previous	23	136	
experience	14.3 (3.8)	12.8 (4.4)	1.48, ns

5.1.11 Homogeneity of characteristics of women who attend for screening

As women who attended for screening after 1 April 1992 would have received a reminder letter from the FHSA, which constitutes a cue to uptake of screening in addition to the original invitation letter sent to all participants, a further set of analyses were carried out. The group of attenders was sub-divided into a group of prompt attenders (n=108), who attended for a smear test within three months of receiving an invitation letter (by March 1992), and a group of late attenders (n=42), who attended between 1 April and 31 October 1992. These groups were compared on all demographic and social cognition variables. Two differences were found. Women who attended later for screening were more likely to know someone who had had cervical cancer or cervical abnormalities (χ^2=5.21, (1), p<0.05). Fifty six per cent of late attenders knew someone compared to 39 per cent of prompt attenders. Late attenders were also more likely to be from a higher social class than those women who attended promptly (χ^2=6.51, (2), p<0.05). No differences were found for social cognition variables. The fact that these two groups differed shows that the individuals who carry out a behaviour, as well as being distinguishable from women who do not, do not form an homogeneous group (as suggested by Marteau, 1993).

5.1.12 Univariate differences between women based on demographic and past experience variables

Prior to carrying out a multiple regression, demographic and past experience variables which were found to distinguish between women on the basis of their reported intentions and behaviour, were explored in more detail. Differences in beliefs among women from different social classes were also explored to investigate why social class did not distinguish between women who reported differing levels of intentions to attend for screening and between women who attended for screening and those who did not.

5.1.12.1 Whether or not woman has a partner

Women with a partner were compared to those without in order to explore associations with this variable. It was found that women with a partner were represented mainly in social class 3 non-manual, whereas those without a partner were represented in classes one and two (χ^2=7.90 (2), $p<0.05$). Although women with a partner were younger than those without, with a mean age of 41 compared to a mean age of 45, this difference was not significant. Among women who had ever been screened a Mann Whitney analysis revealed that those women with a partner were more likely to have been screened more recently ($z=-2.01$, $p<0.05$).

It had been predicted that women with a partner would have a more positive attitude towards screening and feel more susceptible to cervical cancer, however, no social cognition differences were apparent, although there was a tendency for those women with a partner to perceive cervical screening as less costly than those without ($t=1.80$, $p=0.07$).

5.1.12.2 Age

No social class differences were found with respect to women's age or for whether or not they had a partner or had ever had a smear test. The women's ages were correlated with social cognition variables to explore associations which may help to explain differences in intentions and uptake. There was only one significant correlation: perceptions of susceptibility and age were negatively correlated ($r=-0.26$, $p<0.01$) as predicted, i.e. the older the woman the less susceptible she felt. No significant correlations were found for perceptions of the severity of cervical cancer and contrary to predictions no significant correlation was found for the benefits and costs of cervical screening.

5.1.12.3 Whether or not women have ever had a smear test

In order to explore why women who had never been screened were less likely to intend to attend for a test or to actually attend, the sample was split according to whether or not they had ever been screened and analyses carried out to examine differences. Social cognitions were found to be important with women who had never been screened perceiving fewer benefits to cervical screening than those who had been screened ($t=-2.46$, $p<0.05$) and perceiving more costs to screening ($t=2.13$, $p<0.05$). Groups did not differ on this variable for age, social class or whether or not they had a partner.

5.1.12.4 Social class

In order to clarify the non-significant findings between social classes for intentions and behaviour a series of ANOVAs were carried out looking at differences in attitudes towards cervical screening and susceptibility to cervical cancer. It had been predicted that women from the lower social classes would perceive screening to be more negative and themselves as less susceptible to cervical cancer than women from higher social classes. A Scheffé test showed that women in social classes 1 and 2 perceived cervical screening to be more beneficial than women in social classes 3 manual, 4 and 5, whereas women in social class 3 non-manual did not differ from these other two groups ($F=3.45$, $p<0.05$). Classes did not significantly differ for their perception of the costs of screening ($F=2.32$, ns) or for their susceptibility to cervical cancer ($F=2.03$, ns). The lack of significant findings here may explain why social class was not related to intentions and behaviour.

5.1.13 Hierarchical multiple regressions to predict uptake of screening and to examine the role social cognitions may have in mediating the effect of demographic variables on intentions and behaviour.

A series of hierarchical multiple regressions were carried out to examine predictors of uptake of screening and to explore the relative importance of these variables for predicting intentions and behaviour. The first multiple regression includes only HBM variables in order to test the sufficiency of this model in explaining uptake of screening. The univariate analyses showed that demographic factors can be important in distinguishing between women who intend to attend for screening and those who do not, as well as between women who actually have a smear test and those who do not. This calls into question the sufficiency of the HBM to explain differences in behaviour. A second multiple regression therefore includes these additional variables to explore their relationships with intentions and behaviour.

A sub-sample ($n=147$) of women was selected to include only those women who had no missing values for any of the variables to be included in the multiple regressions. A forced entry method was used. To test the sufficiency of the HBM in predicting behaviour, a multiple regression was carried out. Perceived costs, perceived benefits, perceived susceptibility and perceived severity were entered into the analysis. Although these last two constructs did not differ between groups by their reported intentions or behaviour they are included as they form part of the HBM and the sufficiency of this model to explain behaviour is being tested. These HBM variables alone could account for just 8 per cent of the variance in behaviour with perceptions of the costs of screening being the only significant predictor ($\beta = -0.26$, $p<0.01$). A second multiple regression was then carried out regressing intentions, which is not in fact postulated as part of the HBM, onto the HBM variables. HBM variables could account for substantially more of the variance in intentions than behaviour. Nineteen per cent of the variance was explained with both costs ($\beta= -0.25$, $p<0.001$) and benefits ($\beta=0.27$, $p<0.001$) making a contribution. Finally a third multiple regression was carried out regressing behaviour onto intentions and the HBM variables. Twenty-one per cent of the variance in behaviour was explained. The result of the analysis shows that intentions mediate the effects of the HBM variables as this variable was the only significant predictor of behaviour ($\beta = 0.40$, $p<0.0001$).

Following these analyses the influence of other variables was examined. As the outcome variable was dichotomous (i.e. attendance/non-attendance) the analyses were carried out by logistic regression and then the obtained model was tested with multiple linear regression in order to examine the predictive ability of the model in terms of the amount of variance it explains. The results obtained were the same in both types of analyses, indicating a robust model.

As a forced entry method was used for the multiple regression the order in which the variables were entered into the model would not affect the final solution. However, to draw out the hypothesised paths of mediation and to enable the variance explained at intermediate stages to be examined the blocks of variables are described here. The woman's intention to attend for screening was added at the first step as it was predicted that this would be the proximal determinant of behaviour and all other variables would be mediated by this. At the next step the women's perceptions of the costs and benefits of cervical screening and perceptions of susceptibility to and severity of cervical cancer were added. Thirdly, knowledge levels were added as it was expected that these may be mediated by social cognitions. Previous experience of cervical screening was added to assess the impact of past behaviour on future behaviour (quality of previous experience was not used as this would cause all women who had never had a smear test to be excluded from the analysis). It was expected that its effect on intentions and behaviour would be mediated by the social cognitions already in the model. Finally the women's age and whether or not she had a partner were added to the analysis as the variables already in the model were expected to mediate the effects of these socio-demographic variables. (See appendix 7 for correlations between the variables used in the multiple regressions).

In the logistic regression a significant equation was obtained χ^2= 34.10 (9), $p<0.001$. Two variables were important, a woman's intention to attend for screening (Wald statistic = 5.96, $p<0.01$) and whether or not the woman had a partner (Wald statistic = 4.34, $p<0.05$). These variables indicated that attendance was associated with a greater intention to attend and with having a sexual partner. Eighty six per cent of women were correctly classified.

In the multiple linear regression, direct effects on screening status were obtained for intentions (β =0.32, $p<0.001$), and for whether or not the woman had a partner (β=0.17, $p<0.05$). The equation was significant and the variables accounted for 24 per cent of the variance in behaviour (F=5.91, $p<0.00001$, adjusted R^2 = 0.24). Table 5.1.12 shows the results of these analyses. With only reported intentions in the model 20 per cent of the variance was explained, the addition of social cognition models, knowledge, and past behaviour increased the variance to 22 per cent. The addition of age and whether or not the woman had a partner accounted for a further two per cent of variance.

Table 5.1.12 The final statistics for the linear regression equation predicting uptake of screening. Variables are listed in the order in which they were added to the regression analysis.

Block	Variable	Standardised beta	Significance
First	Intention (0=no; 1=yes probably; 2=yes definitely)	0.319	0.0008*
Second	Perceived costs	-0.132	0.1103
	Perceived benefits	0.019	0.8218
	Perceived susceptibility	-0.031	0.6956
	Perceived severity	0.039	0.6059
Third	Knowledge	-0.124	0.1135
Fourth	Whether or not woman has ever had a smear test (0=no; 1=yes)	0.124	0.1464
Fifth	Age	-0.027	0.9211
	Whether or not woman has a partner (0=no; 1=yes)	0.172	0.0245*

Multiple R = 0.53; R square = 0.28, Adjusted R square = 0.24; * significant predictors

The analysis was repeated regressing intentions onto the other variables to examine mediated effects on behaviour. The effect of perceptions of the benefits and costs of cervical screening on behaviour was mediated by a positive association, in the case of benefits (β=0.19, $p<0.05$), and a negative association, in the case of costs (β =-0.18, $p<0.05$) with reported intentions. The effect of ever having had a smear test on later behaviour was also mediated by a positive association with intentions (β =0.37, $p<0.00001$). These variables accounted for 34 per cent of the variance in intentions (F=10.01, $p<0.00001$, adjusted R^2= 0.34), with women's past behaviour making the largest contribution (see table 5.1.13). As can been seen, then, the direct effect on intentions of past behaviour is greater than its mediated effects. Incremental F ratios (Tabachnick and Fidell, 1996) were calculated for the increase in prediction of intentions from 19 per cent to 32 per cent with the addition of this variable. It was found, unsurprisingly, that this large increase was significant (F_{inc}= 43.53, $p<0.00001$).

Table 5.1.13 The final statistics for the linear regression equation predicting intentions to attend for a smear test. Variables are listed in the order in which they were added to the regression analysis.

Block	Variable	Standardised beta	Significance
First	Perceived costs	-0.178	0.0257*
	Perceived benefits	0.191	0.0161*
	Perceived susceptibility	0.089	0.2272
	Perceived severity	-0.023	0.7453
Second	Knowledge	0.035	0.6266
Third	Whether or not woman has ever had a smear test (0=no; 1=yes)	0.369	0.0000*
Fourth	Age	-0.130	0.0775
	Whether or not woman has a partner (0=no; 1=yes)	0.073	0.2965

Multiple R = 0.61; R square = 0.37; Adjusted R square = 0.34; * significant predictors

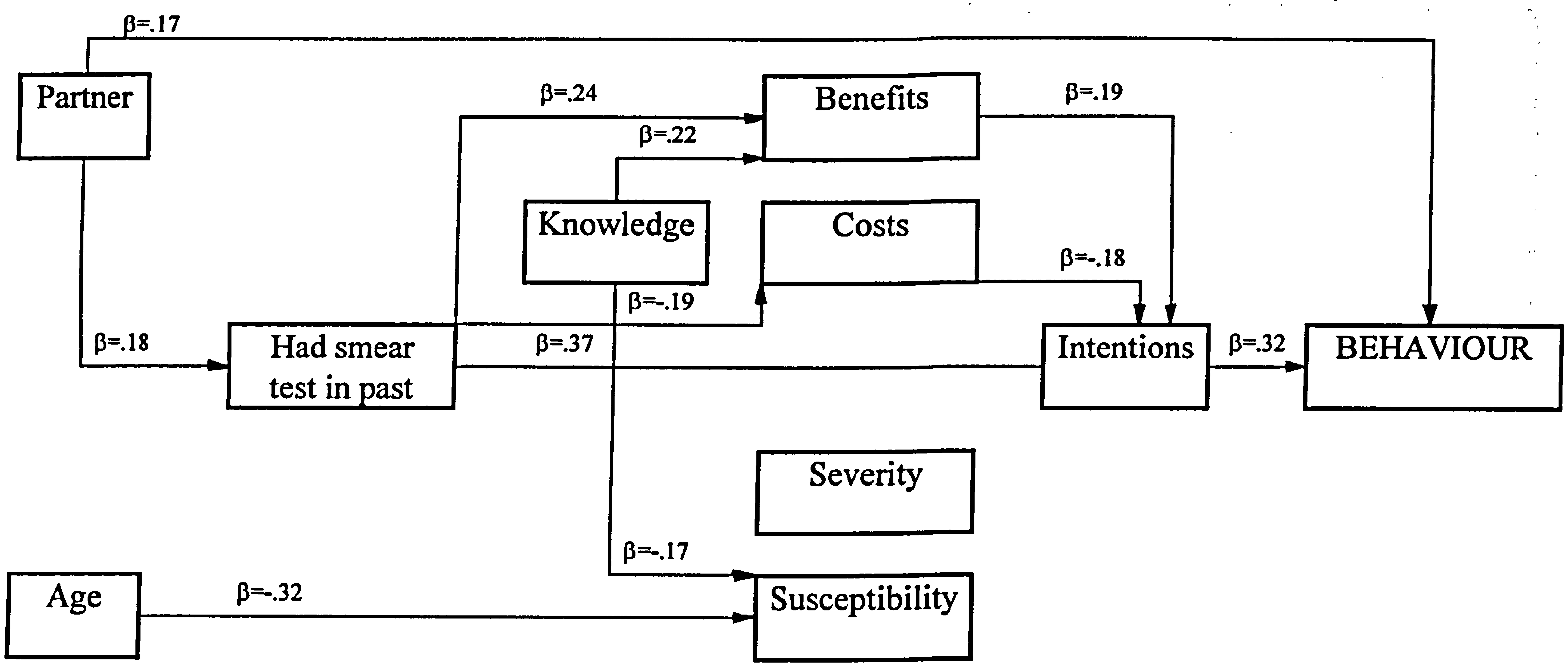
Further regressions were carried out to explore associations between the variables in the model. The influence of ever having had a smear test on both intentions and behaviour was mediated by a positive association with the perceptions of the benefits of screening (β =0.24, $p<0.01$) and a negative association with perceptions of the costs of screening (β =-0.19, $p<0.05$), as was expected. The effect on uptake of screening of having a partner was partly explained by a positive association with ever having been screened where women with a partner were more likely to have also been screened in the past (β =0.18, $p<0.05$). However, there remained a substantial direct effect on behaviour of this variable which was not explained by the beliefs and other variables included in the model. This is explored in detail in study 2 of this thesis.

The effect of knowledge on intentions and behaviour was mediated by a positive relationship with perceptions of the benefits of screening (β=0.22, $p<0.01$). Knowledge was also negatively related to perceptions of susceptibility to cervical cancer (β=-0.17, $p<0.05$), although susceptibility was not a significant predictor of intentions or behaviour. Age was also found to be negatively related to perceptions of susceptibility to cervical cancer (β=-0.32, $p<0.0001$). It remains unclear, therefore, as to why the older women in this study were less likely to intend to be screened and to actually be screened for cervical cancer.

The relative contribution of mediated and unmediated effects in predicting intentions and behaviour can be seen in figure 5.1.1. Reported intentions make the greatest direct contribution to predicting behaviour, followed by whether or not the woman has a partner. A number of calculations were carried out to explore whether the influence of mediated or unmediated effects was greater for a given variable and whether the mediated effect via one route was larger than the mediated effect via another.

The direct effect of past behaviour on intentions was 0.37. Two indirect effects could be calculated, one via benefits ($0.24 \times 0.19 = 0.05$) and one via costs ($-0.19 \times -0.18 = 0.03$). The total mediated effect of past behaviour is therefore 0.08. This shows how the direct effect of past behaviour is much larger than the mediated, indirect effect. In addition, the mediated effect via benefits is greater than that via costs, although not substantially. For

Figure 5.1.1 Representation of the hierarchical multiple regressions to predict intentions and behaviour in study 1



Adjusted r square for behaviour = 0.24.
Adjusted r square for intention = 0.34
Only significant paths are shown (at least $p<0.05$), although all theoretical paths were tested. Beta weights are written above the path to which they refer

whether or not the woman has a partner the unmediated effect on behaviour is 0.17. Three mediated effects can be calculated. Firstly, via past behaviour and intentions (0.18 x 0.37 x 0.32 = 0.02), secondly via past behaviour, perceived benefits and intentions (0.18 x 0.24 x 0.19 x 0.32 = 0.003), and thirdly via past behaviour, perceived costs and intentions (0.18 x -0.19 x -0.18 x 0.32 = 0.002). Here too, then, the direct effect of this variable is much larger than the mediated, indirect effects. Examining how effects may be mediated can help explain the influence of some variables, however, as can be seen the beta weights obtained are very small due to causal dilution.

These hierarchical multiple regressions demonstrate that social cognitions are not the sole predictors of intentions and behaviour and that past behaviour makes a contribution as do demographic factors such as whether or not the woman has a partner.

In addition, the effects of the social and past behaviour variables are not mainly mediated by the HBM variables. As the addition of the other variables significantly added to the amount of variance explained this shows that the HBM is not a sufficient model of health behaviour.

5.1.14 Microanalysis of beliefs about the benefits and costs of cervical screening

Having shown that beliefs about the benefits of cervical screening and about its costs are independently predictive of intentions to attend for cervical screening a further analysis was carried out in order to assess if any specific beliefs are particularly pertinent. This follows the analysis of Hill *et al* (1985), Hennig and Knowles (1990) and Sutton *et al* (1997).

As can be seen from table 5.1.14, reported intentions are significantly positively correlated with all but three of the individual benefits items. Smear tests detecting abnormalities early, enabling cervical cancer to be found before it is advanced, and before it is too late to treat it were not correlated with intentions. The most important benefits in terms of how far they distinguish between women with differing levels of intention, were the beliefs that a woman would 'gain a lot' by being screened, that cervical screening gives women reassurance and that screening represents something women can do to detect cervical cancer. For perceptions of costs all but three beliefs were significantly correlated with reported intentions. Beliefs that the smear test makes women flustered, is uncomfortable and is time consuming were not correlated with intentions. Particularly important beliefs were that the smear test is inconvenient and a belief that a smear test is frightening. Generally beliefs in the costs of screening were correlated more highly with intentions than were beliefs in the benefits of screening (mean r=-0.24 compared with a mean of r=0.21).

Table 5.1.14 Correlations between individual benefits and costs items and reported intentions to attend for a smear test

Benefits	r	p value
Can do nothing to detect cervical cancer (R)	0.29	<0.01
Tests find cervical cancer when it is too late to treat it	0.08	ns
Tests find cervical cancer before it is advanced	-0.03	ns
Does not give peace of mind (R)	0.27	p<0.01
Smear tests are not a good idea (R)	0.24	p<0.01
Tests detect abnormalities before symptoms	0.12	ns
A lot to gain from tests	0.35	p<0.001
Reassured if have tests	0.36	p<0.001
Test are no good at detecting cervical cancer early (R)	0.19	p=0.05
Costs		
Afraid of test	-0.32	p<0.001
Too inconvenient	-0.42	p<0.001
Flustered during test	-0.15	ns
Does not interfere with other activities (R)	-0.24	p<0.01
Time consuming	-0.15	ns
Don't mind giving up time (R)	-0.29	p<0.001
Rarely embarrassed (R)	-0.19	p<0.05
Tests are painful	-0.27	p<0.01
Tests are distressing	-0.24	p<0.01
Tests are uncomfortable	-0.12	ns

n=146 (same participants as used in the multiple regressions). R = item reversed.

5.2 Phase II

5.2.1 Characteristics of the sample

Statistical analyses were carried out to test for any differences in social cognitions, intentions, behaviour or demographic characteristics between the participants in phase II and the women who, despite taking part in phase I, were not participants in phase II. No significant differences were found for reported intentions, behaviour, whether or not the woman had a partner, social class or age, showing that the sub-sample who participated in phase II was not biased with respect to these variables (see table 5.2.1).

However, an examination of the social cognition variables revealed that those women who only participated in the first phase of the study felt significantly more susceptible to cervical cancer and perceived significantly fewer benefits to screening that women who participated in both phases (see table 5.2.2). They did not differ for their perceptions of the costs of screening or their perceived severity of cervical cancer.

In addition, half of the women who had never been screened did not take part in phase II of the research (n=3). This severely compromised some of the planned statistical analyses.

Table 5.2.1 Comparisons between participants in both phases of the study and participants in phase I only.

Variable	Participants in both phases of the study	Participants in phase I only	Significance levels
	Frequency (%)	Frequency (%)	χ^2, p
Whether or not the woman has a partner			
Yes	120 (80)	26 (81.3)	0.03, ns
No	30 (20)	6 (18.8)	
Social class			
1 or 2	52 (35.1)	11 (35.5)	
3 non-manual	82 (55.4)	16 (51.6)	0.37, ns
3 manual, 4 or 5	14 (9.5)	4 (12.9)	
Whether or not woman attended for a test			
Yes	127 (84.1)	23 (71.9)	
No	24 (15.9)	9 (28.9)	2.67, ns
	N mean (sd) or mean rank	N mean (sd) or mean rank	t or z, p
Intentions	148	31	-0.79, ns
	91.1	84.9	
Age (in years)	149	32	
	42.7 (11.7)	41.1 (11.1)	-0.66, ns
Perceived susceptibility	136	30	
	22.2 (4.8)	24.5 (4.0)	-2.39, p<0.05
Perceived severity	144	30	
	15.7 (3.2)	14.9 (2.9)	-1.14, ns
Perceived benefits	144	30	
	38.9 (40.4)	37.0 (4.3)	-2.38, p<0.05
Perceived costs	145	28	
	19.8 (6.0)	20.7 (5.7)	0.65, ns

5.2.2 Impact of uptake of screening on women's attitudes

In order to compare the amount of change in women's attitudes after they had been screened for the first time, screened for the second time or more, or had not been screened, a difference score was calculated for each woman by subtracting her score from phase II from her score from phase I for each social cognition variable. Subsequent to this four groups were created. Women who were screened for the first time (group 1, n=2); women who had been screened in the past but who did not attend on this occasion (group 2, n=23); women who had been screened in the past and who attended on this occasion (group 3, n=125)[1] and women who had never had a smear test and who did not attend for one on this occasion (group 4, n=1). It was the intention to carry out an ANOVA to test the prediction that women in group 1 would have significantly greater mean difference scores for social cognitions than women in groups 2, 3 or 4. However, the numbers of women in the groups were too small to make this possible. Sufficient numbers were available to compare groups 2 and 3, however. No significant differences in belief change scores were predicted between these groups and a series of t tests showed that this was the case (see table 5.2.2).

Table 5.2.2. Change in beliefs about cervical cancer and cervical screening

Variable	Group 2	Group 3	Significance
	N mean (sd)	N mean (sd)	t, p
Change in perceptions of susceptibility	19 -0.7 (3.0)	105 -0.1 (3.8)	-0.68, ns
Change in perceptions of the severity	18 0.2 (3.1)	114 0.1 (2.7)	0.18, ns
Change in perceptions of the benefits	20 2.9 (3.1)	116 2.9 (3.7)	0.10, ns
Change in perception of the costs	18 -0.6 (7.0)	112 -0.8 (4.6)	0.16, ns

[1] Two women in this group had received a positive smear test result and were excluded from the subsequent analyses.

In fact, there was very little change in beliefs for the group of women as a whole, as can be seen from table 5.2.3 which gives the mean scores for the social cognition scales, taking just those women who participated in both phases of the study into account.

Table 5.2.3 Mean scores for social cognition scales at time 1 and time 2

Variable (N)	Time 1 mean (sd)	Time 2 mean (sd)
Perceived susceptibility (127)	22.1 (4.8)	22.3 (4.9)
Perceived severity (135)	15.7 (3.3)	15.7 (2.9)
Perceived benefits (139)	38.9 (4.1)	36.1 (3.1)
Perceived costs (133)	19.6 (6.0)	20.4 (5.9)

5.2.3 Prospective prediction or retrospective explanation?

Two multiple regressions were carried out to test the second hypothesis of this phase of the study. This was that for women who had had a smear test in the past the variance in behaviour explained by beliefs measured prospectively or beliefs measured retrospectively would be similar. The outcome measure of the study (i.e. attendance or non-attendance for a smear test) was regressed onto the social cognition variables (perceived benefits, costs, susceptibility and severity). With prospectively measured social cognitions a significant equation ($F=2.73$, $p<0.05$) was achieved. This predicted 5 per cent of the variance in behaviour (Adjusted r square = 0.05). Perceived costs was the only variable to make a significant contribution to the variance explained ($\beta=-0.24$, $p<0.05$). Similarly, using social cognitions measured retrospectively (i.e. assessed at time 2), a significant solution was achieved ($F=3.04$, $p<0.05$), which accounted for 6 per cent of the variance in behaviour (Adjusted r square = 0.06) and again, perceived costs was the only significant variable ($\beta=-0.34$, $p<0.01$). It can be seen, then, that neither method gave a superior solution in terms of variance in behaviour explained.

It was not possible to carry out similar analyses using data from women who had not previously been screened as only three women fell into this category. The hypotheses that social cognitions measured prospectively would give the better prediction of behaviour for these women could not, therefore, be tested.

5.3 Summary

- Intentions are the proximal determinant of behaviour, and the best predictor of behaviour, mediating the effect of social cognitions.
- There is a direct effect of past behaviour on intentions which is greater than the mediated effect via social cognitions.
- Whether or not the woman has a sexual partner is important for predicting behaviour. This shows a direct relationship to behaviour which is greater than the effect mediated by other variables in the model.
- A perception that cervical screening is beneficial and not costly is related to reported intentions and later behaviour.
- Of the social cognitions explored in the study, perceived costs of cervical screening makes the greatest contribution to the prediction of intentions and behaviour.
- Perceptions of the threat of cervical cancer are not important for predicting intentions or behaviour.
- Younger women are more likely to intend to have a smear test but when explored in a multivariate analysis this variable is not a significant predictor of intentions.
- No social class differences were observed between groups.
- Variables external to the HBM significantly increased the amount of variance explained showing that this model is not a sufficient model of screening behaviour.
- Beliefs about cervical screening and cervical cancer remained relatively stable over the course of the study.

Chapter 6

Study 1: Discussion

6.1 Summary of study findings and theoretical implications

6.1.1 Introduction

Study 1 of this thesis was designed to test a number of hypotheses concerning the psychological and social factors which may predict intentions to have a smear test and later uptake of screening following a written invitation. How far these hypotheses have been supported, refuted or remain to be assessed will be discussed in this section, together with the theoretical implications of the main findings of the study. The possible limitations of the study and how these may affect the interpretation of the results will be discussed in the next section. The wider issue of the usefulness of the application of social cognition models in this behavioural domain is discussed in the concluding chapter of this thesis along with the practical implications of this study and study 2.

Using the framework of the Health Belief Model (HBM), beliefs about perceived susceptibility to, and perceived severity of, cervical cancer and perceived benefits and perceived costs of cervical screening, were assessed using measures for which good reliability had been established. An examination of past screening behaviour and social and demographic influences on screening uptake was also made to explore whether these factors influence screening uptake independently of social cognitions or whether their effects on intentions and behaviour are mediated by social cognitions.

The current study adds to the body of knowledge about factors which affect uptake of screening. Very few prospective studies have been carried out and the use of this design enabled the potential casual influences on intentions and behaviour to be assessed. Because data were collected before women were asked to attend for a smear test, conclusions can be drawn about how health beliefs and demographic characteristics may *predict* intentions and behaviour. In addition, the use of multivariate statistical analyses enabled the most important variables for explaining behaviour to be identified and the pathways of mediation to be quantified. The study therefore not only shows which variables predict behaviour but the closer examination of the relationship between the variables allows the reasons for behaviour to be explained.

The results of the study indicate that behaviour is predicted by a combination of women's intentions, how they have behaved in the past, their beliefs about screening, and their social circumstances. From a theoretical viewpoint, the findings of the present study provided only partial support for the HBM as a useful framework in apply to this behavioural domain. In particular, threat perceptions were not found to be important in the prediction of intentions or behaviour, and reported intentions to act - which are not postulated to be part of the HBM - were found to be the best predictor of behaviour. In addition it was found that other variables that are regarded as external to the model added significantly to the prediction of intentions and behaviour. The main study findings are discussed below.

6.1.2 Intentions to attend for a smear test

As predicted, women who attended for a smear test were more likely to have reported a greater intention to do so before receiving a letter inviting them for a smear test. In addition, when examined in a multivariate model it was found, as expected, that this variable made the largest contribution to explaining behavioural variance and mediated the effects of all other variables (with the exception of whether or not the woman had a current sexual partner - this result will be discussed below).

The finding that reported intentions significantly added to the prediction of behaviour has important theoretical implications. The current study is informative in this regard as no other prospective study of uptake of cervical screening used a measure of reported intentions, in addition to social cognition variables, to predict behaviour. Social cognition models including reported intentions have, however, been used successfully to predict uptake of breast screening (e.g. Calnan, 1984; Sutton *et al*, 1994; Vaile *et al*, 1993). In the current study HBM variables alone predicted 8 per cent of variance in behaviour but 19 per cent of variance in intentions. There is, therefore, a strong case for routinely including a measure of intention in applications of the HBM to uptake of screening as this gives a more accurate prediction of behaviour. Other researchers applying the model to uptake of cancer screening and screening for hypertension have made this suggestion (Calnan, 1984; King, 1982). The finding that intentions predict behaviour is consistent with the Theory of Planned Behaviour (TPB; Ajzen, 1991) and this theory is applied to uptake of cervical screening in study 2 of this thesis.

Although intentions were an important predictor of behaviour, only five per cent of the women in the current study reported that they would not attend for screening, whereas 18 per cent actually did not attend. These errors in prediction are of theoretical interest. The phenomenon of optimistic bias when considering a health threat is widely researched (e.g. Weinstein, 1982; Hoorens, 1994). However, as Sutton (1997) points out, little emphasis has been placed on exploring the optimistic bias which may result when individuals are asked to report their intentions to carry out a behaviour. It seems that in the present study, women over estimated the likelihood with which they would actually attend for a smear test.

In this study the correlation between intentions and behaviour was 0.40. This compares well to findings from meta analyses based on studies using the Theory of Reasoned Action (TRA) and the TPB. The average correlation between intentions and behaviour found by Sheppard *et al* (1988) in a meta-analysis of 87 studies was 0.53, although the range was large from 0.10 to 0.94 and in ten per cent of the studies the measures correlated at less than 0.20. None of the studies included in the Sheppard *et al* analysis were about screening attendance. The closest which comes to a preventive health behaviour is having an inoculation (Oliver and Berger, 1979), where the correlation was reported as 0.32 between intentions and behaviour, slightly lower than in the current study. A more recent meta analysis carried out by Godin and Kok (1996) focused solely on health related behaviours. They found that the lowest correlations between intentions and behaviour at 0.35 was for screening behaviours (which included 8 studies of attendance for mammograms, self examination behaviours, attendance for general health checks, and self administered colorectal cancer screening). Again this figure is comparable to the correlation found in the current study.

There are a number of reasons why there may be a discrepancy between intentions and behaviour (Sutton, 1997). Some of these reasons are discussed here. It is possible that as women were not in the position of making an actual decision when reporting their intentions these provisional intentions may be subject to a social expectation effect whereby women felt obliged to indicate that they would at least probably attend for screening. In addition, it has been suggested that intentions may change once they are formed, for example, due to the receiving of new information or obstacles occurring to prevent behaviour being carried out. This may particularly occur if there is a long period of time between their measurement and the assessment of behaviour (Ajzen and Timko, 1986). It is possible that this happened in the current study, with up to 10 months elapsing between the two measures. Indeed it is possible that as the time to act approaches the more negative aspects of the behaviour may become more salient, causing intentions to alter. This shortcoming is addressed in study 2 which used a shorter time frame.

However, the length of time for follow up may also offer advantages, in that idiosyncratic reasons for women's behaviour may be avoided as the women had a long period of time in which to act, and were not offered one chance to attend for a smear test. If a short period of time is available in which to act, or one particular opportunity is being studied, it is likely that other important causes of behaviour may be omitted from the predictive model (Sutton, 1997). However, in the current study, if women were prevented from attending for a test on one occasion they would have had other opportunities. Temporary obstacles, such as having no child-minding facilities available on the day they intended to be screened, could be a reason for the postponement of attendance. Naturally it depends on how enduring the obstacle to behaviour is, and it is of course possible that some women suffered permanent obstacles which prevented their attendance. However, this would be unlikely to affect very many participants.

A report by Orbell *et al* (1994) has highlighted the difficulty of extrapolating from intention to perform a behaviour to actual behaviour. Social cognition models, on the whole, are concerned with predicting individuals' motivations to behave (although the HBM is phrased in terms of predicting actual behaviour). Measures of perceived behavioural control (an element of the TPB) have been found to predict behaviour independently of intentions but in the main social cognition models do not contain variables designed to account for the intention-behaviour gap (Abraham and Sheeran, 1993b). Recent theoretical frameworks have been devised to fill this gap in knowledge by exploring the ways in which intentions are translated into behaviour (e.g. Bagozzi and Warshaw's 1990 theory of trying and Gollwitzer's 1993 implementation intentions). Other possible reasons for the lack of concordance between intentions and behaviour, which are related to the operationalisation of the measures, are explored in section 6.2 of this chapter.

6.1.3 Social cognitions

6.1.3.1 Introduction

Social cognitions proved to be an important influence on intentions and behaviour. Concerning specific cognitions, hypotheses relating to perceptions of threat and its relationship to intentions and behaviour were not supported whereas hypotheses relating to attitudes towards the screening itself were. As predicted, the relative contribution of constructs derived from the HBM in predicting intentions was greater than the contribution made by demographic and social variables although whether women had been screened in the past also made a substantial contribution. Regarding the prediction of behaviour, however, it was found that the effects of social cognitions were mediated by reported intentions and that the social variable of whether or not women had a partner made a greater direct contribution to the prediction of behaviour than that made by social cognitions.

6.1.3.2 Perceptions of threat

It was expected that beliefs about perceived susceptibility to, and perceived severity of, cervical cancer would influence intentions and uptake of screening. However, the study did not find that women who reported a greater intention to attend for screening or those who attended for a smear test perceived themselves to be more susceptible to cervical cancer than women who reported less intention or did not attend; nor did they perceive cervical cancer to be significantly more severe. As predicted, however, perceptions of severity were related to perceived costs of screening. Those women who thought that cervical cancer was severe were also more likely to perceive the costs of attending for cervical screening to be higher.

These results could be interpreted to imply that perceptions of threat are not important in the decision to undergo cervical screening. It is possible that this is because the majority of the participants were familiar with this screening and, as discussed in Chapter 3, threat perceptions may only be important for predicting the performance of novel behaviours (Rogers, 1983; Schwarzer, 1992). When an individual has carried out a behaviour in the past a perception of threat may be unnecessary to motivate them to form an intention to perform the behaviour again. This indicates that it is important, instead, to take past behaviour into account. However, in an empirical examination of predictors of first time attendance for a mammogram carried out by Jepson and Rimer (1993) risk perceptions were not found to be important for predicting intentions to have a mammogram among prior non-screenees. It is difficult to draw firm conclusions from this finding, however, because weak measures of social cognitions were used and whether threat perceptions would be important for influencing the behaviour of women who had never been screened remains to be established.

A further reason why perceptions of susceptibility in particular may not have been important for explaining behaviour is that definite attitudes about susceptibility to a disease which may influence behaviour may only occur in the presence of symptoms (Becker and Maiman, 1975; Weinstein, 1993). Considering the prevalence of invasive carcinoma in the UK most women in this study would have been asymptomatic. Leventhal *et al* (1985) criticise the HBM for failing to include perceptions of symptoms as a core element in the model and argue that this perception can predict health behaviour over and above perceived susceptibility. It is arguable, however, that the model does attempt to account for such perceptions in terms of cues to action. Likewise, it is possible that disease severity will only be seriously considered when people have, or believe that they have, the disease (Arnold & Quine, 1994). In fact, research using the HBM has found that the element of perceived severity tends to be a significant variable when sick role behaviour is being examined (e.g. Kegeles and Lund, 1984). It is possible that the women could not judge the severity of cervical cancer in a way that would influence their later behaviour having had, on the whole, no personal experience of cervical cancer. Women may have rated the severity of cervical cancer by considering it in general terms despite the items including self-referents, such as 'If I got cervical cancer my whole life would change'. Therefore, their perceptions would not be expected to influence their own uptake of screening as the HBM requires that the individual believes the consequences of the disease would be severe for them.

It is also possible that a perception of susceptibility to a disease will not predict uptake of a behaviour which may lead to an increase in anxiety. So if a woman feels that she is likely to receive a positive result following screening, instead of this susceptibility increasing the chances of her attending for a smear test, it may instead increase her fear and act as a deterrent. Kash *et al* (1992) observed this effect in women being asked to attend for breast screening.

The assumption that cancer is universally believed to be very severe, for example as suggested by Stein *et al* (1992), was not borne out by the present study, although there was little variation in this measure, most women believed cervical cancer to be only moderately severe. It has been suggested that if everyone perceives a disease to be severe, this lack of variation would have the result of the variable having little effect on other variables (Janz and Becker, 1984). It is possible that the general consensus as to the severity of cervical cancer in the present study also had this effect. The lack of perceived severity may be because the participants had a strong belief in the benefit of screening to detect cervical abnormalities in the early stages leading to better treatment and an improved prognosis.

Ronis and Harel (1989) and Schwarzer (1992) suggest that threat perceptions should be considered as more distal predictors of behaviour via their effect on other cognitions. The current study provides some support for this view finding that greater perceived severity was related to an increase in the perception of costs which in turn was related to lower intentions to attend for screening and a reduced likelihood of actually attending. In the microanalysis of perceptions of costs and their relationships to intentions, a belief that having a smear test would be a frightening experience was particularly important in terms of its ability to predict intentions to be screened. This is consistent with the finding that perceptions of severity and costs are related. It is possible that the fear engendered is a fear of not wishing to find out that something is wrong. Haefner and Kirscht (1970) in fact found that if individuals perceived a disease to be severe then the level of fear this produced had an inhibiting effect on their behaviour, rather than encouraging attendance. Severity as assessed in the current study tended to evoke social aspects of the severity of cancer rather than medical aspects. For example, items included 'getting cervical cancer would interfere with my sex life' and 'my whole life would change'. This may explain its relationship to perceived costs. Indeed, Ronis and Harel (1989) found that social severity was related to perceived costs in their study.

Whilst there are some plausible reasons why susceptibility may not distinguish between attenders and non-attenders for screening it is advisable to attempt to replicate the result as it is inconsistent with the findings of many other studies. Indeed, Orbell *et al* (1996) found that for explaining past use of cervical screening, perceptions of susceptibility was the most important variable, and more important than beliefs about the behaviour itself. Hill *et al* (1985) and Hennig and Knowles (1990) also found that susceptibility was important for predicting intentions to have a smear test.

On the other hand, the finding that perceptions of the severity of cervical cancer are not important for predicting intentions and behaviour is consistent with the literature (e.g. Hennig and Knowles, 1990; Hill *et al*, 1985; King, 1987; Murray and McMillan, 1993; Orbell *et al*, 1996). Janz and Becker (1984) found perceptions of severity to be the least important HBM variable in their review of research using the model. Harrison *et al* (1992) observed particularly low effect sizes for this variable in studies of uptake of screening. Indeed, the effect sizes were non-significant whereas those for benefits, costs and susceptibility were significant, with perceived benefits and costs of behaviour being the most important.

6.1.3.3 Perceptions of benefits and costs

The study results do, however, show that women's intentions to undergo cervical screening and their behaviour can be explained, at least in part, by their health beliefs as derived from the HBM. It was found that women reporting differing levels of intentions differed in their beliefs about the costs and benefits of screening, as did groups of attenders and non-attenders. Whereas most of the participants believed that cervical screening is reassuring and useful in detecting cervical abnormalities, women reporting a greater intention to attend for screening, and those women who attended, perceived screening to be significantly more beneficial than women reporting less intention to attend and non-attenders. In addition, women reporting less intention to attend and non-attenders perceived the smear test to be significantly more costly than women reporting a greater intention to attend and women who attended. They perceived more costs in terms of how embarrassing, distressing, painful and inconvenient the smear test was. In a multivariate analysis beliefs about the costs and benefits of screening were the most important (together with past behaviour) for predicting intentions, which in turn predicted behaviour. The study also shows how beliefs about having a smear test are important in terms of their ability to mediate the effects of other variables. This illuminates why these other variables may be related to intentions and behaviour. These findings are explored in greater depth in the discussion of the relevant variables below.

Of the two constructs, it was found that perceptions of costs are more important for predicting intentions and behaviour. This is consistent with the predictions of the study and also with the literature in this area, where this component of the HBM has consistently been found to be the most relevant in relation to uptake of preventive health behaviours. In two meta-analyses of studies employing the framework of the HBM (Harrison *et al*, 1992; Janz and Becker, 1984) and in studies specifically about uptake of cervical screening (e.g. Hill *et al* 1985; King, 1987; Orbell *et al*, 1996) this was shown to be the case. It is plausible that perceptions of the costs of screening may be particularly influential in predicting intentions as the behaviour itself is not intrinsically rewarding and it is necessary to undergo this 'costly' behaviour in the short term before any benefits may be accrued.

An examination of the particular beliefs which comprised the benefits and costs measures allowed an explanation of screening behaviour to be made. Beliefs about the efficacy of screening in detecting cervical abnormalities early were not the most important for predicting reported intentions to be screened. Instead, the psychological benefit of screening in terms of the reassurance it offers and a belief that women would have a lot to gain by being screened were the most important beliefs. The results of the present study are consistent with findings by Orbell *et al* (1996) and Murray and McMillan (1993), neither of whom found that the relationship between the perceived benefits of screening in terms of detecting cancer early, when it would still be curable, was as important in predicting attendance for cervical screening as beliefs about the reassurance offered by screening. Concerning perceived costs, the items which were most important in predicting intentions seemed to cover both of the aspects of the costs of screening, i.e. the psychological and the practical, in that they related to a belief that the smear test was inconvenient and also to a fear of being screened.

As perceived costs of screening were the most important element of the HBM and significantly contributed to the predictions of intentions, this shows how anticipated affective reactions to the act of screening are important determinants of behaviour. A theoretical perspective which emphasises anticipated feelings about the consequences of behaviour is regret theory (e.g. Richard *et al*, 1995). The role that anticipated post behavioural reactions may play in predicting intentions and behaviour is explored in more depth in the second study of this thesis.

6.1.3.4 Normative pressure

Normative pressure to attend for screening did not prove to be related to intentions or behaviour. Attenders were no more likely than non-attenders to believe that their partner thinks that screening is beneficial or report that their family and friends attend for cervical screening. Nonetheless, these variables were found to be associated with attitudes towards screening. If their friends attend for screening women were more likely to hold a more positive attitude towards screening and in addition the reported attitude of partners to screening was negatively correlated with the perception of its costs, in that these were perceived as fewer if a partner thought screening was beneficial. Behaviour of other family members, however, was not related to beliefs about screening, perhaps indicating that these people are less important in influencing women's beliefs than their partners and friends.

The study shows, therefor, that attitudes towards behaviour (i.e. perceived benefits and costs) are more important for predicting intentions and behaviour than normative pressure. It remains possible that the perceived attitudes of other people are not important for undergoing screening beyond their influence in shaping the individual's attitudes towards that behaviour. The shortcomings of the measurement of these variables are discussed in the final section of this chapter. Normative pressure to attend for screening is explored further in study 2.

6.1.3.5 Cues to action

Regarding possible cues to action it was expected that those women with personal experience of cervical abnormalities either in themselves or in other women known to them, would report greater intentions to attend for screening and be more likely to actually attend. However, this did not prove to be the case. Few women had experienced cervical abnormalities themselves, and although more knew other women who had experienced them this did not affect the women's reported intentions and behaviour. Due to the way in which the study was designed all women received arguably the 'best' cue to action i.e. a letter inviting them to attend for a smear test. As discussed in Chapter 3, a number of studies have found that receipt of such letters can act as an impetus to behaviour (e.g. Eardley *et al*, 1985; Norman and Fitter, 1991a; Vernon *et al*, 1990; Wilson and Leeming, 1987).

The study also highlighted the fact that women who attend for screening may not form an homogeneous group. Differences were observed between attenders depending on how soon they attended for a test after being sent an invitation to have one. Those women who attended later were more likely to know someone who had had an abnormal smear test and were also more likely to be from a higher social class. This shows that whilst differing from women who do not attend for screening, women who do attend may also differ from one another. Murray and McMillan (1993) found a difference in perceptions of the benefits of screening between those women who actively asked for a test and those who attended in response to an invitation. However, in the current study attenders split into groups on the basis of when they had their smear test did not differ in their beliefs about cervical cancer or cervical screening so it seems that delayed attendance does not indicate a less positive attitude towards screening. In addition, whether women attend for cervical screening at all is of particular importance, rather than the exact timing of their attendance.

6.1.3.6 Knowledge

Knowledge levels about cervical cancer and cervical screening were examined and most participants were found to be aware of the purpose of the smear test, how it is carried out and some of the risk factors for developing cervical abnormalities. As predicted, women who had a stronger intention to attend for screening were found to have better knowledge about screening and cervical cancer. The strength of this association was, however, considerably weaker than the influence of cognitions on intentions. Knowledge was not related to behaviour and attenders and non-attenders did not differ for their levels of knowledge. The reconceptualising of knowledge in this thesis as a variable whose influence would be mediated by social cognitions proved to be useful. Greater knowledge was found to be associated with a more positive attitude towards screening, as had been predicted, and also to a lower perception of susceptibility to cervical cancer - a finding which had not been predicted. It was not found to be related to social class however.

The lack of relationship between knowledge and behaviour found in this study is similar to the findings of the extensive research about the role of knowledge in affecting safe-sex practices in the prevention of HIV infection. This research has consistently found that knowledge does not predict behaviour but that attitudes towards the behaviour are more important (e.g. Abraham and Sheeran, 1993). However, in the present study knowledge was related to reported intentions. The literature concerning the role of knowledge in influencing uptake of screening tends to focus on a lack of knowledge which would influence a woman's perceptions of being the 'right' type of woman who should have screening. It is possible therefore that because in the current study each woman is sent a letter asking them to attend for a test, any effect of knowledge on behaviour is neutralised. However, for intentions, which are reported by women before they receive the letter, levels of knowledge may still be important. It remains possible that knowledge is simply an aspect of an attitude towards a behaviour, and it is not re-explored in the second study of this thesis.

6.1.4 Past behaviour

Recently there has been increasing interest in the predictors of adherence to screening programmes over time, as it is believed that it is repeated attendance which will ultimately lead to the reduction of mortality from cancers. Although most of the women had attended for screening and therefore a number of the planned analyses could not be conducted, the current study was able to take into account the influence of repeated attendance. As discussed in Chapter 3 of this thesis the influence of past behaviour on current behaviour has been conceptualised in different ways. It can be seen as a predictor variable in one of two ways. Firstly, Bentler and Speckhart (1979) suggest that past behaviour may directly predict behaviour. Secondly, Ajzen (1988) instead suggests that the influence of past behaviour is mediated by attitudes. He argues that the TPB is sufficient to explain and predict social behaviour and therefore past behaviour should not have a direct effect on behaviour.

As cervical screening is an infrequent behaviour which is not habitual and which would also require some conscious thought, in the current study the influence of past experience of screening on future behaviour was expected to be mediated by beliefs. Partial support was obtained for this prediction. Past experience of cervical screening proved to be an important variable for understanding intentions and behaviour. Women reporting a greater intention to attend for screening and those who attended were more likely to have had a smear test in the past. In a multiple regression it was found, as expected, that this relationship was partly mediated by social cognitions in that those women who had been screened in the past had a more positive attitude towards screening, perceiving it to have fewer costs and more benefits. In addition, though, and contrary to the suggestion by Ajzen, a substantial direct effect of past behaviour on intentions was found. No direct link from past behaviour to current behaviour was found, providing no support for the Bentler and Speckhart approach to past behaviour. The current study shows that there is a strong case for including a measure of past behaviour in applications of the HBM.

The finding that past behaviour is a direct predictor of intentions is consistent with findings of Rodriguez *et al* (1995) and Jepson and Rimer (1993), concerning attendance for mammograms. Fazio (1990) suggests that social cognition models will only predict behaviour if the individual is a rational decision maker who systematically uses and deliberates upon available information to form a behavioural intention. It is feasible that individuals may only do this when they have the opportunity and motivation to do so (Conner, 1993). This may explain why past behaviour is directly related to intentions - women do not expend the cognitive energy of deliberating the issue each time.

Past behaviour can also be seen as a moderating variable (Norman and Conner, 1996) moderating the relationship between the components of a psychological model and intentions and behaviour. Thus the predictors of intentions and behaviour can be different for people who have carried out the behaviour in the past and those who have not. The findings of the study by Jepson and Rimer (1993) of predictors of first time mammogram or attendance after having had a mammogram before, show that prediction of intentions among first time attenders was superior to prediction of the intentions of women who had had a mammogram in the past. However, they did not assess actual behaviour, only intentions. It was not possible to test the moderating role of past behaviour in the current study due to insufficient numbers. This limitation is discussed below and will be addressed in study 2.

The results of the current study also indicate that the influence of past behaviour on intentions and behaviour is not related to the quality of that experience. The relationship which would be suggested by Bandura's social learning theory (1986), that a negative experience of behaviour would lead to a reduced likelihood of the behaviour occurring in the future, was not found. However, extremely negative experiences were not reported, and it may be these which would have the greatest influence over whether or not behaviour would be carried out in the future. It is also possible that this is an example of how general measures are inadequate in predicting specific actions (see Ajzen and Timko, 1986). Women were asked about their experience of their last smear test, this would, however, have been some years ago and therefore women may have considered their general experience of screening. It is possible therefore that this would not predict uptake during a specific time.

6.1.5 Social and demographic variables

The study is informative by showing that the addition of social variables to a multivariate analysis can increase the variance in behaviour which is explained by the sole use of social cognition models. Whilst the influence of social and demographic variables has been extensively studied, few studies have included both social and demographic factors and social cognition models in the same research and used multivariate techniques to explore associations between these different classes of variables.

Social and demographic characteristics were hypothesised to differ between women reporting differing levels of intentions to be screened and between women who attended for a smear test and those who did not. It was also anticipated that the design of the study and the statistical tests employed would enable an exploration to be made of *why* demographic and social variables may influence intentions and behaviour, i.e. to explain this behaviour. Whilst some mediated effects were identified, on the whole, the reasons for the influence of social and demographic variables on intentions and behaviour remains to be established.

Those women reporting a greater intention to attend for screening and those who attended were found to be significantly younger than other women. These results therefore add to the substantial number of findings that older women are less likely to attend for cervical screening than younger women (e.g. Bailie and Petrie, 1990; Beardow *et al*, 1989; Cockburn *et al*, 1991 and 1992; Coulter and Baldwin, 1987; Davidson and Clements, 1971; Hennig and Knowles, 1990; Hill *et al*, 1985; King, 1987; Peters *et al*, 1989; Vuori *et al*, 1972). Contrary to the suggestion in the review of cervical screening (Chapter 2) that age differences in uptake of screening in the UK may be explained by service provision and therefore with a national programme no age difference should be apparent, the study finds that age differences are still evident.

However, the reasons why age differences may exist were not established. Examined univariately there was no correlation between age and perceived benefits and costs, and contrary to predictions, older women did not have a more negative attitude towards screening. As predicted, though, age was related to perceptions of susceptibility with older women feeling less susceptible. In the multivariate model, although a significant path from age to perception of susceptibility was found, the effect of age was not mediated by any predictors of intentions or behaviour. Susceptibility perceptions did not predict intentions or behaviour and therefore this finding goes little way to explaining why age is significantly related to intentions to have a smear test and to later behaviour.

The fact that increasing age was found to be related to decreasing perceived susceptibility to cervical cancer is interesting as age is a risk factor for developing cervical cancer and the finding demonstrates that women fail to recognise this. This effect has been observed by others (e.g. Vernon *et al*, 1993). It is possible that older women feel less susceptible due to the wide publicity that cervical cancer is associated with sexual behaviour and older women (in the 1990s) tend to have had fewer sexual partners over their lifetimes relative to younger women. In addition, as mentioned in earlier chapters of this thesis, whilst affecting more older women than younger women, cervical cancer is nonetheless much less prevalent than other female cancers e.g. breast cancer. It may be, therefore, that in the face of higher risk of developing other cancers there is a relatively reduced feeling of susceptibility to cervical cancer. Research by Kahneman and Tversky (1979) in fact suggests that individuals over estimate the likelihood of familiar events and underestimate the likelihood of less familiar events (the availability heuristic). The effect of age on intentions and behaviour will be explored again in study 2 to attempt to replicate the finding and to establish if it is associated with any social cognitions which are predictive of intentions and behaviour.

Relationship status was found to be predictive of intentions and behaviour. Women reporting a greater intention to attend for screening and those who attended were more likely to have a current sexual partner. This is consistent with other research findings (see Chapter 3, section 3.4.4). For example, Calle *et al* (1993) found that marital status was a strong predictor of uptake of screening when examined together with other demographic variables. However, in the current study in contrast to the influence of other variables, relationship status was more highly related to behaviour than to intentions, and in a multiple regression a direct, unmediated, relationship to behaviour was found. Although the multiple regression also showed that having a partner was associated with a higher likelihood of having been screened in the past, which in turn was related to a greater perception of the benefits of screening and a lower perception of the costs of screening and these were predictive of intentions, this mediated effect was substantially smaller than the direct effect.

It was expected that having a sexual partner would be related to a perception of screening as less costly and more beneficial and also to an increased susceptibility to cervical cancer. However, these attitude differences were not found and therefore the mechanisms by which having a partner may influence uptake of screening remains unclear.

The finding that a woman having a partner is directly predictive of her behaviour in fact suggests that a variable which was not measured in the study may be mediating this relationship. It would seem reasonable to assume that the effect of this variable is not due to a directly causative role of having a partner on uptake of screening. There are a number of possible mediating variables. Firstly, the women's level of contact with their GPs may be important in that those women with a partner possibly have more chance to be (opportunistically) screened in conjunction with postnatal and family planning care (e.g. Orbell *et al*, 1996). Although the current study was prospective, and all participants therefore had equal opportunity (all other things being equal) to undergo screening, it is possible that those women with a partner attend the doctor more frequently (for antenatal and family planning care) and therefore have more chance of having a smear test. Indeed, as Marteau (1993) points out, screening can sometimes occur as a result of the actions of health professionals, for example opportunistically screening individuals, and not purely from a woman's decision to be screened. This possibility will be explored in study 2.

Another mediating variable, which has been suggested in other studies, may be sexual behaviour and previous number of sexual partners. Orbell *et al* (1996) found that women who had never been screened had had significantly fewer sexual partners than women who were screened. This finding may be due to a perceived link between sexual intercourse and cervical cancer. Health education literature, in fact, tends to stress this link. It is possible, therefore, that women who have a partner attend for screening as they are sexually active and perceive themselves to be at risk. However, it is not necessarily the case that the difference in the current study is due to those women with a partner making an association between sexual intercourse and the need to attend for screening, as the women who do not have a current partner may also be sexually active and those women with a partner may not be. Women in the current study with a partner, in fact, did not perceive themselves to be more susceptible to cervical cancer than women without a partner.

Finally, having a partner may provide increased levels of social support (e.g. Wyke and Ford, 1992). The direct effect on behaviour of having a partner may, therefore, be mediated by social support and it is plausible that it is this support which predicts uptake of screening. This possibility is explored in more detail in study 2.

Contrary to predictions, no social class differences were found, either for reported intentions or behaviour. It is possible that as the women in the current study were part of a national call programme then the influence of social class is not so apparent in uptake as differences in access to services are eliminated. The finding is in line with that of Wright *et al* (1992) who reported that previous differences in uptake of cervical screening among the social classes had disappeared. In addition, Coulter and Baldwin (1987) showed that in younger women uptake between the social classes was similar. Some studies based on social cognition models have also found no social class differences in behaviour (e.g. Calnan, 1984; Murray and McMillan, 1993).

Whilst it is possible that the non-significant finding is genuine, the result would need to be replicated. Most studies, as discussed in Chapter 3, have found that social status and health behaviour are related (e.g. Cockburn *et al*, 1991 and 1992; Gillam, 1991;

Houghton, 1968; Hurley *et al*, 1994; Orbell *et al*, 1996; Peters *et al*, 1989; Rutledge *et al*, 1988). Examining differences in social cognitions among social classes in the current study it was found that women from different classes had quite similar beliefs on the whole. The only difference was that women in the top two classes, perceived cervical screening to be significantly more beneficial than women in the lowest three classes. The general similarity in beliefs may explain the lack of significant findings. For example, in the study by Orbell *et al* (1996), where they were able to trace the links between social class and social cognitions, it was found that lower class women had a significantly less positive attitude towards screening. Social class was not explored in a multiple regression in the current study, in view of the fact that it was unrelated to intentions or behaviour.

6.1.6 Change in beliefs following screening

As discussed in chapter 2, undergoing a smear test can have a negative psychological effect (e.g. Posner and Vessey, 1988; Schwartz *et al*, 1989). Whilst psychological state was not addressed directly in the current study, change in attitudes to screening can be observed to indicate whether attending for a smear test can result in the screening process being viewed more negatively. A aim of the current study was to examine whether or not there would be significantly more belief change for women participating in the screening programme for the first time than for those women who had attended for screening in the past, or for those women who did not attend. More change was expected among first time attenders as at follow-up they would have actual experience on which to base their beliefs. If beliefs change following attendance for screening then little confidence can be placed in the findings of retrospective studies that measure beliefs after the opportunity to attend for a smear test has passed.

It was found that overall social cognitions remained remarkably stable. It has been suggested that the measurement of social cognitions and assessment of behaviour should be close together in time as cognitions may change (e.g. Ajzen, 1985). However, the current study showed that, once formed, beliefs may not substantially alter. This suggests that retrospective assessment of beliefs, at least among individuals who have carried out the behaviour in the past, may offer an accurate picture of influences on behaviour.

6.1.7 Variance in intentions and behaviour explained by the study

Despite the significant and theoretically interesting findings described above, 76 per cent of the variance in uptake of behaviour of the participants in the present study still remained unexplained by the social cognitions specified by the HBM, even with the addition of reported intentions, social and demographic variables. Nonetheless this proportion is comparable to previous research which has used a similar design. For example, Montano and Taplin (1991) were able to explain 20 per cent of the variance in uptake of mammography and 26 per cent with the inclusion of social variables. Thirty-three per cent of the variance in intentions was explained in the current study and this, too, is comparable to other studies (e.g. Stein *et al,* 1992, 27 per cent; Montano and Taplin 1991, 39 per cent; Hennig and Knowles 1990, 27 per cent; Hill *et al* 1985, 32 per cent; Vaile *et al* 1993, 27 per cent). Particularly relevant is the comparison with the studies by Hennig and Knowles (1990) and Hill *et al* (1985) who used the HBM to predict intentions to attend for cervical screening.

Retrospective studies tend to fare better in terms of the variance in behaviour they can explain. In the study by Orbell *et al* (1996) 52 per cent of the variance in behaviour was explained by variables derived from the HBM. However, this study has the limitation of the measured beliefs possibly being rationalisations of past behaviour, a limitation acknowledged by the authors. The use of this study design may therefore have artificially increased the amount of variance explained. Other studies which have also used retrospective measures and which additionally relied on self report of past behaviour are particularly likely to lead to artificially inflated correlations (e.g. Stein *et al,* 1992; Mandleblatt *et al,* 1992). Individuals are likely to strive for consistency throughout the interview or questionnaire and if beliefs and behaviour are reported at the same time then this may have the effect of increasing correlations. For example, Budd (1987) found that questionnaires used to measure elements of the TRA, including intentions and past behaviour, may artificially cause correlations between the components as individuals become aware of the 'rules' and answer questions in a consistent manner. This suggestion is in line with Fazio *et al* (1989) who argue that attitudes are only formed when individuals are required to express an opinion (e.g. when responding to a questionnaire). However, it is arguable that this may only be a problem with a novel topic, but would not occur with a familiar one as individuals will already have formed opinions.

Finally, Sutton (1997) points out that emphasising the amount of variance explained can give a fairly negative picture of how well models are predicting intentions and behaviour. The current study, whilst predicting a relatively small amount of variance in intentions and behaviour, nonetheless highlights a number of important influences on motivations and behaviour which are useful for explanatory purposes.

6.2 Possible limitations of the study

6.2.1 Measurement issues affecting the interpretation of the results

A possible limitation of the study concerns the way in which some of the measures were operationalised. This has implications for the interpretation of the results in that it may go some way to further explaining the relatively small amount of variance in behaviour accounted for and also some of the non-significant findings.

6.2.1.1 Variance in behaviour explained

The amount of variance in intentions and behaviour accounted for, whilst comparable to previous research, may partly be a result of the way variables were operationalised. It is possible that the belief and intention measures used were not measured at the necessary level of specificity to make them exactly matched with the behavioural assessment, having the result that the 'principle of compatibility' is violated (Ajzen and Timko, 1986). Although the measures specified action and target they did not also include time. For example, the measure of intention to have a smear test was quite general, in that intentions to be screened 'in the future' were assessed rather than specifically intentions to attend for screening in the following few months when behaviour was assessed. The strength of the relationship to later uptake may therefore be weaker than if it had been measured more specifically. In addition as only one item was used to measure intentions it is possible that random measurement error occurred. Considering the perceptions of the costs and benefits of screening, these were asked about in general terms and not, for example, in terms of whether women believed that attending for a smear test in a specified period of time would be beneficial. It is therefore possible that here too a greater prediction of intentions and behaviour may have been found for these measures had they referred specifically to attendance in the following few months.

With a view to improving the amount of variance explained, the second study in this thesis examines the contribution of an alternative theoretical perspective which more clearly specifies the operationalisation of its constructs; the Theory of Planned Behaviour (TPB). In the second study, intentions are specified more precisely and better matched to the assessment of behaviour, and a multi-item scale is used. Belief measures used in study 1 are retained and others based on the TPB are added. These attitude measures refer to attendance for screening in a specific time period. All measures refer to cervical screening and cervical cancer rather than screening and cancer in general as the literature indicates that this is a superior method of measurement (e.g. Jette *et al*, 1981).

6.2.1.2 Non-significant findings

Some of the predicted effects of variables were not found in the current study. In addition to the theoretical justifications for these non-significant findings they may also be partly explained by measurement problems. As discussed, perceptions of susceptibility to and the severity of cervical cancer did not distinguish between intenders and non-intenders and attenders and non-attenders. It has been suggested by Ronis (1992) that threat perceptions should be assessed referring to conditions of action and inaction. For example 'I am likely to develop cervical cancer if I do not attend for a smear test' and 'I am likely to develop cervical cancer even if I attend for a smear test'. Perceptions of susceptibility with action are unlikely to be related to behaviour. It is possible that a significant result may have been found if the items had been measured in this way.

The lack of effect on intentions and behaviour of social norm variables needs to be replicated, particularly in view of the fact that having a sexual partner was important for predicting behaviour and the influence of this variable may partly be related to subjective norms. In addition, research using the TRA/TPB has shown these variables to be important predictors of intentions. It is possible that the variables used to measure these factors were ineffective in detecting a difference between intenders and non-intenders and attenders and non-attenders. It was not possible to determine the reliability of the measures as they were categorical and it is possible that a more rigorous test of subjective norms would have more successfully determined any influence social pressure may have on a woman's behaviour. In addition to assessing what other women in the individual's life do, it would have been useful to also make an assessment of what the individual thinks these people think she should do (i.e. an injunctive social norm in addition to the already measured descriptive norm). In addition, other research has found that a GP suggesting screening has been important for uptake and this should perhaps have been included in the measure (e.g. Beaulieu *et al*, 1996; Hennig and

Knowles, 1990; Orbell *et al*, 1996). The shortcomings of this scale are addressed in study 2.

It is possible that the measurement used to assess a woman's social position was not the most appropriate to find a relationship to intentions and behaviour. Previous research found that education and income were also important predictors of behaviour in addition to occupational class (see Chapter 3, section 3.4.5). Occupational social class may have been a poor measure of social status for this sample of women. Unemployment is quite high in the area of the research and individuals may carry out jobs for which they are over qualified (Croydon Health Commissioning Agency, 1995). Study 2 of this thesis therefore extends the measures of social status. This enables a confirmation to be made of whether social status factors are not important for uptake of screening (as was found in study 1) or if differences are found it will be possible to explore beliefs which may mediate the observed effect.

The study found no significant influence of quality of past screening experience on intentions and uptake. It is feasible that this influence may be particularly important for individuals carrying out the behaviour for the first time (Baines *et al*, 1990). It may therefore have been useful to establish how many tests women had had, and relate their assessment of the screening experience to this, although it remains possible that a general measure to predict a specific behaviour will not be useful.

The exploration of change in beliefs following screening was hampered by the small number of women who had never been screened. In addition, the measurement of beliefs was not at the same time after the smear test for all attenders. Change in beliefs is not explored further in study 2, as it is secondary to the overall aim of the thesis which is prediction and understanding of factors affecting future screening behaviour.

6.2.2 Sample effects on interpretation of results

Factors which may have affected the 28 per cent response rate to the study are discussed in this section followed by how this response rate may have affected the composition of the sample. Finally how the sample may influence the interpretation of the study results is highlighted.

6.2.2.1 Influences on the response rate

Influences on the response rate include the method used in the study and the constraints of the geographical area of the research. With respect to methodological influences, it is possible that women did not receive the request to participate in the research. FHSA records were used to locate participants and these can be up to 50 per cent inaccurate (Fraser and Clayton, 1981; National Audit Office, 1992). In addition, it has been found that 40 per cent of women move within five years of having a smear test (Allman *et al*, 1974). Given the possibility of inaccurate FHSA records and the fact that most of the women contacted for the present study were called for a routine smear test up to five years after their previous one, it is likely that more than 4.7 per cent of women did not receive the initial letter requesting their participation, i.e. 47 of the 1,000 letters sent to potential participants which were returned by the Royal Mail (see procedure section 4.3.2). Study 2 uses an 'if undelivered label' to achieve a better indication of how great a problem non-receipt of correspondence might be. Use of these labels avoids the Royal Mail having to accumulate the correspondence, open it, and identify a return address. Of course, this method does also rely on people returning incorrectly addressed questionnaires rather than simply discarding them.

Besides eligible women not being reached, the recruitment of women in two stages is likely to have also reduced the response rate. There were at least two drawbacks to this method. Firstly, the researcher could not approach the women personally to reassure them about the confidentiality of the study and to explain in more detail about its aims.

Cartwright and Windsor (1989a) found that asking women to provide their telephone number, and to commit themselves to participating in the research in the future, significantly reduced the response rate in their study. The potential participants in the present study may have been more willing to participate had they been given further information about the extent of their involvement in the research before being expected to provide their names, addresses and telephone numbers. Other studies examining uptake of screening have achieved good response rates indicating that it is not the subject matter of the study that leads to a lack of participation. Better response rates have been achieved in some studies where the researchers had access to patient records at a GP surgery or access to up to date Health Authority data and could therefore approach individuals directly (e.g. Calnan, 1984; Orbell *et al*, 1996; Sutton *et al*, 1994). Other studies (Rutledge *et al*, 1988; Friedman *et al*, 1995) had access to a work population who were easily contacted and for whom there may have been social pressure to participate as their colleagues were doing so. In addition if the request to participate seemingly originates from a 'known source' e.g. a GP, a better response rate can be achieved (e.g. King, 1987).

A second drawback of the method of recruitment for the present study is that some non-responders might have completed a questionnaire had it been sent directly to them but would not have made the effort to request a questionnaire. Indeed, sending questionnaires directly to women who had not had a recent smear test achieved a 62 per cent response rate in a study by Bailie and Petrie (1990). In the present study, 86 per cent of the women completed the phase II questionnaire which had arrived unrequested. It is likely, however, that this good response rate was achieved by the fact it was a continuation of a study in which the woman had already agreed to participate. Other studies which achieved a better response rate used an opt out, rather than an opt in, method (King, 1987; Orbell *et al*, 1996) which increases participation as individuals are not lost by, for example, forgetting to return a reply slip.

A consequence of the method used for the study is sample attrition. Participants were recruited using a FHSA list of women thought to be due for screening. This led to the subsequent disqualification of ineligible women who had been willing to participate. These women included those who had moved from the area or those who were not due for screening. This had the effect of reducing the overall number of women eligible to take part and agreeing to do so, from 360 out of 1,000 to 226. Whilst this does not affect the response rate or bias the sample it did reduce the number of participants and this is undesirable and resulted in some hypotheses being untestable.

The above problems will be addressed in the second study of this thesis by the use of up-to-date GP records, study information letters signed by GPs and questionnaires being sent directly to women.

Recruitment may have also been influenced by the geographical area in which the research was carried out (Cartwright, 1986). It has been found that in urban areas the response rates to studies such as the present one may be 30 per cent or even lower (Dixon and Carr-Hill, 1989). The low response to the present study may, therefore, be due to the area in which the research was conducted. However, other studies achieving better response rates have also been conducted in inner city areas (e.g. Orbell *et al*, 1996; Sutton *et al*, 1994). These studies were interview based and it may be that a better response rate can be achieved by such a method. Self-report questionnaires are, nonetheless an appropriate method for assessing social cognition models. More importantly, though, in the current research there would have been insufficient time between names of eligible women becoming available to the researcher and women being asked to attend for a test, for an interview based study to be possible.

6.2.2.2 The effect of the response rate on the sample

The sample of women for this study would be, at best, representative of a group of inner city women eligible for screening. It is not expected that the results could necessarily generalise to a group of rural women, for example, although results from previous studies of disparate groups of women have achieved similar results. Whilst the factors influencing the response rate - method and geographical area - would be likely to reduce the *overall* numbers of women participating in the study, they would not necessarily systematically bias the sample towards a particular type of participant. However, there is evidence to suggest that the sample achieved may be unrepresentative of inner city women, in terms of social characteristics and past use of cervical screening, due to the low response rate, and may also be unrepresentative in terms of beliefs about screening. This would reduce the confidence with which one could generalise from the results.

Women who participate in studies such as this tend to be younger and better educated than those who do not participate and are more likely to be white (Cartwright and Windsor, 1989a). To the extent that bias in social characteristics has occurred in the current study sample it would seem that it contains a slight over-representation of women from the higher social classes (74 per cent compared with 68 per cent in the general Croydon population) and slightly fewer women from ethnic minorities than in the general Croydon population (11 per cent compared with 17 per cent in general). The result is that the sample was not a perfect demographic cross-section of Croydon women (Balarajan and Raleigh, 1992; Croydon Health Commissioning Agency, 1995).

A further way in which the response rate possibly affected the sample achieved is in terms of the participants' experience of cervical screening. The sample of women participating in the research were, on the whole, experienced with cervical screening. Social cognition models work especially well for first time behaviour (e.g. Jepson and Rimer, 1993) and this may therefore explain the rather poor amount of variance explained. A higher proportion of the participants had ever had a smear test than women in the general Croydon population: 97 per cent compared to 90 per cent. For screening during 1992, 82 per cent of the participants were screened compared to only 65 per cent of women in general being screened at any one call-up (Croydon FHSA, 1995). However, this percentage does not reflect overall uptake in the same group of women that were approached to participate for this study, who were only women due for screening during one month. FHSA cytology records could not be checked for names of women invited but not taking part in the study. It is therefore not clear whether an uptake rate of 82 per cent would be closer to, or more distant from, the uptake overall during January. The second study in this thesis allows for a direct comparison of attendance rates in participants and non-participants to see how representative the sample is in terms of uptake from the invitation in question.

6.2.2.3 How the sample may have affected the results

Before individual results are discussed it is worth noting that although the response rate to the current study is lower than that reported in some other published studies of uptake of cancer screening, it is possible that constructs derived from the HBM do not work any differently in a sample with a low response rate. In addition, the difficulty of achieving a *representative* sample is a consistent problem for studies of screening behaviour and is not specific to the present investigation. Theories of health behaviour have been developed using data from predominantly white and middle class individuals and it is possible that the study results would not be any different with a higher response rate. Therefore to the extent that the study findings are consistent with the literature, perhaps the unrepresentativeness of the sample is not a serious limitation to the present study. Indeed, although the response rate to Sutton *et al's* (1994) questionnaire part of their study was only just over half of the response to an interview (36 per cent compared with 75 per cent), no substantial differences in beliefs or characteristics or predictors of uptake of mammograms were found between the samples.

However, it is also possible that the distribution of the demographic characteristics in the sample did have an effect on some of the study results. If the sample is not representative then this has implications for the interpretation of results and how justifiable it would be to generalise from the results to influences on the screening uptake of other women. The main findings of the study which may have been compromised by the study sample are reviewed below.

Both outcome variables of reported intentions and screening attendance were skewed. It is possible that a higher reported intention to attend for screening was observed in this study than one would expect in a more representative sample, and as discussed more women attended for screening than in the general population. As uptake among women in the current study was high it is possible that the results would not generalise to areas where uptake is lower. The resulting restricted range of variance in intentions and behaviour will have tended to lower the correlations between the two and reduce the percentage of variance explained (Sutton, 1997).

It is arguable that the social cognitions of the study sample are likely to be different from those of the women who did not participate in the study. For example, women with more positive attitudes towards health screening may be more likely to participate in the research. Indeed, individuals who respond to questionnaires but who do not attend for screening are unusual (King, 1982) which raises the possibility that the 33 non-attenders in the present study were not representative of women who do not attend for screening. This is a serious limitation of the study as the reasons for non-attendance for screening are particularly important if ways to encourage informed uptake are to be identified. Nonetheless in the present study women who intended to attend for screening and those who did attend had significantly different perceptions of the costs and benefits of cervical screening from those not intending to attend and non-attenders, and this suggests that although the response rate was low, the sample did show a degree of variability with not all participants showing equally positive attitudes towards screening. It does, of course, remain possible that women with extremely negative attitudes were not included in the study.

Regarding perceptions of the threat of cervical cancer, previous research (e.g. Orbell *et al* 1996) has found that social class can be related to perceptions of susceptibility, with the lowest class women feeling less susceptible. The current study contained an over-representation of women from the higher social classes which may have unduly influenced the range of beliefs concerning susceptibility thus making interpretation of the non-significant finding problematic.

The over-representation of women who have had a smear test resulted in the measure of past behaviour being very skewed. If it had been less skewed it may have been found to have a greater influence on intentions. However, substantial numbers of recent studies indicate that past behaviour is an important predictor of intentions and future behaviour and therefore it would seem reasonable to assume that the result in the present study has not simply arisen due to an unrepresentative sample. Although this variable was skewed this would be expected even with a representative sample as more women have had a smear test than those who have not. The current literature does not shed light on the influence of threat perceptions on first time behaviours. As mentioned in chapter 3 this may be because this type of sample is difficult to achieve. Study 2 attempts to achieve a sample with a greater number of women who have never been screened.

6.3 Conclusions

To the extent which the results of this study are considered to be unique to the particular sample of women they cannot be extrapolated to other women in this area and nor to other geographical areas. However, the literature concerning uptake of cancer screening shows that similar results are found from diverse populations and therefore some tentative conclusions can be drawn from the results of this study. In addition, the results are of theoretical interest.

The main conclusions to be drawn from the results of study 1 are firstly that measures of intentions and of past behaviour should be included in applications of the HBM. Secondly, components of the model are not sufficient to explain screening uptake as variables external to the model added to the prediction of behaviour. In the light of the findings that reported intentions and perceived benefits and costs of screening were most important for explaining behaviour, the TPB is a useful comparison model to apply to this behaviour to examine whether it is able to predict more of the variance in behaviour than the HBM. The second study in this thesis, which addresses the limitations of study 1, also gives an opportunity to explore the extension and refinement of the social cognition models and to examine whether a combination of variables from the models will give the most complete explanation of behaviour. This study and the additional factors it assesses are described in more detail in the following chapter.

Chapter 7

Study 2: introduction

7.1 Introduction

This study aims to replicate and extend the findings of study 1. It also affords the opportunity to compare the ability of two social cognition models: the Health Belief Model (HBM) and the Theory of Planned Behaviour (TPB) to predict cancer screening behaviour. It will be possible to establish whether one model is superior to the other in terms of the ability to predict intentions and behaviour, or whether a combination of variables taken from both models will provide the best prediction and most complete explanation of behaviour. A number of studies have compared the performance of models and attempted to combine constructs from these to achieve the best explanation of behaviour (e.g. Conner and Norman, 1994; Mullen *et al*, 1987; Oliver and Berger, 1979; Ronis and Kaiser, 1989). However, few have done this with cancer screening uptake. There are some exceptions, for example, both Hill *et al* (1985) and Hennig and Knowles (1990) compared the Theory of Reasoned Action (TRA) with the HBM, Seydel *et al* (1990) compared Protection Motivation Theory (PMT) with the HBM, and Seibold and Roper (1979) compared the TRA with Triandis's theory of social behaviour. However, these studies have the drawback of failing to include a measure of behaviour in addition to the outcome measure of reported intentions. In addition, the studies by Hill *et al* (1985) and Hennig and Knowles (1990) had some problems with the measurement of aspects of the HBM, failing to use multi-item reliable scales for all components.

In the light of the findings from study 1 that intentions, beliefs about attending for a smear test (i.e. costs and benefits) and the social variable of whether or not the woman had a partner, were important influences on behaviour, the TPB was an appropriate choice of comparison model, as it includes behavioural intentions, attitudes towards the behaviour and subjective norms. In addition, the TPB has the advantage of specifying precisely how these constructs should be related to one another and to behaviour and there is a consensus as to how the constructs should be operationalised. Although the theory has been found to be useful in predicting a variety of behaviours (see Godin and Kok, 1996; Sheppard *et al,* 1988) it is of interest to see whether this usefulness will generalise across behavioural domains as the theory has been infrequently applied to uptake of cancer screening (see Vaile *et al*, 1993 for an exception). The TPB has been criticised for failing to include measures of threat as predictors of intentions and behaviour but as these were found to be less important influences in study 1 than attitudes towards behaviour, this is not expected to be a major drawback, particularly as the HBM is utilised again which includes measures of threat.

Some measures and hypotheses are identical to those used in study 1. The study method and exact details of the measures and how these are operationalised are described in the following chapter. The additions and extensions to the measures used in study 1 are discussed below. Some measures are extended in this study in order that the limitations of study 1 can be addressed, that hypotheses which could not be tested in study 1 could be tested, and that results may be replicated. Additional new measures are also used to explore hypotheses resulting from the findings of the first study.

7.2 Extensions and additions to measures used in study 1

7.2.1 Intentions to attend for screening

The measure of intention to have a smear test used in study 1 is extended in study 2 to also include an item to assess behavioural expectation - which can be viewed as a type of self prediction of behaviour. This additional measure is included because the measures of intention and behavioural expectation are expected to be highly correlated and the use of a multi-item scale would lead to a more reliable measure of intentions to have a smear test. Hypotheses are identical to study 1 (see Chapter 3, section 3.6).

7.2.2 Components of the Health Belief Model

HBM measures used in study 1 were reassessed in study 2 (i.e. perceptions of the benefits and costs of screening, perceptions of susceptibility to, and severity of, cervical cancer and cues to action). In addition to being found to be partially useful in explaining screening behaviour, these measures were repeated to allow a comparison with the TPB in terms of how much variance in the intentions and behaviour of the women in study 2 each model could explain. The HBM has the advantage of allowing the negative consequences of behaviour to be kept separate from the positive consequences and, therefore, to see which are more important for predicting intentions and behaviour. Giles and Cairns (1995) for example found that the negative consequences of blood donating behaviour differentiated donors from non-donors but that the positive consequences did not. In the TPB, in contrast, the behavioural belief measures are constructed in a way which does not separate out the consequences of behaviour in this way and for these measures, and for the global attitude to behaviour used in the current study, avoiding pain is equal to gaining pleasure. The hypotheses for the effect of the HBM variables on intentions and behaviour are the same as for study 1 (see Chapter 3, section 3.6), given that the low response rate to study 1 may have affected the study findings.

7.2.3 Components of the Theory of Planned Behaviour

Components of the Theory of Planned Behaviour are measured in study 2; i.e. attitude towards the behaviour, subjective norms, normative beliefs and perceived behavioural control. Studies using the TRA have been reviewed in Chapter 3 but are briefly mentioned here. It has been found that a positive attitude towards having a smear test and normative pressure to attend for a test are predictive of intentions to be screened. In some studies measures of subjective norms have been found to be less important than attitudes in predicting intentions (e.g. Hill *et al*, 1985; Montano and Taplin, 1991) and in others they are more important (e.g. Hennig and Knowles, 1990; Seibold and Roper, 1979). The study by Vaile *et al* (1993) which used the TPB to predict uptake of mammograms did not measure intentions to be screened and in addition, no multivariate analyses were carried out to predict behaviour, therefore the relative importance of the model components cannot be assessed.

Although behavioural beliefs underlying attitudes are not assessed in study 2 this is because the beliefs measured by the HBM scales of perceived benefits and costs would be very similar to those used to assess behavioural beliefs for the TPB. In addition there is some evidence that direct measures are at least as good as belief based measures in predicting intentions and behaviour (e.g. Giles and Cairns, 1995).

> *It is predicted that women reporting an intention to attend for screening and those who do attend will have a more positive overall attitude towards having a smear test than those women reporting that they do not intend to attend for a test and those who do not attend.*

Study 2 reassesses subjective norms in a way which is more consistent with the TPB than that used in study 1. Both direct and belief based measures of subjective norms will be used in study 2, in view of the fact that they are not assessed elsewhere in the study by other measures. The literature concerning the role of subjective norms in predicting uptake of screening has been discussed in Chapter 3, section 3.3.7. There is conflicting evidence as to whether the direct or belief based measure is the better predictor of intentions and behaviour. For example, Hill *et al* (1985) found that the direct measure of subjective norm was more important for predicting intentions whereas Hennig and Knowles (1990) found that the belief based measure was the better predictor.

Two aspects of the direct measure of subjective norm will be assessed in study 2: firstly, what other people would approve of the woman doing (injunctive norm); and secondly what other women who are important to the woman do (descriptive norm as used in study 1). Cialdini *et al* (1991) have made this distinction between injunctive and descriptive social norms. In view of the result from study 1, it is expected that a woman's partner will be a salient referent affecting her decision to attend for screening. As the behaviour in question is gender specific (and most women have male partners) the descriptive norm would therefore take into account fewer, and possibly less influential people, than the injunctive norm and it is therefore possible that the direct measure of descriptive norm may not be as predictive of intentions and behaviour as the measure of injunctive norm.

To assess belief based measures of norms women will be asked to report what various referents would approve of her doing. Beliefs underlying descriptive norms were not assessed. This has the advantage of reducing the questionnaire length, and therefore reducing the chances of the attendant problems of missing data. Due to the way in which these normative beliefs are measured, it is therefore expected that they will underlie the measure of injunctive subjective norm, but not necessarily, the descriptive subjective norm.

Ajzen (1991) suggests that motivation to comply with referents should be a general motivation, but it could be argued that this is too broad for screening uptake. It is possible, for example, that a woman's GP may have a great deal of influence over health matters but would not be considered at all in other matters. Motivation to comply in study 2 will therefore be specified in terms of motivations to comply with referents in health matters. The relative importance of the direct measures of social norms and the belief based measures will be assessed with the use of multivariate statistics.

> *It is hypothesised that those women who intend to attend for a smear test and those who do attend will report more normative pressure to attend than those women who do not intend to attend and those who do not.*

As described in Chapter 3, the TPB expands on the TRA to include a measure of perceived behavioural control, in order to be more applicable to behaviours which are not completely under volitional control. The theory argues that perceived behavioural control will predict intentions, i.e. that an individual would only form an intention to carry out a behaviour if he/she felt they had a reasonable chance of successfully performing it. Measures of perceived behavioural control have been found to add to the prediction of intentions and behaviour in behavioural domains other than preventive health behaviour (e.g. Ajzen and Driver, 1992; Beale and Manstead, 1991). When a realistic assessment of control has been made it is argued that perceived behavioural control will, with intentions, directly predict behaviour (Ajzen and Madden, 1986). For example, Norman and Conner (1993) found that intentions and control were the best predictors of attendance for health screening following an open invitation. It would seem, however, that some experience of the behaviour would be necessary in order to judge the problems that may be encountered. Therefore, actual control and perceived control may only be the same for people who have carried out the behaviour in the past.

An issue relating to perceived behavioural control is that research has found that external and internal control factors may be distinct from one another, i.e. that an estimate of the amount of control a person has is different from an appraisal of their ability to perform a behaviour, although perceived behavioural control is proposed to encompass both. Internal constraints may be taken into account when forming an intention and would include measures of self efficacy. External constraints may prevent an intention being translated into action. Empirical evidence supports the distinction between the aspects of perceived behavioural control. For example, Terry and O'Leary (1995) found a distinction between measures of 'control' and 'ease' for intentions to use a condom and Parker *et al* (1995) report difficulty in developing a reliable measure of perceived behavioural control when these different types of issues are included in one scale.

Both aspects of control will be assessed in the current study although it is anticipated that measures implying internal control factors, such as the ease or confidence with which one can attend for screening will be better predictors of intentions and behaviour than a measure implying external constraints, as there may be few of these which are relevant to cervical screening behaviour. Once an intention to attend for a smear test has been formed, presenting oneself for a test may be relatively free of potential obstacles.

An additional point is that if it is found that perceived behavioural control adds nothing to the prediction of intentions and behaviour as regards cervical screening uptake beyond that offered by attitudes towards screening and subjective norms then it can be concluded that the TPB is no superior to the TRA when applied to this type of behaviour.

> *Firstly, it is hypothesised that those women who report a greater intention to attend for a smear test and those who do attend will report a higher level of perceived control over the behaviour than those who report a lesser intention or who do not attend for a smear test. Secondly, aspects of the measure implying internal constraints will be a better predictor of intentions and behaviour than aspects implying external constraints.*

7.2.4 Anticipated affect

A criticism of social cognition models which has been particularly applied to the TPB is that these models portray individuals as economic decision makers and do not adequately take into account emotional factors in decision making. Arguably, the models are therefore unable to explain behaviour which may be under affective control. The role of anticipated affect in predicting intentions to undergo a smear test and to predict later behaviour is explored in study 2. There are two additional reasons stemming from the results of study 1 for examining this concept. Firstly, it is of interest to gain insight into how attendance for screening is conceptualised. From the results of study 1, it seems that women attend or do not attend for screening based on beliefs about the test itself rather than beliefs about a threat to their health; indeed threat perceptions do not seem to influence their decision. It is possible, therefore that decisions are made on the basis of anticipated post-behavioural feelings. Secondly, the results of the microanalysis of beliefs in study 1 suggest that anticipated feelings are important for explaining intentions and behaviour.

Anticipated emotional feelings about the consequences of a behaviour being a useful predictor of intentions to behave has recently received research interest (e.g. Richard *et al*, 1995). The concept of anticipated affect stems from regret theory (Bell, 1981; Loomes and Sugden, 1982) and is also an important concept in the Triandis (1977) model of interpersonal behaviour. The central tenet of regret theory is that individuals are motivated to avoid feelings of regret. However, other feelings which may occur after the behaviour can also be important and anticipated affect is not restricted to regret.

Since attending for a smear test is a behaviour which may lead to 'bad news' (i.e. cancer diagnosis) or 'good news' (i.e. normal smear test) the feelings that individuals anticipate they will experience after they do or do not carry out this behaviour may be important predictors of their intentions, in addition to their attitudes about the actual behaviour.

That is, their attitudes about the anticipated *consequences* of the act may be as important as their attitudes about the act itself.

The concept of anticipated affect has not been applied in studies of cancer screening behaviour. Richard *et al* (1995) have used a measure of anticipated affect in predicting behavioural expectations with regard to sexual behaviour. Other studies, for example, Parker *et al* (1992) and Parker *et al* (1995) have used the construct to predict intentions to commit a driving violation. This research has found that the addition of the measure of anticipated affect added to the prediction of intentions/behavioural expectations over and above the components of the TPB. It can be seen then that anticipated affect can refer to the omission of behaviour (e.g. not using a condom) or the carrying out of a behaviour (e.g. speeding while driving). Concerning uptake of screening for cancer, it is feasible that individuals may be motivated to attend for screening to avoid the chances of feeling regret at *not* having done so. For this behaviour then, negative affect may be anticipated following non-performance of the behaviour. Research supports this and it has been found that encouraging attendance for screening is more successful if women are given loss-framed messages – emphasising the risks of not having the screening – than gain-framed messages – emphasising the benefits of screening (e.g. Banks *et al*, 1995).

The subject matter of other research using this theory has referred to behaviour which differs in important ways from not attending for cervical screening. Anticipated affect with screening non-attendance is not expected to be as predictive of intentions and behaviour as with irrevocable decisions such as having had unsafe sex, because if an individual does not attend for a smear test on one occasion she may still attend at a later date. However, this is, of course, dependent on the way in which the concept is operationalised, i.e. as *not* having a smear test. If operationalised as anticipated affect following having a test then this would be comparable to other behaviours which are irrevocable. A measure of anticipated affect is expected to significantly contribute to the variance explained by variables derived from the TPB.

It is predicted that women reporting an intention to attend for a smear test and those women who actually attend will report more anticipated negative affect following non-attendance for a smear test than women reporting that they do not intend to attend and those who do not attend.

7.2.5 Social support

The role of social support in mediating predictors of uptake of cervical screening is explored in study 2. Having a sexual partner was an important predictor of behaviour in study 1 and as mentioned in the previous chapter it is feasible that the variable which actually predicts uptake of screening is social support. Wyke and Ford (1992) specifically investigated the mechanisms by which marital status is related to better health outcomes. One explanation they tested was that married individuals experience more social support than unmarried people. It was found that being married was not just associated with having more available support, but that it was also associated with a greater intimacy and quality of social support and that it was this which seemed to be related to better health outcomes.

Social support is an extensively researched area (e.g. Schwarzer and Leppin, 1989) and a full review is outside the scope of this thesis. A basic outline of the relevant issues is given below together with how some of what is known may be applied to the understanding and prediction of uptake of cervical screening.

The study of social support involves theoretical, conceptual and methodological issues. There are different definitions of support, different ideas about the mechanisms by which social support may affect health outcomes and also basic uncertainties about how social support should be measured. Social support has mainly been examined in research on stress and in physical health outcomes, however, there is some evidence that it may influence the performance of health behaviour.

Cohen and Syme (1985) suggest that social support may be examined from two perspectives. Firstly, as the availability and structure of supportive relationships which determine how socially integrated or isolated an individual is (e.g. the number and frequency of social contacts) and secondly as the perceived adequacy of, and function served by, these beneficial social relationships, (e.g. emotional support, material assistance). The function of social relationships is usually measured in terms of informational, emotional and tangible support.

The mechanisms by which social support affects health outcomes are unclear and there is a marked lack of prospective data (Rutter and Quine, 1994). However, the protective effects of social support on health has been postulated to occur in two main ways. Firstly, it has been argued that social support may provide a direct, independent effect on health at all times. It is possible that this occurs by creating a sense of well being which affects health by reducing tension and increasing relaxation and this in turn leads to positive health outcomes such as reducing muscle tension and heart rate (Berkman and Syme, 1979). Secondly, it has been argued that social support may act as a 'buffer' in times of stress, and so would become activated when required to help individuals cope with difficult circumstances, but that in the absence of adversity it has no independent effect on health (Payne and Jones, 1987). There has been much research carried out on the effects of social support on health outcomes (e.g. see Thoits, 1982 for a review). In general it has been found that low levels of social support are associated with an increased rate of mortality and although the evidence for the role of social support in morbidity is less clear it also seems that those individuals with less social support do less well when ill, in terms of prognosis and recovery.

In study 2 a direct effect of social support on facilitating healthy behaviour (i.e. attendance for screening) is explored. It has been suggested that a perception that other people are willing to help may result in increased self esteem, stability and control over one's environment and this in turn would reduce the chances of adopting unhealthy behaviours e.g. smoking and drinking and avoiding healthy ones, e.g. exercise and a good diet (Cohen and Syme, 1985).

Regarding the carrying out of medical regimes or behaviours designed to reduce risk of disease, social support has been found to be important. Shumaker and Hill (1991) suggest that having social support may promote healthy behaviours. There is evidence that those individuals with a partner can gain benefits from this. For example, some research has found that social support can increase adherence to medical advice (e.g. Doherty *et al*, 1983; McCann *et al*, 1990). In both these studies the support assessed was emotional and tangible support from a spouse. Regarding structural social support, Langlie (1977) found that individuals who had more frequent social contact with non-kin were more likely to carry out preventive health behaviours.

The influence of social support has been infrequently applied to uptake of screening or examined in conjunction with attitudes about health and health behaviour. However, it is plausible that the role of social support in increasing healthy behaviours as suggested by Cohen and Syme (1985) may hold true for the adoption of preventive health behaviours such as attendance for screening, i.e. that having social support can encourage healthy behaviours.

Some research evidence exists to show that this may be the case and a small number of studies have utilised some social support variables in explaining screening behaviour. For example, Calnan (1984) explored the effects of broad measures of structural and functional social support on uptake of mammograms. He found that attenders for a mammogram were more likely than non-attenders to report that they had at least one close friend and in addition, those women with no confidant, or only a female confidant were less likely to attend than those who had a confiding relationship with their husband or partner. This finding, then, offers evidence that having a partner may be related to increased social support and, in turn, to uptake of screening. In a later study by the same author (Calnan, 1985) the effect of various factors, including social support, on the preventive health behaviours of middle aged women was explored. Again the measures used were fairly broad, encompassing both structural and functional aspects of social support. Women were asked about the availability of a health counsellor other than a GP, the availability of a confiding relationship and number of close friends. Cervical screening was found to be related to having a health counsellor, a confiding relationship with a husband or partner and more than one close friend. Mammogram use was related to having more than one friend. These social support variables were also significantly related to whether women had been screened or not, when examined in a discriminant function analysis with other variables.

Wagle *et al* (1997) examined how diminishing social networks (i.e. less structural social support) in women over the age of 55 may influence the frequency with which they practice breast self examination. Whilst the sample used was small (n=22) and very specific (women attending for a routine examination in a gynaecological clinic) the authors found that social support as assessed by the Norbeck Social Support Questionnaire (Norbeck *et al*, 1981) was significantly related to the frequency with which women carried out breast self examination. However, there is a problem with this particular social support measure, as mentioned by House and Kahn (1985), in that the measure confounds the size of an individuals' social network with the quality of these relationships. This makes the measures of the type of support provided essentially a function of the number of persons in an individuals' network, meaning that those women with larger networks will receive a higher social support score regardless of the quality of this support. This problem is avoided in study 2 in this thesis by calculating mean scores for functional social support measures.

Kang *et al* (1994) explored the role that social support played in uptake of cancer screening among African-American women. They used both structural and functional measures of social support, utilising an adjusted version of Berkman and Syme's (1979) Social Network Index - SNI - (including marital status, number of relatives and friends and membership of a church and of another organisation), and measures of instrumental and emotional support. The SNI was found to be related to uptake of mammograms but not of cervical screening or clinical breast examinations. The measures of emotional and instrumental support were not related to use of any of the tests. However, the measures were limited to a few items and the authors suggested that they were perhaps inadequate to capture the influence of these functional aspects of social support on these types of health behaviour.

It should be noted that social support can also be related to other factors. Individuals who are better educated, earn higher incomes and come from the higher social classes tend to have greater levels of social support (Weinberger *et al*, 1987). It is therefore important to look at the influence of social support on behaviour in association with other possible predictors of intentions and behaviour.

Much of the existing research in this area has been correlational and cross sectional and therefore causal paths are difficult to detect. It is possible, for example, that individuals who engage in healthy practices may attract more social support and not the other way around, although how far this would be the case for cervical screening is debatable. In addition, the reliability of measures used in studies is not always reported.

The available research evidence for the role of social support in influencing preventive health behaviour is limited and the results are not clear. In some studies structural support is found to be associated with behaviour and in others functional social support is the more important. The current study therefore explores the role played by social support in predicting uptake of cervical screening and also how social support may mediate the effects of other influences on behaviour, such as having a partner and social class. It is possible that social support promotes health behaviour by an increase in confidence that a health behaviour could be carried out, perhaps by means of encouraging a feeling of self efficacy. As discussed previously, self efficacy has been found to be an important predictor of intentions and behaviour (see chapter 3) and it is conceivable that emotional social support may increase such feelings. In addition, other types of functional social support may be important, for example informational social support in that having a greater opportunity to discuss the options with someone may increase the likelihood of the behaviour being carried out. Also, for a health behaviour such as screening which can potentially lead to bad news, a greater sense that people would be available during an illness as assessed by perceptions of practical social support could plausibly increase the likelihood that screening would be undertaken. The relative importance of these types of social support will be explored in the current study.

Structural social support, in terms of number and frequency of social contacts is also measured to assess whether simply being less socially isolated is associated with greater intentions to attend for smear tests and a greater uptake of screening.

The current study therefore uses measures of structural (number and frequency of contacts, proximity to woman) and functional (available emotional support and specific support about screening) social support and explores their relationship to intentions and behaviour and whether any influence they have mediates the effects of other variables. The measures used are described in more detail in the following chapter.

It is predicted that women reporting an intention to attend for screening and those who do attend will be less socially isolated, be more likely to report that they have a confidant and report that they have someone with whom they can discuss their health than women who do not intend to attend for screening or non-attenders.

It is also predicted that intenders and attenders will perceive themselves to have more practical support when ill, more informational support as regards cervical screening and to report a greater level of confiding than non-intenders and non-attenders.

In addition, the following hypotheses are made concerning social support and demographic variables

It is predicted that the influence of having a sexual partner on uptake of screening will be mediated by social support with those women with a partner having a higher level of social support than those without. It is also predicted that those women from a higher social class and with more years of education will have higher levels of social support than those from a lower social class and those with fewer years of education.

7.2.6 Demographic characteristics

The same demographic characteristics that were assessed in study 1 will be re-assessed for study 2 in order to examine how these variables relate to health beliefs, intentions and behaviour. The hypotheses concerning these variables are the same as for study 1 (see Chapter 3, section 3.6).

The indices assessing social status are extended to include a measure of educational attainment. Studies in the literature concerning uptake of cancer screening have found that educational level can be important in predicting uptake of cancer screening (see Chapter 3). It is expected that, as predictor for social class in study 1, that women with differing levels of education will have different attitudes towards cervical screening.

It is predicted that those women who report an intention to attend for a smear test and those who attend will be more highly educated than those women who report that they do not intend to attend for screening or those who do not attend. It is expected that the influence of this variable will be mediated by a more positive attitude towards screening among women who have had more education.

7.2.7 Past behaviour

In study 2 the influence of having had a smear test in the past will be re-explored to determine whether or not the direct effect it had on intentions in the first study can be replicated. In study 1 the measure of past behaviour was very skewed, with 97 per cent of women having been screened. Uptake of screening in the geographical area of the second study is lower than in the first, 65 per cent in comparison with 90 per cent, and therefore fewer women may have ever been screened (Croydon Family Health Services Authority, 1995; Lambeth, Southwark and Lewisham Health Authority, 1997). In addition, further indices of behaviour are also used in study 2, including details of the frequency of, and recency with which, women had had a smear test. It will therefore be possible to explore differences in intentions and future behaviour based on these measures.

Generally, it would be expected that women who have been screened more frequently would be more likely to intend to attend for screening and to actually attend. However, with the frequency of uptake of screening the woman's age would also be an important contributory factor. Simply by virtue of being eligible for screening for longer, older women may be likely to have had more frequent smear tests. In the current study, then, the influence of frequency of screening on future intentions and uptake will be explored controlling for the age of the woman.

Due to the design of study 2 all women should be due for screening, and therefore, for a large number of them the recency with which they have been screened will be similar, (i.e. within the last 3 to 5 years). If the sample of women had been drawn from a group not selected on the basis of being due for screening, recency of behaviour and later uptake of screening would approximate a curvilinear relationship in that those who have been screened very recently would not attend again (as they are not due for screening) and those who have not been screened for many years would also not attend. However, in the current study it would be expected that differences in beliefs, intentions and behaviour may be observed for those who have been screened within the recommended screening interval and those whose last test was outside those guidelines.

Examining the influence of screening frequency and recency in addition to whether or not women have ever been screened, will allow the exploration of whether it is the very fact of ever having carried out a behaviour which is important or whether familiarity and proximity in time are also important predictors of intentions to be screened in the future.

> *As found in study 1, the simple measure of whether or not women have ever been screened is expected to be partly mediated by attitudes and to also have a direct relationship to intentions. In addition, it is predicted that those women who intend to attend for a test and who actually attend will have had more tests than those who do not intend to attend and who do not attend (with age being controlled for). Also, women who intend to attend and attenders will be more likely to have been screened within the recommended age guidelines than non-intenders and non-attenders.*

7.2.8 Service provision factors influencing uptake of screening

As detailed in Chapter 3, a number of studies, particularly those carried out in countries where no national screening programme exists, have found that access to the screening service can be an important predictor of behaviour. A national screening programme should control such factors to a certain extent, in that all women should have the same opportunity to be screened, however, study 2 assessed contact with a GP to examine any influence this may have on uptake of screening. Contact with GP is not expected to be mediated by intentions. The relationship between this variable and having a partner will also be examined to establish whether women with a partner might be more likely to attend for screening due to an increased contact with their GP. Women suffering from a chronic illness will tend to consult their GP more frequently so this will also be assessed in order to control for its influence.

It is predicted that those women who attend for a smear test would report more contact with their GP than those women who do not attend. In addition, those women who have ever been screened are predicted to report more frequent visits to their GP than women who have never been screened.

7.3 Summary of new hypotheses

Hypothesis 1:

(a) Women who intend to attend for screening will have a more positive overall attitude towards having a smear test than those women who do not intend to attend for a test.

(b) Women who attend for a smear test will have a more positive overall attitude towards having a test than those women who do not attend.

Hypothesis 2:

(a) Women who intend to attend for a smear test will report more normative pressure to attend than those women who do not intend to attend.

(b) Women who attend for a smear test will report more normative pressure to attend than those women who do not attend.

Hypothesis 3:

(a) Women who intend to attend for a smear test will report a higher level of perceived control over the behaviour than those women who do not intend to attend.

(b) Women who attend for a smear test will report a higher level of perceived control over the behaviour than those women who do not attend.

(c) Aspects of perceived behavioural control implying internal constraints will be a better predictor of intentions and behaviour than aspects implying external constraints.

Hypothesis 4:

(a) Women who intend to attend for a smear test will report more anticipated negative affect following non-attendance for a smear test than those women who do not intend to attend.

(b) Women who attend for a smear test will report more anticipated negative affect following non-attendance for a smear test than those women who do not attend.

Hypothesis 5:

(a) Women who intend to attend for a smear test will be less socially isolated, be more likely to report that they have a confidant and report that they have someone with whom they can discuss their health than those women who do not intend to attend.

(b) Women who attend for a smear test will be less socially isolated, be more likely to report that they have a confidant and report that they have someone with whom they can discuss their health than those women who do not attend.

(c) Women who intend to attend for a smear test will report more practical support when ill, more informational support as regards cervical screening and a greater level of confiding than those women who do not intend to attend.

(d) Women who attend for a smear test will report more practical support when ill, more informational support as regards cervical screening and a greater level of confiding than those women who do not attend.

(e) The influence of having a sexual partner on uptake of screening will be mediated by social support with those women with a partner having a higher level of social support than those without.

(f) Those women in the higher social classes and those with more years of education will have higher levels of social support than those in the lower social classes and those with fewer years of education.

Hypothesis 6:

(a) Women who intend to attend for a smear test will be more highly educated than those women who do not intend to attend.

(b) Women who attend for a smear test will be more highly educated than those women who do not attend.

(c) The influence of this variable will be mediated by a more positive attitude towards screening among women who have had more education.

Hypothesis 7:

(a) Women who intend to attend for a smear test will have had more tests than those who do not intend to attend.

(b) Women who attend for a smear test will have had more tests than those who do not attend.

(c) Women who intend to attend will be more likely to have been screened within the recommended guidelines than non-intenders.

(d) Women who attend for a test will be more likely to have been screened within the recommended guidelines than non-attenders.

Hypothesis 8:

(a) Those women who attend for a smear test will report more frequent visits to their GP than those women who do not attend.

(b) Those women who have ever been screened will report more frequent visits to their GP than women who have never been screened.

Chapter 8

Study 2: measures and methodology

8.1. Design

Essentially the same design was adopted for the second study as that used for the first. The study was prospective, assessing women's demographic characteristics, beliefs about cervical cancer and cervical screening and their perceptions of social support before they were invited to attend for a smear test. The women were selected from two general practices in an inner city area. Some measures in the questionnaire were identical to those used in study 1. In addition, pilot interviews were carried out to develop the new items used in the questionnaire for this study.

8.2 Elicitation study

8.2.1 Introduction and participants

Women similar to those who would be asked to participate in study 2 were interviewed or completed a questionnaire about their attitudes to cervical screening. This method adheres to the recommendation by Fishbein and Ajzen (1975) to use beliefs generated by a sample of the population under study and not researcher-generated beliefs.

Fifteen female employees of the Royal Mail, who worked in a variety of administrative and manual jobs, were interviewed and a further seventeen completed a questionnaire.

They were aged between 24 and 62 with a mean age of 39.5 (sd 10.9). Most were married (61 per cent) or cohabiting with a partner (23 per cent). All but one woman had had a smear test in the past, the majority having had between two and five tests.

8.2.2 Interview/Questionnaire

The interview and questionnaire were very similar. They were designed to elicit beliefs to be incorporated in the main questionnaire. The interview was semi-structured and the questionnaire contained open ended questions. They both covered the following areas: advantages and disadvantages of attending for a smear test; disadvantages of not attending for a smear test; factors which make it easy or difficult for the woman to have a smear test and individuals who would approve or disapprove of the woman attending or not attending for a smear test.

There were a number of reasons for assessing these beliefs about the target behaviour. Firstly, to establish if anything would be generated that had not been covered by the Health Belief Model (HBM) items used in study 1. Secondly, in asking about anticipated feelings following non-attendance for a smear test, i.e. the disadvantages of not attending, appropriate adjectives to use for an anticipated affect scale could be identified. There were two aims to asking about salient referents. Firstly in order that the salient referents who were mentioned could be used to establish normative beliefs, and secondly in order that the same people could be mentioned in the social support measures to be included in the questionnaire. Demographic information and the number of smear tests women had had were asked about after beliefs were assessed.

8.2.3 Results

Generally, there was much consistency in the beliefs and salient referents mentioned by the women. Responses from interviews and from questionnaires did not substantially differ. No additional benefits and costs of screening emerged from the elicitation procedure and the list was broadly similar to the HBM measures used in study 1. Advantages given most frequently were the reassurance that nothing is wrong and the benefit of early detection. It became obvious that women found it easier to consider the 'costs' to screening (as operationalised in a HBM framework) when asked explicitly about what makes it difficult to attend for a test, rather than when they are asked about the disadvantages of attending. Pain and embarrassment were mentioned as were problems with the clinics including the inflexibility of clinic hours and waiting times. Direct measures of attitude to behaviour and control beliefs would therefore be used in the main questionnaire study to avoid the repetition of items which would occur if belief based measures were used as these would already have been assessed with the HBM measures. Concerning anticipated affect women reported that they would feel guilty if they did not attend for screening. Also mentioned were feelings of regret and concern that a chance to have an illness detected early might be missed. There was a consensus as to the salient referents in this decision, with women most frequently mentioning their GP, partner/husband, friends and female relatives.

8.2.4 Questionnaire development

The questionnaire developed from these interviews consisted of six sections (see appendix 7). Following Ajzen and Timko (1986), belief items written for this study were all phrased specifically as referring to attending for a smear test in the next three months in order that they would match the behavioural assessment. This time-frame was chosen to be short enough to reduce the chances of reported intentions having changed, which can be a cause of poor prediction of behaviour (Ajzen and Timko, 1986). The period of time was, however, long enough to ensure that beliefs would be measured prospectively in that there would be a period of at least six weeks for women to complete the questionnaire before they would be sent an invitation letter to attend for screening. In addition, the time scale would be long enough to avoid the poor prediction of behaviour which can come from assessing it on a particular occasion. However, the time-frame was also a compromise in that as there was a limited time in which to collect data, the follow-up period had to be kept fairly short.

All components to be measured from the Theory of Planned Behaviour (TPB) and the HBM were assessed with multiple items. The items were assessed for internal consistency (Cronbach's alpha) and if appropriate they were summed to form scales.

The first section of the questionnaire assessed the woman's intentions to be screened with the use of two items. Both items used 5 point bipolar Likert style scales scored from -2 (definitely do not intend to attend for a smear test/extremely unlikely to attend for a smear test) to +2 (definitely do intend to attend for a smear test/extremely likely to attend for a smear test).

Also included in section one were three items to assess a direct measure of behavioural control. The items included measures of perceived control over attending for a test (external constraint) perceived difficulty and perceived confidence (internal constraints). As can be seen then, the latter two measures are closer to Bandura's concept of self efficacy. These type of items are suggested by Ajzen and Madden (1986) as appropriate ways of tapping this construct. The items were on a four point unipolar scale. Scores ranged from 1 (extremely difficult/not at all confident/no control) to 4 (not at all difficult/extremely confident/complete control).

Section two comprised the 33 HBM items used in both phases of study 1. To recap, ten items measured perceptions of the costs of cervical screening, nine items measured the perceived benefits of screening, nine measured perceptions of susceptibility to cervical cancer and five items measured perceptions of the severity of cervical cancer. Items were all on five point bipolar scales ranging from strongly agree to strongly disagree.

Section three included five semantic differentials to provide a direct measure of attitude towards attending for a smear test in the next three months. The items were on a five point bipolar scale. Differentials assessed were important-unimportant, harmful-beneficial, foolish-wise, safe-unsafe and good-bad. A measure of anticipated affect was also included in this section. Four items assessed how women anticipated they would feel if they did not attend for a smear test when invited to do so. Items were scored on a four point unipolar scale from 1 (not at all tense, guilty, worried or regretful) to 4 (extremely tense, guilty, worried or regretful).

Section four examined the influence of the woman's social context on her uptake of screening. Three items assessed a direct measure of subjective norms, two injunctive (i.e. what other people think the woman should do and what they would approve of her doing) and one descriptive (if women important to the individual attend for smear tests). The items were scored on five point bipolar scales, ranging from strongly disagree (-2) to strongly agree (+2). Normative beliefs were calculated for four referents (GP, husband/partner, female relatives, friends). When calculating normative beliefs, for each referent the likelihood that they would want the woman to attend for a smear test in the next three months (scored on a five point bipolar scale from -2 extremely unlikely to +2 extremely likely) was multiplied by the woman's motivation to comply with the referents about health matters (scored on a four point unipolar scale from 1 - not at all to 4 - very much). These products were then summed across referents. In addition, these totals were divided by the number of referents the woman had in order to correct for artificially low scores among women for whom the referents did not apply (for example, if they had no partner).

The remaining items in this section explored structural and functional aspects of social support. A wide variety of measures have been used to assess social support (see House and Kahn, 1985 for a review). Short scales, relevant to health screening, were developed for the current study with items derived from established measures. This was done in order to keep the questions relevant and to avoid unreasonably lengthening the questionnaire by the use of standardised scales, which may have increased the risk of missing data occurring.

For assessing levels of structural social support, core aspects of the Social Network Index (SNI) of Berkman and Syme (1979) were used. This index covers frequency of any contact with relatives and friends. Items were written specifically for this questionnaire. They assessed whether or not the woman lived alone; how many people she would class as her friends; how far she had to travel to visit family and friends and how often she spent time with friends, family and partner doing things they enjoy together. The current study therefore extends the SNI to cover only 'positive' social contact, rather than any contact.

The Significant Others Scale of Power *et al* (1988) which covers informational, practical and emotional aspects of functional support, guided the development of the functional social support measures used in the current study. It was, however, considered to be too wide ranging, long and, in parts, ambiguous, to be used in full (for example with an item such as 'can you trust, talk to frankly and share your feelings with your spouse', some but not all of these may be true).

The degree of informational support the woman perceived she received about cervical screening was assessed by six items, all scored on five point bipolar scales. Questions asked about how likely it was that the woman would want to discuss her decision of whether or not to attend for a smear test with a friend, female relative or husband/partner and how willing these people would be to discuss the woman's decision. A scale was constructed by multiplying a woman's score for 'discuss' for a particular referent by her score for 'willing' for that referent and then these products were summed. The mean of these was used in analyses to control for confounding by size of network. This measure therefore assesses not only women's perceptions of available informational support, but also whether or not they would want to utilise such support when making a decision about cervical screening. In addition, respondents were asked if they had anyone (other than their GP) with whom they could discuss their health.

Practical support was assessed by asking women how much help they felt they would receive from social contacts if they were ill, for example with shopping, lifts to the GP etc. The items were on a four point unipolar scale ranging from 1 (none at all) to 4 (a great deal). Four referents were included: husband/partner, friends, female relatives and male relatives. A mean score was calculated to control for confounding by size of network.

Emotional support was assessed by summing scores for how much the woman felt she could confide in a number of referents (husband/partner, friends, female relatives and male relatives). The items were scored from 1 (not at all) to 4 (about anything). A mean confiding score was calculated. Women were also asked to state whether they had someone in whom they would particularly choose to confide, and if so, who this was.

Section 5 assessed experience with cervical screening. Items included the number of smear tests the woman had had (if any) and how long ago her last one had been. Previous personal experience of abnormal tests, and experience of these, and cervical cancer in others was also assessed.

The final section of the questionnaire mainly covered demographic details such as age, ethnic background and marital status, as used in study 1. In addition, age on leaving full time education, amount of contact the woman had with her GP in last year, and whether she had a chronic illness were also assessed.

The date on which the woman completed the questionnaire was noted.

8.3 Methods

8.3.1 Participants

The women who participated in study 2 were selected from two general practices in south-east London. A limitation of study 1 was overcome by being able to send questionnaires directly to women from a pre-checked list ensuring that all women were due for a smear test. In addition, the letters were signed by a female GP in the practice. Both of these aspects were expected to increase the response rate and therefore gain a more representative sample of women than achieved in study 1. Criteria for participation in the study were that the women were able to complete the questionnaire and that they were due for screening.

8.3.2 Procedure

Approval for the research was obtained from the research committees of the two general practices. For a period of three months in one general practice (July - September 1996) and for a period of two months in the second general practice (August - September 1996), the list of women who would be asked to attend for screening in the following six weeks was obtained. Five lists were therefore collected.

A total of 283 questionnaires were sent to women on the GP lists together with a covering letter signed by a female GP (see appendix 9) explaining the purpose of the study. A FREEPOST envelope was included with the questionnaire and the envelopes were stamped with a return address to be used if they were undelivered. Forty-two women were not eligible for the study, having left their address. Although this percentage is quite high, representing 14.8 per cent of the questionnaires sent, it transpired that one month's list contained the names of a number of students who had been living in a hall of residence three years earlier when they registered with the general practice. These women had all left the address and the questionnaires sent to them were returned by the Royal Mail. Therefore, taking these returns into account, 241 questionnaires were sent to eligible women. One hundred and forty two questionnaires were completed before the women would have been sent an invitation letter to attend for screening. Two questionnaires were completed too late and were therefore not included. The response rate to the study was 58.9 per cent (142/241). Disregarding the student population the numbers of women available each month to be contacted and response rates each month did not substantially differ between the surgeries or between months and therefore the groups of women contacted will be treated as one group.

GP records were checked to establish whether or not the women had attended for a smear test in the three months following their completion of the questionnaire reporting their intentions and beliefs (if women had not specified the date, the date the questionnaire was received was used). It was found that 72 women (50.7 per cent) had been screened and the remaining 70 women (49.3 per cent) had not.

Chapter 9

Study 2: results

9.1 Introduction

This chapter describes the findings from the second study of this thesis. The participants were women due for a smear test in Lambeth during the end of 1996. The characteristics of these women are described below, followed by details of the psychometric properties of the scales used in the analyses. The main comparative analyses between women based on their reported intentions to be screened and on their subsequent behaviour are then described. A series of hierarchical multiple regressions are used to examine the efficacy of the Health Belief Model (HBM) and the Theory of Planned Behaviour (TPB) in predicting intentions and behaviour. The better predictions which can be achieved with the addition of variables external to these models is highlighted. Finally, a composite model, including the most predictive variables is described.

A point to note is that contrary to the study aims, the sample of women participating in this study were, as for study 1, familiar with screening as 94 per cent had been screened in the past. Therefore, due to the small numbers of women involved, any analyses which would require using only those women who had never been screened were not carried out.

9.1.1 Demographic profile of the women

The mean age of the women was 38.1 years (sd 11.6). Seventy six per cent had a partner and 44 per cent of those with a partner were married. Most of the women (56 per cent) were from social classes one or two [classified according to their current or previous occupation] and left school on average at just over 18 years old (mean 18.7, sd 3.1). Eighty-three per cent of the women described themselves as white. The majority (66 per cent) worked outside the home and just over half (51 per cent) had children.

9.1.2 Psychometric properties of the study scales

A number of multi-item scales were used in the analysis of the data. Reliability coefficients were calculated for these scales and table 9.1.1 shows the results of these analyses. The items designed to measure concepts derived from the HBM and the TPB were found to form reliable scales. The scale measuring perceptions of severity was the least reliable with an alpha reliability coefficient of 0.59. For the scale measuring subjective norms, it was found, as expected, that an item to measure a descriptive norm reduced the reliability of the scale and was therefore not added to the two items measuring injunctive norms. Subsequent analyses treat these variables separately to explore whether they have different influences on intentions and behaviour. Similarly, for perceived behavioural control, a measure of control reduced the reliability of the scale and was therefore not combined with the two items measuring the ease and confidence with which a woman could attend for a smear test (i.e. self efficacy concepts). Subsequent analyses treat these variables separately.

Table 9.1.1 Alpha reliability coefficients of the scales used in the analyses

Name of scale	Number of items	Number of cases	Reliability coefficient
Intention to attend for screening	2	142	0.88
Perceived benefits of cervical screening	9	134	0.73
Perceived costs of cervical screening	10	133	0.79
Perceived susceptibility to cervical cancer	9	130	0.81
Perceived severity of cervical cancer	5	129	0.59
Attitudes towards attending for screening	5	110	0.86
Subjective norm (injunctive)	2	138	0.86
Self efficacy (ease and confidence)	2	140	0.68
Anticipated affect	4	117	0.90

9.1.3 Correlation analyses

Pearson's product moment correlation coefficients or Spearman's rank correlations were calculated to examine associations between reported intentions, behaviour and other measured variables. The results are reported in table 9.1.2. As can be seen from this table a number of variables were significantly related to women's reported intentions to attend for a smear test, but far fewer were found to be related to later uptake of screening. Variables derived from the TPB tended to have the strongest relationships with reported intentions, including attitude towards screening and injunctive norms. Also strongly associated were anticipated affect following non-attendance for screening and whether or not the woman had ever been screened. For behaviour, the strongest correlations were also observed for attitude towards screening and anticipated affect but the value of these was much lower than for reported intentions. In fact, the number of times the woman had visited her GP in the last year was nearly as strongly correlated with behaviour as were these two belief measures.

Table 9.1.2 Correlation analysis of intentions and behaviour with other measured variables

Variable	Intentions			Behaviour			Variable	Intentions			Behaviour		
	r	p	n	r	p	n		r	p	n	r	p	n
Age	0.16	ns	141	0.01	ns	141	Number of visits to GP	0.06	ns	141	0.20	*	141
Social class	0.09	ns	117	0.14	ns	117	Ever been screened	0.33	***	139	0.14	ns	139
Years of education	-0.26	**	134	-0.16	ns	134	Time since last test	0.08	ns	133	-0.13	ns	133
Has partner or not	-0.06	ns	137	0.00	ns	137	Number of tests	0.11	ns	133	0.07	ns	133
Ethnicity	-0.09	ns	137	-0.16	ns	137	Ever had abnormal smear test	0.04	ns	132	0.15	ns	132
Perceived benefits	0.26	**	134	0.17	*	134	Know someone who has had abnormal smear test	0.00	ns	138	0.06	ns	138
Perceived costs	-0.30	***	133	-0.14	ns	133	Know someone who has had cervical cancer	-0.01	ns	138	0.03	ns	138
Perceived susceptibility	0.31	***	130	-0.03	ns	130	Proximity to social contacts	-0.11	ns	139	-0.05	ns	139
Perceived severity	-0.09	ns	129	0.03	ns	129	Frequency of socialising	-0.06	ns	133	-0.03	ns	133
Attitude towards behaviour	0.71	***	117	0.25	**	117	Emotional social support	0.05	ns	134	-0.03	ns	134
Injunctive subjective norm	0.57	***	138	0.12	ns	138	Practical social support	0.14	ns	139	-0.10	ns	139
Descriptive subjective norm	0.14	ns	137	0.05	ns		Informational social support	0.00	ns	138	0.12	ns	138
Normative beliefs	0.45	***	130	0.07	ns	130	Have confidant	0.11	ns	132	0.08	ns	132
Self efficacy	0.49	***	140	0.08	ns	140	Have health advisor	-0.08	ns	138	-0.11	ns	138
Perceived control	0.12	ns	140	0.09	ns	140	Number of friends	-0.11	ns	133	-0.06	ns	133
Anticipated affect	0.50	***	117	0.21	*	117	Live alone	-0.07	ns	131	-0.06	ns	138

* $p<0.05$; ** $p<0.01$; *** $p<0.001$. Two tailed significance levels.
Intentions and behaviour correlate at $r=0.22$, $p<0.01$.

9.2 Univariate comparative analyses

9.2.1 Introduction

For the purposes of carrying out comparative analyses participants were split in two ways. Firstly, they were categorised on the basis of their reported intentions. Scores for the two item scale could range from -4 to 4. Women scoring 1, 2, 3 or 4 were classified as 'intenders' and women scoring -1, -2, -3 or -4 were classified as 'non-intenders'[1]. If women obtained a score of zero the variable was recorded as missing as it was not possible to classify these women into one of the two groups, as only seven women were in this category it is unlikely that their exclusion will substantially alter the results found. The resulting groups were therefore as follows:

(a) intended to attend for a smear test: 'intenders' (n=117)
(b) did not intend to attend for a smear test: 'non-intenders' (n=18).

Secondly, analyses were carried out using behaviour as the dependent variable. For these the group was split into two:

(a) women who attended for a smear test (n=72)
(b) women who did not attend for a smear test (n=70).

T tests of significance, Mann Whitney U tests, and chi square tests of significance were used, as appropriate, to test for group differences for variables on interval or ordinal scales or for categorical variables. Fisher's exact tests are reported instead of chi square

[1] This splitting of the group is carried out for simplification and to make comparisons between women for categorical variables more meaningful. However, according to the TPB intention is a continuum and therefore 'intenders' and 'non-intenders' do not represent two qualitatively different groups but simply an artificial categorisation.

tests where the expected frequencies in the cells are small. The results of these analyses are described below.

9.2.2 Demographic influences on intentions and behaviour

Demographic factors which were hypothesised to differ between women based on their reported intentions to attend for a smear test and their later behaviour were explored. Any differences would be subsequently examined in a multivariate analysis to establish how their influence on intentions and behaviour may be mediated by other variables.

The results of the analyses in fact showed that the groups were remarkably homogeneous, with no age, occupational social class or relationship status differences between intenders and non-intenders or between attenders and non-attenders. Ethnic origin was classed as white or non-white. The seventeen per cent of women who classified themselves as other than white were too small in number to be treated as separate categories. Chi square tests of significance also revealed no differences between intenders and non-intenders or attenders and non-attenders for ethnic origin (see tables 9.2.1 and 9.2.2).

However, one demographic variable was found to differ between women based on differing levels of reported intentions. Intenders and non-intenders differed for the additional measure of socio-economic status used in this study, i.e. age at leaving school. Prior to carrying out the analyses this variable was adjusted to represent years of education at the time of completing the questionnaire in view of the fact that some women were still in full time education. The variable therefore represented the reported age at leaving school minus five - the assumption being that all women would have started school by the time they were five years old. Contrary to predictions, those women who intended to attend for screening had significantly *fewer* years of education than those who did not intend to attend. This variable did not, however, differ between attenders and non-attenders. In the multivariate analyses which follow, whether or not this effect is mediated by cognitions is explored. It was predicted that both attitudes and social support variables may mediate the influence of this variable.

In view of the fact that attenders and non-attenders did not differ for whether or not they had a partner, this variable was not explored further in the multivariate analyses to predict intentions and behaviour, as a result, some of the study hypotheses, e.g. that the influence of having a partner on uptake of screening may be mediated by differing levels of social support, are now redundant. However, women with a partner were compared with those without for social support variables and these analyses are reported below in section 9.2.7.4.

Table 9.2.1 Comparisons between intenders and non-intenders for demographic variables.

Variable	Non-intenders	Intenders	Significance levels
	Frequency (%)	Frequency (%)	χ^2, p
Whether or not the woman has a partner			
Yes	14 (77.8)	83 (74.1)	
No	4 (22.2)	29 (25.9)	0.11, ns
Ethnicity			
White	16 (94.1)	92 (81.4)	
Non-white	1 (5.9)	21 (18.6)	0.19, ns
Social class			
1 or 2	11 (78.6)	49 (51.0)	
3 non-manual	2 (14.3)	30 (31.3)	3.73, ns
3 manual, 4 or 5	1 (7.1)	17 (17.7)	
	N	N	
	mean (sd)	mean (sd)	t, p
Age	18	116	
	35.7 (11.0)	39.2 (11.7)	-1.12, ns
Years of education	18	109	
	15.4 (2.9)	13.4 (3.0)	2.66, p<0.01

Table 9.2.2 Comparisons between attenders and non-attenders for demographic variables showing frequencies (%) or number of subjects and means (sds) and significance levels.

Variable	Non-Attenders	Attenders	
	Frequency (%)	Frequency (%)	χ^2, p
Whether or not the woman has a partner			
Yes	53 (75.7)	51 (76.1)	
No	17 (24.3)	16 (23.9)	0.003, ns
Ethnicity			
White	62 (89.9)	53 (77.9)	
Non-white	7 (10.1)	15 (22.1)	3.60, ns
Social class			
1 or 2	37 (62.7)	29 (50.0)	
3 non-manual	15 (25.4)	17 (29.3)	2.40, ns
3 manual, 4 or 5	7 (11.9)	12 (20.7)	
	N	N	
	mean (sd)	mean (sd)	t, p
Age	70	71	
	38.1 (11.9)	38.1 (11.5)	0.01, ns
Years of education	68	66	
	14.2 (3.1)	13.4 (3.2)	1.53, ns

9.2.3 Social cognition influences on intentions and behaviour

Differences between groups of women for variables derived from the HBM and from the TPB were explored. In addition, the influence of anticipated affect on intentions and behaviour was examined. Table 9.2.3 shows that most of the social cognition variables were highly inter-correlated. This would be expected as the variables were intended to represent related concepts. Perceptions of the severity of cervical cancer was the least correlated with the other variables.

To carry out the comparative analyses firstly, level of intentions to attend for screening was compared between attenders and non-attenders. It was found, as predicted, that

Table 9.2.3 Correlation analysis among social cognition variables

	Susceptibility	Severity	Benefits	Costs	Attitude	Injunctive subjective norm	Descriptive subjective norm	Normative beliefs	Self efficacy	Perceived control
Severity	-0.26**									
Benefits	0.11	-0.05								
Costs	-0.15	0.27**	-0.54***							
Attitude	0.34***	-0.15	0.46***	-0.46***						
Injunctive subjective norm	0.34***	-0.07	0.27**	-0.25**	0.70***					
Descriptive subjective norm	0.22**	-0.09	0.17	-0.10	0.24*	0.38***				
Normative beliefs	0.27**	-0.07	-0.26**	-0.23**	0.59***	0.64***	0.33***			
Self efficacy	0.09	-0.07	0.32***	-0.41***	0.33***	0.25**	0.27**	0.18*		
Perceived control	-0.06	-0.11	0.27**	-0.34***	0.23*	0.10	0.11	0.12	0.30***	
Anticipated affect	0.42***	-0.14	0.34***	-0.27**	0.62***	0.61***	0.41***	0.53***	0.21*	0.19*

* p<0.05, ** p<0.01, *** p<0.001. Two tailed significance levels.

women who attended for a smear test had reported significantly higher intentions to attend than non-attenders (t=-2.69, p<0.01).

For the four main components of the HBM, the same analyses were carried out as for study 1 to establish whether the results would be replicated with this sample of women. Comparable results were found for perceptions of the benefits of screening and for perceptions of the severity of cervical cancer. However, a different pattern of results emerged for perceived susceptibility to cervical cancer and perceptions of the costs of screening. The results of the analyses are described below (see tables 9.2.4 and 9.2.5).

The participants generally perceived the threat of cervical cancer as being moderate; the mean perceived susceptibility score was 23.5 (sd 5.7) and the mean perceived severity score was 17.3 (sd 3.3). Consistent with the findings of study 1, no differences were found between women based on their reported intentions or their behaviour for perceptions of the severity of cervical cancer. Whilst the correlation between intentions and perceived severity (r=-0.09) was slightly greater than that between behaviour and perceived severity (r=0.03), neither correlation was significant. As for study 1 perceptions of severity were, however, correlated with perceptions of the costs of screening (r=0.28, p<0.01). A higher perception of the severity of cancer was related to a greater perception of the costs of cervical screening.

In contrast to the results of study 1, and in line with predictions, differences were observed between intenders and non-intenders for perceptions of susceptibility to cervical cancer, with intenders perceiving themselves as more susceptible than non-intenders. Groups of attenders and non-attenders, however, did not differ for this variable.

Women held generally positive attitudes towards the smear test itself, with the mean score for perceived benefits being 38.3 (sd 4.6) and for perceived costs being 22.0 (sd 6.5). Intenders perceived cervical screening to be significantly more beneficial than non-intenders and likewise, attenders perceived it to be significantly more beneficial than non-attenders. As can be seen, as predicted, the relationship with reported intentions was stronger than that with behaviour. However, for perceptions of the costs of screening only intenders differed from non-intenders, in perceiving cervical screening to be significantly less costly. No difference was observed between attenders and non-attenders; the latter did not perceive cervical screening to be more costly than the former.

Cues to action were also examined. A high percentage of participants had had an abnormal smear test in the past (45 per cent). In addition, 62 per cent knew of someone else who had had cervical abnormalities and 25 per cent knew someone who had had cervical cancer. Differences between groups were explored for these variables. No significant differences were found. Intenders were no more likely than non-intenders to have had an abnormal smear test, or to know someone who had had one, or who had had cervical cancer. Likewise, women who attended for screening were no more likely to have had an abnormal smear test, or to know someone who had, or who had had cervical cancer (see tables 9.2.4 and 9.2.5).

Table 9.2.4 Comparisons between intenders and non-intenders for social cognition variables derived from the HBM.

Variable	Non-intenders	Intenders	Significance levels
	N mean (sd)	N mean (sd)	t, p
Perceived susceptibility	16 19.2 (5.6)	107 24.1 (5.4)	-3.41, $p<0.001$
Perceived severity	16 17.6 (2.8)	106 17.2 (3.4)	0.48, ns
Perceived benefits	17 36.1 (6.5)	110 38.6 (4.2)	-2.15, $p<0.01$
Perceived costs	17 25.6 (7.7)	109 21.3 (6.0)	2.60, $p<0.01$
	Frequency (%)	Frequency (%)	χ^2, p
Whether or not woman had ever had an abnormal smear test result			
Yes	7 (53.8)	49 (43.4)	
No	6 (46.2)	64 (56.6)	0.52, ns
Whether or not woman knows anyone who has had an abnormal smear test result			
Yes	12 (66.7)	67 (59.3)	
No	6 (33.3)	46 (40.7)	0.35, ns
Whether or not woman knows anyone who has had cervical cancer			
Yes	3 (16.7)	27 (23.9)	
No	15 (83.3)	86 (76.1)	0.46, ns

Table 9.2.5 Comparisons between attenders and non-attenders for social cognition variables derived from the HBM.

Variable	Non-attenders	Attenders	Significance levels
	N mean (sd)	N mean (sd)	t, p
Perceived susceptibility	67 23.5 (5.8)	63 23.4 (5.6)	0.02, ns
Perceived severity	65 17.3 (3.5)	64 17.4 (3.2)	-0.14, ns
Perceived benefits	67 37.5 (4.8)	67 39.1 (4.2)	-2.04, $p<0.05$
Perceived costs	67 23.0 (6.9)	66 21.1 (6.0)	1.73, ns
	Frequency (%)	Frequency (%)	χ^2, p
Whether or not woman had ever had an abnormal smear test result			
Yes	23 (36.5)	36 (52.2)	
No	40 (63.5)	33 (47.8)	3.26, ns
Whether or not woman knows anyone who has had an abnormal smear test result			
Yes	40 (58.8)	45 (64.3)	
No	28 (41.2)	25 (35.7)	0.44, ns
Whether or not woman knows anyone who has had cervical cancer			
Yes	16 (23.5)	18 (25.7)	
No	52 (76.5)	52 (74.3)	0.08, ns

Concepts derived from the TPB were then explored (see tables 9.2.6 and 9.2.7). The attitude to behaviour variable contained some missing data with 25 women endorsing only the important-unimportant semantic differential. A further seven women had a missing value on one of the semantic differentials. A mean score was therefore calculated for these women and those with complete data.

The women had a generally positive attitude towards attending for a smear test; the mean was 1.4 (sd 0.7) from a range of -2 to 2. This direct measure of attitude towards attending for screening in the following few months distinguished between women based on their reported intentions and their behaviour. Intenders had a more positive attitude than non-intenders and attenders had a more positive attitude than non-attenders. The difference based on intentions was, however, much greater than that based on behaviour. This would be expected if intentions mediate the effects on behaviour of such beliefs, as predicted by the TPB.

Three aspects of social influence on intentions and behaviour were assessed; injunctive subjective norms, descriptive subjective norms and normative beliefs. The women tended to perceive moderate amounts of social pressure. The mean score for injunctive social norms in a range of -4 to 4 was 2.5 (sd 1.6), for descriptive norms the possible range of scores was -2 to 2 and the mean was 1.0 (sd 0.7). It was predicted that overall, intenders and attenders would perceive greater normative pressure (both injunctive and descriptive) to attend for screening than non-intenders and non-attenders. For injunctive subjective norms intenders were found to obtain significantly higher scores than non-intenders, but attenders and non-attenders did not differ. For descriptive subjective norms neither intenders and non-intenders, or attenders and non-attenders, significantly differed from each other. This is in line with the suggestion that injunctive subjective norms would be more highly related to intentions and behaviour than would descriptive subjective norms.

Normative beliefs were calculated by multiplying a woman's perception that a referent would want her to attend for a smear test by her motivation to comply with this person concerning health matters and summing over the four referents. The scores could range from -8 to 8. The mean of this product was then calculated to avoid confounding with the size of a woman's social network. The mean score for the group was 3.5 (sd 3.0), showing a moderately high degree of normative pressure. Normative beliefs were found to differ between intenders and non-intenders with the former perceiving more normative pressure to attend for screening. Attenders and non-attenders did not differ for this variable. This normative belief variable was then correlated with the direct measures of subjective norm (both injunctive and descriptive). As expected, although significant correlations were found for both, normative beliefs were more strongly related to the injunctive norm measure (r=0.63) than the descriptive norm measure (r=0.33).

The direct injunctive measure of subjective norm was more highly correlated with both intentions and behaviour than the belief based normative measure (see table 9.2.3). Therefore this measure was used in subsequent multivariate analyses to predict intentions and behaviour.

Perceived behavioural control was operationalised with three variables. However, as mentioned above, a variable measuring 'control' did not add to the reliability of a two item scale which included measures of perceived ease of attending for screening and perceived confidence in attending - these will be referred to as self efficacy measures. The control measure was therefore treated separately. Generally women perceived themselves to have high levels of control over this behaviour and also scored highly on self efficacy. For control, the mean score was 3.4 (sd 0.9) in a range of 1 to 4. For self efficacy scores the mean was 6.8 (sd 1.3) in a range of 2 to 8. Perceptions of control over attending for screening did not differ between intenders and non-intenders or between attenders and non-attenders. For the self efficacy measure, intenders obtained significantly higher scores than non-intenders. No differences were observed, however, between attenders and non-attenders for this measure. In the multivariate analyses the measure of self efficacy will be included.

One hundred and seventeen women had full data for the anticipated affect scale. Those 25 women with missing data had only endorsed one option of the four emotions and therefore it was not feasible to calculate a mean score for this variable. The group tended towards anticipating negative reactions if they did not attend for screening. The mean score for the group was 9.3 (sd 3.6) in a range of 4 to 16. Intenders and non-intenders, and attenders and non-attenders, differed for their scores on this measure. As predicted, those women who intended to attend for screening perceived that they would experience greater negative affect after not attending for a test than women who reported that they did not intend to attend. Likewise, for behaviour, those women who attended for a smear test reported more anticipated negative affect following non-attendance than those women who did not attend, although this relationship was less strong than for intentions. Whether this variable significantly adds to the prediction of intentions and behaviour using variables derived from the HBM and the TPB will be explored in a multivariate analysis.

Table 9.2.6 Comparisons between intenders and non-intenders for social cognition variables derived from the TPB and anticipated affect.

Variable	Non-intenders	Intenders	Significance levels
	N	N	t, p
	mean (sd)	mean (sd)	
Attitude towards behaviour	16	94	
	0.4 (0.7)	1.6 (0.5)	-6.62, p<0.001
Injunctive subjective norm	17	114	
	0.3 (1.8)	2.8 (1.3)	-7.03, p<0.001
Descriptive subjective norm	16	114	
	0.8 (0.7)	1.0 (0.7)	-1.14, ns
Normative beliefs	16	107	
	0.4 (2.7)	4.1 (2.8)	-4.93, p<0.001
Self efficacy	17	116	
	5.5 (2.1)	6.9 (1.1)	-2.81, p<0.01
Perceived control	18	115	
	3.3 (1.0)	3.4 (0.8)	-0.44, ns
Anticipated affect	15	95	
	5.9 (2.5)	9.9 (3.5)	-5.49, p<0.001

Table 9.2.7 Comparisons between attenders and non-attenders for social cognition variables derived from the TPB and anticipated affect.

Variable	Non-attenders	Attenders	Significance levels
	N mean (sd)	N mean (sd)	t, p
Attitude towards behaviour	55 1.2 (0.7)	62 1.5 (0.5)	-2.93, p<0.01
Injunctive subjective norm	68 2.3 (1.8)	70 2.7 (1.4)	-1.59, ns
Descriptive subjective norm	67 0.9 (0.7)	70 1.0 (0.7)	-0.60, ns
Normative beliefs	66 3.4 (3.2)	64 3.8 (2.7)	-0.89, ns
Self efficacy	70 6.6 (1.5)	70 6.9 (1.2)	-1.22, ns
Perceived control	70 3.3 (0.9)	70 3.4 (0.9)	-0.89, ns
Anticipated affect	54 8.5 (3.8)	63 9.9 (3.4)	-2.24, p<0.05

9.2.4 The influence of social support on intentions and behaviour

Indicators of both functional and structural social support were assessed in this study. Eighteen per cent of the women participating in the study lived alone. The majority, however, shared with one (37.7 per cent) or two (23.9 per cent) other people. Nearly all the women reported that they have at least one friend (97.7 per cent), with the majority of women having between 3 and 10 friends (52.6 per cent). Eighty-eight per cent of women reported that they had someone in whom they could confide. Just over half (50.9 per cent) of these people were reported to be the woman's husband or partner, 26 per cent a friend and the remainder a relative. Taking only those women who reported that they have a current partner into account, 78 per cent of these women reported that their partner was their confidant. Eighty-eight per cent of the women reported that they had someone, other than their GP, to whom they could talk about their health.

Chi square tests of significance were carried out to assess whether intenders and attenders would be more likely than non-intenders and non-attenders to be less socially isolated, have a confidant and have someone with whom they could discuss their health. No significant group differences were found (see tables 9.2.8 and 9.2.9)

Regarding social contact with friends and family, and distance lived from these social contacts, 90 per cent of women with a partner reported that they do something at least every fortnight with their partner, with half of these women socialising with their partner every day. Seventy two per cent of women socialise with friends at least every two weeks and 57 per cent socialise with their family at least every two weeks. Most women lived near to their friends and family with 89 per cent of them having less than an hour's journey to visit friends and 54 per cent having less than an hour's journey to visit family.

The greatest amount of socialising that women reported, and the shortest distance they have to travel to visit a friend or relative, were noted. Groups were then compared for these two variables to explore whether intenders and attenders would report more socialising and closer proximity to social contacts than non-intenders and non-attenders. No significant differences were found (see tables 9.2.8 and 9.2.9).

Table 9.2.8 Comparisons between intenders and non-intenders for structural social support variables.

Variable	Non-intenders	Intenders	
	Frequency (%)	Frequency (%)	Fisher's exact p value
Whether or not the woman has a confidant			
Yes	16 (88.9)	98 (86.7)	
No	2 (11.1)	15 (13.3)	p= 0.57
Whether or not the woman has someone with whom she can discuss her health			
Yes	15 (83.3)	95 (88.8)	
No	3 (16.7)	12 (11.2)	p= 0.36
Whether or not the woman lives alone			
Yes	2 (11.1)	22 (19.5)	
No	16 (88.9)	91 (80.5)	p= 0.32
	N mean rank	N mean rank	z, p
Number of friends	18	108	
	74.6	61.6	-1.43, ns
Frequency of socialising	17	109	
	58.1	64.4	-0.73, ns
Proximity to social contacts	17	115	
	70.0	65.9	-0.54, ns

Table 9.2.9 Comparisons between attenders and non-attenders for structural social support variables.

Variable	Non-attenders	Attenders	Significance levels
	Frequency (%)	Frequency (%)	χ^2, p
Whether or not the woman has a confidant			
Yes	57 (85.1)	59 (90.8)	
No	10 (14.9)	6 (9.2)	1.0, ns
Whether or not the woman has someone with whom she can discuss her health			
Yes	63 (91.3)	58 (84.1)	
No	6 (8.7)	11 (15.9)	1.67, ns
Whether or not the woman lives alone			
Yes	11 (15.9)	14 (20.3)	
No	58 (84.1)	55 (79.7)	0.44, ns
	N mean rank	N mean rank	z, p
Number of friends	67	66	
	69.1	64.8	-0.65, ns
Frequency of socialising	66	67	
	65.5	68.5	-0.48, ns
Proximity of social contacts	69	70	
	72.0	67.9	-0.79, ns

As discussed in the previous chapter, informational social support was assessed specifically in relation to cervical screening uptake, practical support was specific to illness situations and emotional support was phrased more generally. Mean scores were calculated for all these variables to avoid missing data caused by smaller networks. Confiding was quite low with the mean score being 2.7 (sd 0.6) in a range of 1 to 4. For practical support, scores could also range from 1 to 4 and the mean score was 2.8 (sd 0.7). Informational social support was composed of willingness of referents to discuss the woman's decision to attend for screening weighted by whether or not the woman would want to discuss the matter. Scores could range from -4 to 4. The mean score was -0.4 (sd 2.4). This shows that, on the whole, informational support was moderate amongst this group of women. Differences between intenders and non-intenders and between attenders and non-attenders, for these variables were explored. No significant group differences were found (see tables 9.2.10 and 9.2.11).

Table 9.2.10 Comparisons between intenders and non-intenders for functional social support variables.

Variable	Non-intenders	Intenders	Significance levels
	N mean (sd)	N mean (sd)	t, p
Practical social support	17 2.5 (0.7)	115 2.8 (0.6)	-1.77, ns
Emotional social support	18 2.8 (0.7)	109 2.8 (0.6)	-0.15, ns
Informational social support	17 -0.6 (2.0)	114 -0.4 (2.4)	-0.29, ns

Table 9.2.11 Comparisons between attenders and non-attenders for functional social support variables.

Variable	Non-attenders	Attenders	Significance levels
	N mean (sd)	N mean (sd)	t, p
Practical social support	70 2.8 (0.7)	69 2.8 (0.7)	0.46, ns
Emotional social support	67 2.8 (0.6)	67 2.8 (0.6)	0.30, ns
Informational social support	69 -0.7 (2.3)	69 -0.1 (2.5)	-1.39, ns

Women with a partner were compared with those without in order to examine whether higher levels of social support would be found among women with a partner. A number of predicted differences were found. Women with a partner reported more practical social support than those women without a partner ($t=-1.95$, $p<0.05$). They were also more likely to report that they had a confidant (Fisher's exact test, $p=0.03$) and someone with whom they could discuss their health (Fisher's exact test, $p=0.02$). They did not, however, report greater levels of emotional or informational support, report having more friends, socialise more or live closer to social contacts than women without a partner.

Differences in social support in association with greater or fewer years of education were also explored. It was found that more education was associated with having more friends ($r=0.35$, $p<0.001$). No other social support variables differed with this variable. Likewise differences among social classes for social support measures were explored. A lower social class was associated with fewer friends ($r=-0.36$, $p<0.001$). There was also a tendency for higher social class women to report having a confidant ($\chi^2 = 5.74$, $p=0.06$) and to report having someone with whom they could discuss their health ($\chi^2 = 5.73$, $p=0.06$). Finally, emotional social support was correlated with perceptions of self efficacy to explore whether these would be significantly associated with one another. The observed correlation was not significant ($r=0.04$, ns).

9.2.5 Past behaviour

As for study 1, most women who participated had had a smear test in the past (94 per cent), 53 per cent had had between one and five tests, 29 per cent between six and nine tests and the remainder had had over 10. This was related to age, in that the older women had had more tests ($r=0.22$, $p<0.01$). Ninety two per cent of the women had had their most recent test in the last three years.

As predicted, those women who intended to attend for screening were more likely to have ever been screened than non-intenders, 100 per cent compared to 72 per cent (Fisher's exact test, $p=0.00001$). However, this was not the case for behaviour, and attenders were no more likely to have ever been screened than non-attenders, 98 per cent compared with 93 per cent (Fisher's exact test, $p=0.10$).

Among women who had ever been screened, it was predicted that those who had been screened more frequently would be more likely to intend to attend for a smear test and to actually attend. However, using a logistic regression analysis (in order to control for the confounding influence of age) no differences were observed in screening frequency either between intenders and non-intenders (Wald statistic = 0.11, ns) or between attenders and non-attenders (Wald statistic = 0.61, ns).

It was hoped to compare the influence of screening recency on intentions and behaviour between women whose last smear test had been within the recommended screening intervals and women whose last smear test was outside of this time period. However, it transpired that this variable was nearly identical to the variable indicating whether or not women had ever been screened. Only one woman who had ever had a smear test had had this outside the screening frequency guidelines, and the other 6 women outside the guidelines had never been screened. The planned analyses were therefore not carried out.

9.2.6 Service provision factors influencing intentions and behaviour

Eighty-three per cent of the women had consulted their GP at least once during the previous 12 months. The majority (51 per cent) of women had seen their GP between two and six times. Attenders and non-attenders were compared for this variable using a Mann-Whitney U test. As predicted, attenders reported visiting their GP significantly more times in the previous year than non-attenders ($z=-2.39$, $p<0.01$). Also as predicted there was no difference between intenders and non-intenders for this variable ($z=-1.79$, ns). The influence of this variable in a multiple regression will be explored.

As women suffering from a chronic illness may contact their GP more frequently than those without, the above analyses were repeated excluding women who were chronically ill (13 per cent of the sample). Attenders and non-attenders still differed for this variable (z=-2.77, $p<0.01$), and no significant difference was found between intenders and non-intenders (z=-1.62, ns).

9.2.7 Univariate differences between women based on social variables and screening experience

Prior to carrying out the multiple regressions, demographic and past experience variables which were found to distinguish between women on the basis of their reported intentions were explored in more detail. Differences in beliefs between women who had a partner and those who did not were also explored to investigate possible reasons why, in this study, this variable was not important for distinguishing between women who attended for screening and those who did not.

<u>9.2.7.1. Whether or not women had ever had a smear test</u>

Whether or not women had ever had a smear test was, perhaps unsurprisingly, related to their attitudes and beliefs about cervical cancer and screening. Women who had been screened perceived themselves to be more susceptible to cervical cancer (t=-2.28, $p<0.05$). They also expressed more perceived benefits (t=-3.48, $p<0.001$) and fewer perceived costs (t=3.98, $p<0.0001$) to smear tests, held a more positive attitude towards screening (t=-4.44, $p<0.0001$), experienced more perceived pressure to attend - direct measure of injunctive subjective norm - (t=-3.16, $p<0.01$), anticipated that they would experience more negative feelings if they did not attend when invited (t=-2.82, $p<0.01$) and also showed more confidence in their ability to attend if they wanted to - measure of self efficacy - (t=-2.05, $p<0.05$). In addition, as predicted, the access variable of number of visits to their GP in the last year was associated with whether or not they had ever been screened, in that women who had never had a smear test visited their GP significantly less often than those who had had a test (z=-2.30, $p<0.05$).

9.2.7.2. Years of education

Using Pearson's product moment correlations or Spearman's rank correlations (depending on the type of variable) it was found that the variable specifying the number of years of education a woman had had was significantly correlated with several other variables assessed in the study. Regarding social and lifestyle variables, it was found that years of education was related to occupational social class as would be expected, with more education being associated with a higher social class ($r=-0.52$, $p<0.0001$). More years of education were also associated with having a partner ($r=0.32$, $p<0.001$) and with having more friends ($r=0.34$, $p<0.001$). In addition, more education was associated with fewer visits to the GP ($r=-0.24$, $p<0.01$) and negatively associated with age ($r=-0.38$, $p<0.001$) indicating that younger women had had more years of education. There were also differences in beliefs about screening and cervical cancer. Those women with more years of education expected to experience fewer negative feelings if they did not attend for a smear test ($r=-0.25$, $p<0.01$), perceived more costs to screening ($r=0.19$, $p<0.05$), had a generally less positive attitude towards screening ($r=-0.27$, $p<0.01$), felt less susceptible to cervical cancer ($r=-0.25$, $p<0.01$) and perceived cervical cancer as more severe ($r=0.31$, $p<0.001$).

9.2.7.3 Frequency of contact with GP

The amount of contact that a woman had with her GP in the previous 12 months was found to be significantly correlated with a number of other variables. More frequent contact was associated with the social variables of a lower occupational social class ($r=0.29$, $p<0.01$), being more likely to have children ($r=0.23$, $p<0.01$), and to not be currently working outside the home ($r=-0.27$, $p<0.01$). Regarding beliefs about cervical cancer, more contact with a GP was associated with a higher perceived susceptibility to cervical cancer ($r=0.25$, $p<0.01$). As mentioned above more frequent contact with a GP was also associated with having had a smear test in the past and having fewer years of education.

9.2.7.4 Whether or not woman had a partner

Women with a partner and those without were compared on all social, demographic and attitude variables to explore why it might be that no differences emerged in uptake of screening among women on this basis in this study. As for study 1, women did not differ for attitudes towards screening or towards cervical cancer. Contrary to predictions, women with a partner did not report having contacted their GP more frequently than those women without a partner. However, as mentioned above, it was found that women with a partner were more highly educated ($t=-4.83$, $p<0.001$) than those without. It is possible that this explains the lack of significant relationship to attendance as women with more education in this study were significantly *less* likely to intend to attend for screening and to actually attend.

9.3 Multivariate analyses

9.3.1. Introduction

A series of hierarchical multiple regressions were carried out to explore associations in the data. Firstly, two analyses were carried out to predict intentions and behaviour using variables derived from the HBM. Secondly the sufficiency of the HBM was tested. Thirdly, two analyses were carried out using variables from the TPB to predict intentions and behaviour. Fourthly, a combined analysis was carried out to establish whether variables derived from one model significantly added to the variance in intentions and behaviour explained by variables derived from the other model. Finally, analyses were carried out to determine the best predictors of cervical screening behaviour using only significant predictors from the social cognition models and also using anticipated affect, past behaviour, years of education and contact with GP, i.e. variables which differed between intenders and non-intenders or between attenders and non-attenders. These analyses also allowed the sufficiency of the TPB to be explored.

Data from a subset of participants (n=99) who had no missing data on any of the variables were used in these analyses.

9.3.2. Health Belief Model based analyses

In the first analysis, behaviour was regressed onto intentions and the four main elements of the HBM (perceived susceptibility, severity, benefits and costs). A non-significant proportion of the variance in behaviour was explained by the variables (F=1.23, ns, adjusted R^2=0.01), and no individual variable made a significant contribution to the variance. Secondly, intentions were regressed onto the HBM elements. A better, although still weak, prediction of intentions was achieved (F=4.94, $p<0.01$). Two beliefs significantly contributed to the variance explained; perceived costs of cervical screening (β=-0.27, $p<0.05$) and perceived susceptibility to cervical cancer (β=0.28, $p<0.01$). Fourteen per cent of the variance in intentions was explained (adjusted R^2= 0.14). The results indicate that those women who perceive that cervical screening involves few costs and who feel susceptible to cervical cancer are more likely to intend to attend for a smear test. Tables 9.3.1 and 9.3.2 show the results of these analyses.

Table 9.3.1 The final statistics for the linear regression equation predicting behaviour from intentions and HBM variables.

Variable	Standardised Beta	Significance
Intentions	0.198	0.0759
Perceived benefits	0.092	0.4480
Perceived costs	-0.034	0.7843
Perceived susceptibility	-0.055	0.6123
Perceived severity	-0.035	0.7412
R^2=0.06 ; Adjusted R^2 = 0.01		

Table 9.3.2 The final statistics for the linear regression equation predicting intentions to attend for a smear test from HBM variables.

Variable	Standardised Beta	Significance
Perceived benefits	0.059	0.6028
Perceived costs	-0.267	0.0219*
Perceived susceptibility	0.276	0.0054*
Perceived severity	0.066	0.5022
R^2=0.17; Adjusted R^2 = 0.14; * significant predictors		

Next a multiple regression was conducted to establish whether the addition of variables external to the HBM would significantly increase the variance in intentions which the model explains. If this was found to be the case it could be concluded that the HBM is not sufficient to explain intentions to be screened. With the addition of anticipated affect, past behaviour, years of education and frequency of contact with GP, 38 per cent of the variance was explained, with anticipated affect (β = 0.39, $p<0.001$) and past behaviour (β = 0.35, $p<0.001$) making the largest contribution. This is clearly a significant increase from 14 per cent and shows that the HBM is not a sufficient model.

9.3.3. Theory of Planned Behaviour based analyses

Firstly behaviour was regressed onto the TPB components (i.e. intentions, attitude towards the behaviour, subjective norm and self efficacy). Prediction of behaviour was not significantly better than for the HBM based analyses. No variables were significantly predictive of behaviour, and the proportion of variance explained was not significant (F=1.82, ns, adjusted R^2= 0.03). Secondly, intentions were regressed onto the other variables in the model. Attitudes towards screening was found to be predictive of intentions (β=0.63, $p<0.0001$) and a significant proportion of variance was explained (F=42.6, $p<0.0001$, adjusted R^2= 0.56). Tables 9.3.3 and 9.3.4 show the results of these analyses.

Table 9.3.3 The final statistics for the linear regression equation predicting behaviour from TPB variables.

Variable	Standardised Beta	Significance
Intentions	0.112	0.4626
Attitude towards screening	0.188	0.2909
Injunctive subjective norm	0.003	0.9801
Self efficacy	-0.117	0.2700
R^2=0.07; Adjusted R^2 = 0.03		

Table 9.3.4 The final statistics for the linear regression equation predicting intentions to attend for a smear test from TPB variables.

Variable	Standardised Beta	Significance
Attitude towards screening	0.629	0.0001*
Injunctive subjective norm	0.123	0.2142
Self efficacy	0.091	0.2017
R^2 =0.57; Adjusted R^2 = 0.56; * significant predictor		

9.3.4. Combined analysis using variables derived from the HBM and TPB to predict intentions.

In view of the fact that a far better prediction of intentions was achieved with the TPB, a further multiple regression was carried out using all variables derived from the TPB to examine whether the addition of the HBM variables would add to the variance explained. Incremental F ratios (Tabachnick and Fidell, 1996) were calculated for the increase in prediction of intentions from 56 per cent of the variance to 57 per cent. Unsurprisingly it was found that this small increase was not significant (F_{inc}= 1.86, $p>0.05$).

9.3.5 Combined analysis using significant predictors from TPB and social and past experience variables.

A final series of hierarchical multiple regressions were then carried out to establish the best predictors of intentions and behaviour. This analysis enabled any mediated influences on intentions and behaviour to be highlighted. Variables in the final analysis to predict behaviour were entered in blocks using a forced entry method. Entering variables in blocks enabled an examination of additional variance explained by the new predictors to be made. Intentions were entered first, as they were expected to mediate the effects of other variables on behaviour. At the next step, the direct measure of attitude and anticipated affect were added. Whether or not the woman had ever had a smear test was added at the fourth step as its influence on intentions and behaviour was expected to be mediated by social cognitions, followed by the addition of the frequency with which the woman had consulted her GP in the past year, which was expected to be mediated by whether or not women had ever been screened. Finally the number of years of education the women had was added. It was predicted that the influence of this variable would be mediated by those already in the model (see appendix 10 for correlations between the variables used in the analyses).

As the outcome variable of behaviour was a dichotomous variable, a logistic regression was carried out first to predict the behaviour and then the hierarchical multiple regressions were carried out to explore mediated effects and to indicate the proportion of variance explained. The logistic regression analysis produced a significant equation $\chi^2 = 13.72$ (6) $p<0.05$, although no one variable was found to be significantly predictive of behaviour. Sixty seven per cent of women were correctly classified.

The final hierarchical multiple regression was then carried out. Predictions of both intentions and behaviour were an improvement on the prediction obtained by social cognitions alone, indicating that the model does not offer a sufficient explanation of behaviour. The variance in behaviour explained increased to 7 per cent and the equation was now significant, $F=2.27$, $p<0.05$. However, no one variable was significantly related to behaviour. Examining the changes in the variance in behaviour explained with the addition of new blocks of variables it was found that the frequency with which the woman consults her GP was the variable which most increased the variance explained, from 2.4 per cent to 5.9 per cent. Number of years of education increased the variance explained a further 1.3 per cent. Calculating the incremental F ratios for the additional variance explained by these variables it was found that contact with a GP significantly added to the variance explained ($F_{inc} = 10.67$, $p<0.005$). Years of education also significantly added to the variance explained ($F_{inc} = 4.49$, $p<0.05$).

Concerning the variance in intentions explained, it was found that this increased to 60 per cent ($F=30.1$, $p<0.0001$). Direct effects on intentions were obtained for attitude towards the behaviour ($\beta=0.64$, $p<0.0001$) and whether or not women had ever had a smear test ($\beta=0.24$, $p<0.001$). These results indicate that intentions to attend for screening are associated with a more positive attitude towards screening and having attended for a smear test in the past.

Further regressions were carried out to explore associations between the variables in the model. In addition to its direct effect, the influence of ever having had a smear test on intentions was found to be partly mediated by attitudes towards the behaviour ($\beta=0.39$, $p<0.0001$) with ever having been screened being associated with a more positive attitude towards screening. The addition of this variable increased the variance in intentions explained from 55 per cent to 58 per cent. Calculating the incremental F ratio for this additional variance shows that the variable significantly adds to the variance explained ($F_{inc}=10.07$, $p<0.005$). The relative contribution of these mediated and unmediated effects in predicting intentions and behaviour can be seen from figure 9.3.1. The size of the direct effect on reported intentions of ever having had a smear test was 0.24 and the indirect effect via attitude towards the behaviour was 0.25 (i.e. 0.39 x 0.64). It can therefore be seen that the mediated effect of this variable is very slightly larger than the direct effect.

Frequency of contact with GP was found to have an indirect effect on intentions via its positive association with whether women had ever had a smear test (β=0.21, p<0.05) indicating that those women who have more frequent contact with their GP are more likely to have ever had a smear test and more likely to intend to attend for screening. Finally, years of education was related to reported intentions in two indirect ways. Firstly it was found to be negatively associated with attitude towards screening (β=-0.21, p<0.05) indicating that less education was associated with a more positive attitude towards screening. Secondly years of education was negatively associated with frequency of contact with a GP (β=-0.24, p<0.05), indicating that those women who had fewer years of education contacted their GP more often.

Other associations were found in the model, but these were not related to intentions or behaviour. Whether or not women had ever had a smear test was positively associated with perceptions of anticipated negative affect (β=0.28, p<0.01) and years of education was found to be negatively associated with anticipated affect (β=-0.32, p<0.01).

Tables 9.3.5 and 9.3.6 and figure 9.3.1 show the results of these multivariate analyses.

Table 9.3.5 The final statistics for the linear regression equation predicting uptake of screening. Variables are listed in the order in which they were added to the regression analysis.

Block	Variable	Standardised beta	Significance
First	Intention	0.058	0.7144
Second	Attitude towards behaviour	0.138	0.4328
	Anticipated affect	-0.046	0.7449
Third	Whether or not woman has ever had a smear test (0=no; 1=yes)	0.054	0.6374
Fourth	Number of times woman consulted GP in last year	0.172	0.1355
Fifth	Years of education	-0.162	0.1496
Multiple R = 0.36; R square = 0.13, Adjusted R square = 0.07			

Table 9.3.6 The final statistics for the linear regression equation predicting intentions to attend for a smear test. Variables are listed in the order in which they were added to the regression analysis.

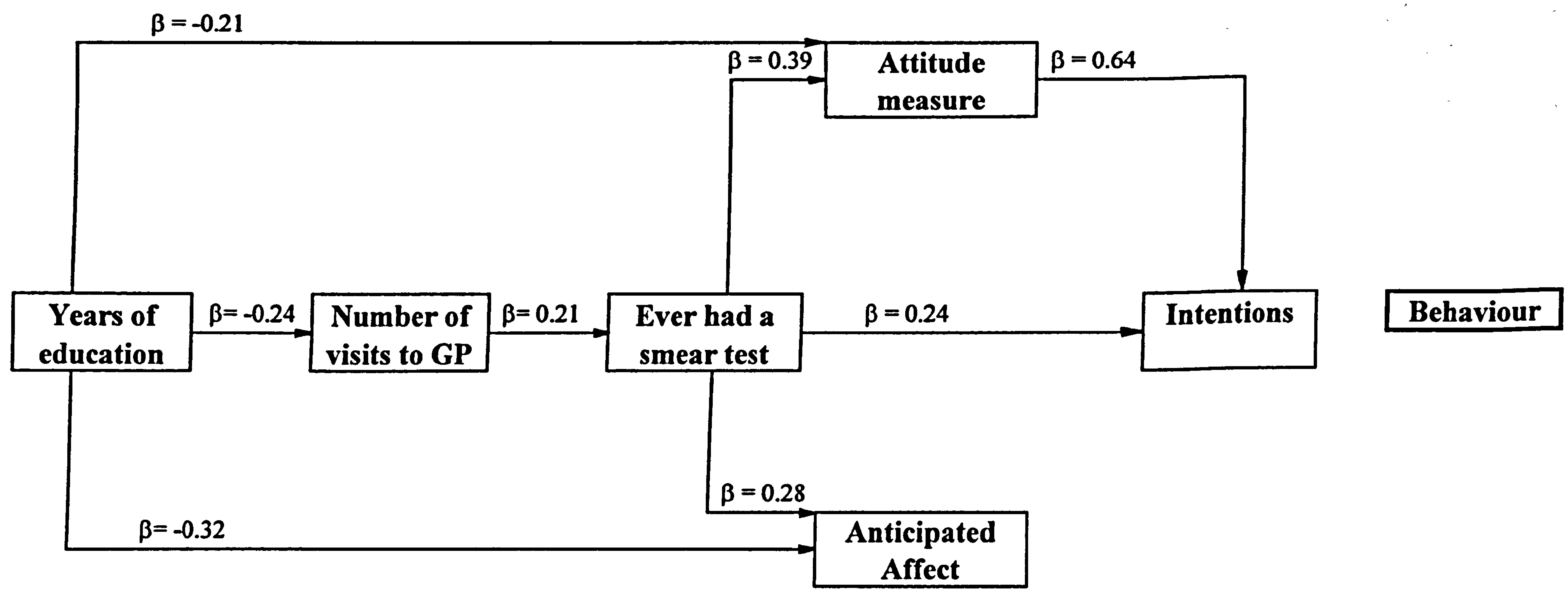
Block	Variable	Standardised beta	Significance
First	Attitude towards behaviour	0.643	0.0000*
	Anticipated affect	-0.003	0.9672
Second	Whether or not woman has ever had a smear test (0=no; 1=yes)	0.237	0.0012*
Third	Number of times woman consulted GP in last year	-0.113	0.1024
Fourth	Years of education	-0.133	0.0589

Multiple R = 0.78; R square = 0.62, Adjusted R square = 0.60 *significant predictors

9.4 Summary

- Intentions to attend for a smear test are correlated with uptake of screening. Intentions do not, however, significantly contribute to the prediction of behaviour in a multivariate analysis.
- Positive attitudes to screening and frequency of contact with a GP are correlated with uptake of screening but not significantly predictive of behaviour when explored in a multivariate analysis.
- No demographic differences were found between women who attended for screening and those who did not.
- A positive attitude towards screening, and having had a smear test in the past are directly predictive of intentions to have a smear test.
- The TPB is a superior model to the HBM in predicting intentions to have a smear test.
- Neither the TPB nor the HBM are sufficient models of screening behaviour as variables external to the models add to the prediction of intentions and behaviour.
- Neither levels of structural nor functional social support were found to be related to intentions or behaviour.

Figure 9.3.1 Representation of the hierarchical multiple regressions to predict intentions and behaviour in study 2



Adjusted R square for behaviour = 0.07
Adjusted R square for intention = 0.59
Only significant paths are shown (at least $p<0.05$), although all theoretical paths were tested. Beta weights are written above the path to which they refer

Chapter 10

Study 2: Discussion

10.1 Summary and theoretical implications of results

10.1.1 Introduction

An aim of study 2 was to replicate and extend the results of study 1 with a higher response rate and therefore a more representative sample. This higher response rate was achieved and whilst some of the results from study 1 were replicated, there was also a number of additional findings. The similarities and differences in findings from this study and study 1 are discussed below, together with how far the study hypotheses have been supported. A further aim of study 2 was to identify the most useful model to apply to uptake of screening. A comparison of the predictive ability of the Health Belief Model (HBM) and the Theory of Planned Behaviour (TPB), and whether or not the variables specified by these models are sufficient to predict intentions and behaviour, is discussed. The study sample and its possible limitations are considered in the final section of the chapter.

From the results of the study it can be concluded that womens' intentions to attend for screening can be predicted from a combination of their attitudes towards screening, their past behaviour, the frequency with which they consult their GP and the number of years of education they have. Whilst a multivariate analysis was unable to produce a significant prediction of behaviour, simple correlations suggest that more frequent contact with a GP in the past year, a positive attitude towards screening and intentions to attend for a test are most highly associated with later uptake of screening. These results are discussed in more detail below.

10.1.2 Intentions to attend for screening

In common with study 1, whilst most (82 per cent) of the women who participated in study 2 reported they would attend for a smear test, far fewer (51 per cent) actually did attend within the three months following the reporting of their intentions. Nonetheless, a significant correlation was found between intentions and behaviour ($r=0.22$, $p<0.01$).

Whilst the amount of variance in behaviour which was predicted in this study was disappointing, similar results have been reported in other research. As mentioned in chapter 6, in their recent meta-analysis of studies of uptake of a variety of health related behaviours, Godin and Kok (1996) observed that for the health behaviours they studied, the lowest correlations ($r=0.35$) between intentions and behaviour were for screening behaviours and the average percentage of variance in these behaviours which was explained by intentions was only 0.16. The lack of prediction of behaviour in the current study is similar to that found by Conner and Norman (1994) in a study of uptake of general health screening. These authors were able to predict just four per cent of variance in behaviour using intentions and HBM variables, and five per cent with variables derived from the TPB. A variety of reasons for the lack of concordance between reported intentions and behaviour has been discussed in chapter 6, section 6.1.2.

One reason why the correspondence between intentions and behaviour may be particularly poor for uptake of screening in some studies is that an appointment is often given and although people may intend to attend for screening they subsequently find that they cannot attend on the date given. In the study by Conner and Norman (1994) a particular date was given for attendance and the authors suggested that, indeed, this may have reduced the strength of the relationship they found between intentions and behaviour. Whilst in the current study it was left up to the women to make their own appointment, it remains possible that women may find that they cannot attend for a smear test in the time period specified, for example, due to unforeseen barriers. This is discussed further in the following chapter.

10.1.3 Social cognitions derived from the Health Belief Model

The repetition of the measurement of the HBM variables in this study enabled an exploration to be made of the predictors of intentions and behaviour in this different sample of women. Despite the fact that HBM variables poorly predicted behaviour and were slightly worse at predicting intentions than in study 1 (14 per cent of the variance explained in comparison to 19 per cent previously), on the whole the results indicate that components of the HBM are not related to intentions and behaviour in a substantially different way in this study, with a better response rate, than in study 1. An additional point to note is that whilst there were slight differences in demographic make up of the participants in this study and those in study 1, which was expected, with women in this study tending to be younger, less likely to have a partner and to be from a higher social class, the results were similar. This is in line with the literature concerning uptake of screening where comparable results are found in terms of predictors of intentions and behaviour from diverse groups of participants.

As for study 1, perceptions of the severity of cervical cancer were not found to be related to intentions or behaviour. This result, in combination with the findings of study 1 and previous research, would indicate that to examine perceptions of severity is not useful to distinguish between women who attend for cervical screening and those who do not. This element of the HBM is arguably unnecessary to predict and explain asymptomatic screening behaviour, although it remains possible that it may be important for predicting sick role behaviour. Possible reasons for its non-significance have been discussed in chapter 6, section 6.1.3.

In contrast to study 1, and consistent with the study hypothesis, it was found that perceived susceptibility was related to intentions, with women who felt more susceptible being more likely to intend to have a smear test. A significant influence of this perception has been found in a number of other studies (e.g. Calnan, 1984; Hennig and Knowles, 1990; Hill *et al*, 1985; Stein *et al*, 1992). In fact, in the current study the multiple regression analysis showed that perceived susceptibility carried a similar beta weight to perceived costs, indicating that a perception of risk of developing cervical cancer was as motivating as beliefs about the costs of screening for this group of women. It is possible that as this group were, on average, younger than those who participated in study 1 this may have affected the variant responses obtained regarding perceptions of susceptibility. Older women, on the whole, tend to feel less susceptible to cervical cancer and perceptions of susceptibility may therefore be more important in distinguishing intenders from non-intenders in a younger group.

In line with the study hypotheses, attitudes towards having a smear test itself were related to intentions and behaviour. The results of the multivariate analysis indicate that as for study 1, the negative consequences of a behaviour (costs) are more important for predicting intentions than the positive consequences of the behaviour (benefits).

10.1.4 Social cognitions derived from the Theory of Planned Behaviour

The application of the TPB in this study proved to be effective in the prediction of intentions to be screened. The variance in intentions explained by the model compares favourably with previous research applying the Theory of Reasoned Action (TRA) to uptake of screening. Godin and Kok (1996) found that, in combination, attitudes towards the behaviour and subjective norms predicted 45 per cent of the variance in intentions in screening behaviour. In the current study 56 per cent of the variance was explained (although subjective norms did not contribute significantly).

Attitude proved to be the single most important variable for predicting intentions, accounting for nearly all of the variance in intentions. Those women who had an overall positive attitude towards attending for a smear test in the following three months were more likely to report that they intended to attend. A positive attitude towards a screening test has been found to predict intentions in previous research (e.g. Hill *et al*, 1985; Hennig and Knowles, 1990; Montano and Taplin, 1991). Although the variable was unable to predict a significant amount of variance when examined in a multivariate model to predict behaviour, it was, however, one of the few which was found to be significantly univariately correlated with later behaviour. Unlike the measurement of perceptions of the benefits and costs of screening, this attitude measure encompasses both positive and negative attitudes towards having a smear test. It is therefore not possible from this result to conclude whether it is the negative or the positive aspects of screening which are more important for predicting intentions.

The revised measurement of subjective norms was a useful extension to this study. As predicted, beliefs about what other people may want a woman to do can influence the strength of a woman's intention to have a smear test. Whilst both the direct measure of subjective norm and the belief based measure were related to reported intentions, the relationship between the direct measure and intentions was stronger, and this was subsequently used in multivariate analyses. This finding is in line with that of Hennig and Knowles (1990) in their study of intentions to have a smear test. In contrast Hill *et al* (1985) found that the reverse was true, with the belief based measure giving the better prediction of intention. It is possible that the direct measure used in the current study taps a general attitude towards having a smear test rather than a perception of social pressure, i.e. the women believe that other important people would want them to attend for screening because they themselves want to attend, as reflected in their positive attitude towards this behaviour.

Consistent with the findings of study 1, a measure of descriptive subjective norm was not related to intentions or behaviour. This result shows that for uptake of cervical screening the extension of subjective norms to include descriptive and injunctive measures (Cialdini *et al*, 1991) is unhelpful and that injunctive subjective norms are more important. As the behaviour in question is not observable by others, women's intentions and behaviour may not be so influenced by the perception of what other people are doing.

The study was able to highlight the relative contribution of attitudinal and normative influences on intentions to have a smear test. The results showed that women's attitudes to the behaviour are more important than the perceived attitudes of other people and considerably more important than the perceived behaviour of others, in influencing intentions to be screened. This demonstrates how the elements of the TPB are not equally as important as one another for every type of behaviour (a point which Ajzen acknowledges). Hill *et al* (1985) and Montano and Taplin (1991) applying the TRA to intentions to have a smear test and a mammogram respectively, both also found that subjective norms did not contribute substantially to the prediction of intentions once attitudes towards the behaviour had been taken into account.

As discussed in chapter 3, the TPB extends the TRA by including an assessment of an individual's perception of their control over the behaviour in question. The current study was able to assess the efficacy of this measure in this behavioural domain. As discussed the measure of control used in the study included both internal and external aspects of control. Concerning internal control, i.e. self efficacy, it was found that those women who perceived that attending for screening would be relatively easy and who were confident that they could attend if they wanted to were most likely to intend to be screened. However, it was found that the measure of 'external' perceived control over attending for screening was not related to reported intentions. These results indicate that, as predicted, beliefs about having the necessary internal resources to carry out the behaviour (i.e. high perceived self efficacy) are more highly associated with intentions to have a smear test than perceptions of external constraints to the behaviour. It should be noted, however, that it is possible that as the external control measure comprised of only one item which may have been unreliable, this would reduce the chances of it being found to be significantly related to intentions.

Despite these univariate significant differences, when examined multivariately perceived self efficacy did not add anything to the prediction of intentions or behaviour beyond that offered by attitudes towards having a smear test and, as discussed, external control was not related to intentions or behaviour. It can therefore be concluded that for uptake of cervical screening the TRA would be as useful a model as the TPB. This is in contrast to a number of studies of other behavioural domains which have found that perceived behavioural control significantly increases the prediction of intention to carry out these behaviours (e.g. Ajzen and Driver, 1992; Beale and Manstead, 1991).

10.1.5 Anticipated negative affect

The findings of the current study provided support for the argument that individuals may intend to act in order to avoid the chances of experiencing negative emotions at not having done so. However, this was only the case when the relationship between anticipated affect and intentions was examined univariately. Anticipated affect did not add to the prediction of intentions or behaviour multivariately.

It therefore seems that for this group of women attitudes towards the consequences of non-performance of a behaviour are not as important as beliefs about the act itself in predicting intentions or behaviour. This is in contrast to the findings by Richard *et al* (1995) for intentions to engage in unsafe sex and the findings by Parker *et al* (1995) for intentions to commit driving violations. In these studies anticipated affect significantly added to the prediction of intentions when included in an analysis with TPB variables. It is possible that this is due to the nature of the behaviour in question and the severity of the consequences of action or inaction. Committing a driving violation and having unsafe sex may in themselves be pleasurable, in contrast to having a smear test which is not. Therefore for screening, attitudes towards undergoing the behaviour are likely to be more salient. In addition, the consequences of unsafe sex and driving violations may be severe whereas *not* having a smear test does not preclude the opportunity of having one at a later stage, again diminishing the importance of the perception of affect following non-performance of the behaviour.

10.1.6 Comparison of social cognition models

Study 2 allowed for a comparison of the predictive ability of the HBM and the TPB in this behavioural domain. There are few examples of such comparisons in the literature. As discussed, neither model was able to account for a significant proportion of variance in behaviour. However it was found that the prediction of intentions based on the TPB explained considerably more variance in intentions than in the analysis using HBM variables - 56 per cent of the variance in comparison to 14 per cent.

In contrast to this study's findings, the few studies which have compared the HBM with the TRA (none have compared the HBM with the TPB for uptake of cancer screening) have found that variables derived from the HBM are able to account for more variance. Hill *et al* (1985) and Hennig and Knowles (1990) both found the HBM to be superior in predicting intentions to attend for a smear test - 32 per cent in comparison with 26 per cent of the variance by Hill and colleagues and 27 per cent compared to 12 per cent of variance by Hennig and Knowles.

In the light of these other research findings, it is debatable whether the better prediction of intentions from the TPB in the current study results from conceptual differences between the theories or differences in the way the model elements were operationalised. On a conceptual level, the study provides evidence that although the TPB is not specifically designed to predict health behaviour, whereas the HBM is, its components predict more variance in intentions and are more highly correlated univariately with behaviour. Equally, the study shows that direct measures of attitudes are better at predicting intentions than the more detailed belief based measures used in the HBM.

On a methodological level, however, the results show that specific measures are effective for predicting specific intentions to carry out a behaviour, and the poorer prediction from the HBM in the current study may in fact be due to the non-specific measures used rather than to the type of components it contains (particularly in view of the considerable overlap in cognitions covered by the models - see chapter 3 for discussion). A plausible reason therefore why the TPB is superior to the HBM in predicting intentions in the current study is that the TPB items measuring cognitions and those measuring intentions share common method variance. The results may therefore reflect evidence that individuals do strive for consistency when associations between questionnaire items are obvious, as suggested by Budd (1987).

The study results seem to indicate then that an assessment of overall attitude is sufficient to achieve a good prediction of intentions. However, although more variance is explained by the TPB, it arguably offers less in the way of explanation in this particular study than the HBM, due to differences in the way in which the variables are operationalised. The direct measure of attitude used offers basic semantic differentials, whereas the HBM measures of perceived costs and susceptibility include a variety of beliefs to tap these components. It is arguable that for most health related decisions to which social cognition models could be applied, and certainly for uptake of screening, it is necessary to assess beliefs which may *explain* behaviour and this can be afforded by the use of more detailed belief based measures underlying the direct measures in the TPB and by the type of measures used to assess HBM constructs. Such variables may be able to indicate where to target health education interventions in order to increase uptake of screening. To conclude, it could be argued that it depends on the aim of the study as to which type of measurement, or which model, is preferable.

10.1.7 Social and demographic variables

As in study 1, this study highlighted how variables external to social cognition models may contribute to the prediction of intentions to be screened and to later uptake of behaviour.

It was predicted that women with more years of education would be more likely to intend to attend for screening and to actually attend, and that the influence of this variable would be mediated by a positive attitude towards screening. In fact, the findings of the study were that those women with *fewer* years of education were more likely to intend to be screened. Whilst this is contrary to most other research, the application of multivariate statistics helps to explain the finding. In the current study the influence on intentions of fewer years of education was found to be entirely mediated by a negative association with attitude towards screening and with a negative association with frequency of contact with a GP. These results indicate that the less educated women actually perceived attending for screening to be more positive than more educated women and also they attended their GP more frequently.

This finding highlights the importance of attitudes towards behaviour. If this attitude is positive and this is also associated with being less educated, then fewer years of education will be related to an increased intention to be screened. The study shows that the actual amount of education is less important for explanatory purposes than the attitudes to which it relates and the study is therefore able to improve on previous research by illuminating this association.

In common with study 1, no occupational social class differences were observed between intenders and non-intenders or between attenders and non-attenders. Although this result may show that social class differences are diminishing (see chapter 6), the result for years of education indicates that differences in intentions are apparent between women. What the study shows is that it is important to select the most appropriate measure of social status in order to achieve the clearest picture of the influence social factors may have on intentions and behaviour.

Some findings differed from those in study 1. Contrary to predictions women in the current study who reported stronger intentions to attend for screening and those who did attend were not significantly younger than those who reported less intention or who did not attend. This result may reflect a general trend, observed in recent studies, that the age gap in uptake of screening appears to be narrowing and is also in line with a number of studies of uptake of mammograms which found no age difference (e.g. Fischera and Frank, 1994; Lerman *et al*, 1990; Mandleblatt *et al* 1992; Mandelblatt *et al*, 1993; Rutledge *et al*, 1988; Sutton *et al*, 1994). In this study, however, the finding may result from the association of this variable with years of education in that younger women were found to be more educated and more education is associated with *reduced* intentions.

Also in contrast to study 1, whether or not the woman had a sexual partner was not related to intentions and behaviour. Having a partner was, however, related to some aspects of social support, as had been predicted. For example, those women with a partner perceived themselves to have more practical social support when they are ill, and were more likely to report that they had someone in whom they could confide. However, as discussed later in this chapter, social support was not related to intentions and behaviour and therefore these associations offer little in the way of explanations of behaviour. As for age, the non-significant findings for having a partner may be as a result of the association this variable has with years of education in that those women with a partner were more highly educated.

As predicted, frequency of contact with a GP was related to attendance for screening, being one of the few variables which had a significant correlation with behaviour. In a multivariate analysis it significantly added to the variance in behaviour explained, although no direct predictive relationship was observed. This result suggests that factors associated with access to screening may remain influential even within a nationally organised screening programme. Substantial research evidence exists to show that such factors are important in explaining screening behaviour (see chapter 3). However, the current study is able to add to previous research findings which do not explore associations between contact with a GP and other factors which may also be predictive of uptake of screening (e.g. Bostick *et al*, 1994; Mamon *et al*, 1990; Meadows, 1987). In the current study, then, contact with GP was found to be related to whether or not women had ever been screened, in that more frequent contact with a GP was related to an increased likelihood of ever having had a smear test. The result may therefore reflect the influence of having a convenient chance to have a test and the role of opportunistic screening.

Thus the study shows that demographic and social variables may influence intentions and behaviour and exploring data with multivariate statistics highlights how these effects may be mediated.

10.1.8 Past behaviour

Ninety-four per cent of the participants had had a smear test in the past. As in study 1 and as predicted in this study, this variable was found to be directly related to intentions in a multiple regression. Contrary to study 1, however, no significant correlation was found between this variable and behaviour. Its influence on intentions in the multiple regression was also partly mediated by attitude to behaviour where those women who had been screened in the past had a more positive attitude and in fact the strength of this mediated influence on intentions was very slightly greater than the strength of the direct influence. This finding is in line with the discussion in chapter 3 that due to the infrequent and important nature of screening behaviour, it would seem plausible that some conscious deliberation is required before an intention to carry it out is formed. In addition, this variable was found to mediate the effects of education and frequency of contact with a GP. The study confirms the importance of the addition of a measure of past behaviour to variables specified by social cognition models.

10.1.9 Social support

The examination of levels of social support in this study added little to the understanding of reasons for intentions and uptake of screening. Differences in reported levels of either functional or structural social support were not found to be significantly related to intentions or behaviour. The study findings are in contrast to Calnan (1984 and 1985) who found that attendance for a smear test and a mammogram was related to measures of available social support and in contrast to Wagle *et al* (1997) who found that performance of breast self examination was associated with higher levels of structural social support. However, the current findings are in line with Kang *et al* (1994) who did not find any influence of either structural or functional social support on uptake of cervical screening. However, these three studies did not explore the perceived attitudes and behaviour of the individuals in the women's support network and it may be that as these aspects are covered in the current study the more general social support measures were not able to distinguish intenders from non-intenders and attenders from non-attenders. It is possible therefore that levels of social support may only be important for carrying out behaviour when illness is currently being experienced (e.g. Doherty *et al*, 1983; Fitzpatrick *et al*, 1991; McCann *et al*, 1990; Shumaker and Hill, 1991) rather than for a behaviour which may result in the identification of an illness.

10.1.10 Sufficiency of the social cognition models

As for study 1, the results of study 2 show that although social cognitions specified by the HBM and TPB are important for predicting intentions to attend for a smear test, variables which are postulated to be external to these models also either have a direct effect on intentions (i.e. past behaviour) or significantly add to the prediction of intentions (i.e. years of education and contact with GP). For predicting behaviour, other variables also contribute to the amount of variance explained (i.e. years of education and contact with GP).

A number of previous studies have also found that variables not specified by the social cognition models employed in the research can also predict intentions and behaviour and contribute to the explanation of previous behaviour. For example as regards previous experience of the screening test, Calnan (1984) found that having had a mammogram in the past was a good predictor of future attendance when examined with other variables in a discriminant function analysis. Likewise, Sutton *et al* (1994) found that not having had a recent mammogram was the strongest predictor of intentions to have one. Demographic variables have also been found to have independent effects on intentions and behaviour, for example age (e.g. Beaulieu *et al*, 1996; Champion, 1992; Mandleblatt *et al*, 1992; Murray and McMillan, 1993) and marital status (Fischera and Frank, 1994).

It can be concluded from the results of the current study that social cognition models are not sufficient models of how individuals behave and cannot fully predict and explain uptake of cervical screening.

10.2 Limitations of the study

10.2.1 Study sample

The response rate to study 2 was over twice as high as the response to study 1 - 59 per cent compared with 28 per cent - and is comparable to that reported in other studies (e.g. Champion, 1992 and 1994; Friedman *et al*, 1995; Rutledge *et al*, 1988). The methods used in this study to ensure a higher response rate were therefore to some extent successful. Whilst it remains possible that the responses from the group of participants would be different from those of the non-participants in terms of their beliefs about screening due to some missing data this would almost certainly be less of a problem than for study 1 (see discussion in Chapter 6).

An additional advantage over study 1 is that the uptake of screening during the study period among participants could be directly compared to uptake among non-participants. As mentioned in chapter 8, 241 women were due for screening during the months of the study. Among the 142 women who participated 72 subsequently attended for screening (50.7 per cent). From GP records it was found that 45 of the remaining 99 women who declined to participate in the study subsequently attended for a smear test (45.4 per cent). Therefore the sample of women who participated in the current study contained only a slight over representation of attenders for screening. However, despite this and the higher response rate, it is possible that the sample may be unrepresentative of women due for a smear test in Lambeth in terms of past screening use and demographic characteristics, and this possibility is explored below.

An aim of the study had been to achieve a larger sample than in study 1 of women who had never had a smear test. However, only two per cent more women in this study had never been screened. This is a disadvantage in terms of its effect on the scope of analyses which could be carried out (i.e. an exploration of the moderating role of past behaviour was not possible) and also in terms of how representative the sample is. Ninety-four per cent of participants reported that they had had a smear test in the past and this is considerably higher than the 65 per cent of women in Lambeth overall who have ever been screened (Lambeth, Southwark and Lewisham Health Authority, 1997). In this respect then, it is possible that the sample may contain unrepresentative views in that a more positive attitude towards screening generally would be expected in a sample of women experienced with screening, and any influence of threat perceptions on behaviour may be less marked (see chapter 6 for fuller discussion). An alternative approach to recruiting participants to achieve a larger sample of women who have never had a smear test is discussed in the following chapter.

The demographic characteristics of the participants were compared with those of the general population in Lambeth. Eighty-three per cent of the women reported having occupations which placed them in the top three social classes, whereas in Lambeth overall only 68 per cent of women are rated as being in these classes (Lambeth, Southwark and Lewisham Health Authority, 1997). Sixteen per cent of the women had missing data for social class and this may have skewed the sample to seeming to contain an over-representation of women from the higher social classes. This is because those women who would be in the lower social classes may never have been employed and it was their current or previous occupation on which they were classified. As mentioned, social class did not differ between intenders and non-intenders or between attenders and non-attenders, and this unrepresentative distribution of classes may be the cause. It seems that occupational social class is not therefore the best measure of social position, particularly among a group of inner city women where unemployment levels are high (Lambeth, Southwark and Lewisham Health Authority, 1997).

The use of years of education as a social status indicator was preferable as there were no missing data and this variable distinguished between groups of intenders and non-intenders. However, education and social class are naturally associated with one another and the sample is probably more highly educated than in Lambeth generally. Although the result that women with less education are more likely to intend to attend can be easily understood for this particular sample (because less education is related to a more positive attitude to screening) this result cannot necessarily be generalised, and it is not suggested that less education would be associated with stronger intentions to attend for a smear test in another sample. It is possible that this result may have resulted from the over-representation of highly educated women, in that the very educated women in this sample did not intend to attend for screening whereas the less educated women - who in another group containing a broader spread of educational levels would be reasonably highly educated - did intend to attend.

Ethnic origin was also examined as a possible source of bias in the sample. It was found that the sample contained a slight under representation of women from ethnic minorities in comparison with the proportion in Lambeth as a whole - 20 per cent compared with 30 per cent (Lambeth, Southwark and Lewisham Health Authority, 1997).

10.2.2 Methodological and measurement issues

In addition to the reasons discussed in chapter 6 for the poor prediction of behaviour from intentions, there is a methodological point in the current study which may have had an impact on the relationship. The follow up period in this study for the behaviour to occur was, as acknowledged in chapter 8, fairly short. A longer period of time for uptake of screening to occur may have been preferable to achieve a better prediction of behaviour. Due to the way in which the study was designed, women would be sent an invitation to attend for a smear test about six weeks after they were sent a questionnaire. Therefore, for those who completed their questionnaire promptly there would only be approximately six weeks after they received the invitation letter for them to attend for screening and for this to be within the three month study period. This time period may have been insufficient, although in study 1 nearly two thirds (63 per cent) of women who attended for a smear test, did so within six weeks of being asked. It is particularly important that women attend for screening at some point and therefore it may have been useful, in the current study, to have examined a longer follow-up to see if intentions (albeit specific to the next three months) could have predicted behaviour and to explore whether cognitions mediated by intentions would be related to behaviour.

There are a number of measurement issues which should also be mentioned. Because of the necessity of using the same items to measure HBM constructs and to avoid the repetition of items, belief based measures for the TPB elements were not used. However, measuring behavioural beliefs underlying the attitude to behaviour may have been useful in order to highlight particularly influential beliefs which could be targeted for interventions and health education, and which, if measured specifically, might have been highly related to attitudes and intentions.

With hindsight the extension of indicators of past behaviour were not useful. Neither frequency of screening nor the recency of behaviour were significantly related to intentions or behaviour. Recency of screening was unlikely to be very interesting in this sample because all women were due for screening (as discussed in chapter 7). However, the division into outside and within recommended guidelines did not contribute to predictions.

The non-significant findings may have much to do with the type of behaviour under study. For another behaviour, frequency may be an important indicator of likely intentions and future behaviour, indicating the role of habit. However screening is unusual in this way. There is a limit to how frequently a woman can have a smear test and therefore frequency is not always a personal choice where a higher rate would be expected to be predicted by positive attitudes towards the behaviour. It seems from the results of this study that it is the very act of ever having had a smear test which is important rather than the frequency or recency of this behaviour.

10.3 Conclusions

Study 2 achieved a much better response rate than study 1. However a similar pattern of results emerged. Women with more positive attitudes towards screening were more likely to intend to attend for a smear test whilst perceptions of the threat to health posed by cervical cancer were less important for this particular health decision. Variables external to the social cognition models significantly added to the prediction of intentions and behaviour, indicating that the models are not sufficient in themselves. Intentions are better predicted from variables derived from the TPB than those derived from the HBM, although the way in which the elements were operationalised has implications for the explanatory power of these models.

Chapter 11

Conclusions

11.1 Introduction

Following a restatement of the context for the studies in this thesis this concluding chapter draws together the main findings of the research and highlights the efficacy of using social cognition models in this behavioural domain. The practical implications of the study results are discussed. Ideas for future research are also suggested.

11.2 Context of the research

As discussed in chapter 2 cervical cancer represents a significant health problem in the UK and there is considerable evidence that survival rates are improved if treatment is carried out when this cancer is at an early stage. Cervical screening can detect pre-cancerous cervical abnormalities and rates of cervical cancer are rising in unscreened women whilst they are falling in those women who are screened. Many women who die from cervical cancer have never been screened.

The aim of the studies in this thesis was to explore how women behave in relation to the cervical screening programme in the UK. Attendance rates nationally for cervical screening are generally fairly high. However, in London Health Authorities, where this research was based, there is the lowest coverage of target populations of all UK health authorities, making it particularly important to identify factors associated with uptake of screening in these areas. It is likely that part of the reason for the poorer coverage is the difficulty of keeping accurate databases of women eligible for screening among these highly mobile populations but, in addition, individual factors are also important.

One aim of the studies in this thesis was to assess whether unchangeable demographic factors, which have been observed in many studies to be related to uptake of screening are more important for influencing behaviour, or whether attitudes towards disease and the screening test itself would prove to be the more important. The latter represent a potential target for health education in order to improve uptake of screening. A second aim of the studies was to establish how well the chosen social cognition models identify factors associated with screening uptake and to establish whether or not the models offer a useful framework for studying this behaviour.

11.3 Summary of main findings and efficacy of using social cognition models to predict screening behaviour

The studies in this thesis represent two of the few prospective examinations of factors affecting intentions and actual behaviour as regards uptake of a cancer screening test. The use of hierarchical multiple regressions enabled the influence of mediated effects on intentions and behaviour to be estimated and the associations between attitudes and demographic variables to be explored.

Both studies show that women who intend to attend for screening are more likely to do so. The studies also show that women who believe that screening is a beneficial procedure, who believe it does not incur physical or psychological costs and who have a positive attitude towards their own attendance for a smear test, have stronger intentions to attend. Having prior experience of the behaviour is also predictive of intentions and associated with a more positive attitude towards screening. In addition, having more frequent contact with a GP, having less education and having a current sexual partner are associated with positive attitudes towards screening and also related to intentions and behaviour.

On a theoretical level it can be concluded that a social cognition model which includes an assessment of the costs and benefits of a behaviour is necessary and useful for studying screening uptake. As the studies in this thesis show, for the variance in intentions and behaviour which is explained, the constructs derived from social cognition models account for most of this variance and mediate the influence of other variables. Social cognition models therefore offer a potentially useful framework to increase our understanding of how social factors may affect screening and in addition they highlight attitudes which may be targeted to improve screening uptake. This is discussed in more detail in section 11.4 of this chapter.

The two models applied in the studies, the Health Belief Model (HBM) and the Theory of Planned Behaviour (TPB), have both been subject to criticism. However, some of the common criticisms of the models do not seem to apply in this research. For example, the TPB has been criticised for lacking emotional content. Partly as a consequence of it not being developed for health care decisions it does not include a measure of threat. However, in study 2 it was found that this model performed better than the health specific HBM in predicting intentions, and no multivariate influence of threat on behaviour and intentions was found when the components of the TPB were included with the HBM components in an analysis. In addition the study found that when compared in a multivariate model, measures of anticipated affect (i.e. emotional factors) did not contribute to the variance in intentions explained over that offered by attitudes towards behaviour.

The HBM has also been criticised. It is argued that as it does not include an assessment of the influence of subjective norms on behaviour, it does not set the individual in a social context. However, the application of the TPB to the decision to be screened in study 2 found, using a multiple regression analysis, that only attitudes to the behaviour were important. Therefore the omission of the measurement of subjective norms in the HBM may not be important when applying the model to uptake of cervical screening.

A further criticism of the HBM is that it omits measures of personal mastery as described by Bandura (1982) (although in a 1987 paper Becker and Rosenstock argued that this may be included in measures of the perceived costs of behaviour). However, in study 2 measures of self efficacy were not found to contribute significantly to the prediction of behaviour in a multiple regression and therefore this criticism, too, may not apply.

The HBM and the TPB are 'static' models and therefore do not distinguish between motivational and volitional stages in a decision. A theory which does do this is the Health Action Process Approach (HAPA, Schwarzer, 1992). However, whilst the HBM and the TPB are not devised in this way, the use of hierarchical multiple regressions, as employed in the current studies, allows for the examination of whether different sets of variables are predictive of intentions (motivational stage) and behaviour (volitional stage).

So on one level it seems that the application of these particular social cognition models to uptake of cervical screening is useful. However, applying such models is not without its problems. A criticism levelled at both the HBM and the TPB is that they assume that individuals are rational decision makers who weigh up the pros and cons of action and behave in accordance with this assessment. However, as the studies in this thesis show, a substantial amount of variance in intentions and behaviour was not, in fact, explained by the models and factors external to the models were also predictive of intentions and behaviour. This may indicate that idiosyncratic and 'irrational' reasons for behaviour also have an influence.

A criticism of both models is that for the variance which is explained, intentions to act (if used in the application of the HBM) are often considerably better predicted than behaviour. There is evidence from the current studies that for the decision to have a smear test this gap between intentions and behaviour requires examination, i.e. why do individuals not act on their reported intentions?

One point which might explain the lack of prediction is that in fact what is being considered is a gap between a *proxy measure* of intention and behaviour (this was briefly touched on in chapter 6, section 6.1.2). This is a methodological limitation of all studies applying social cognition models. Intentions when assessed by questionnaire are simply a proxy measure of an actual decision. A woman's decision to attend for screening might be made after she receives an invitation letter (in both the current studies this would be up to approximately 6 weeks after the proxy measure of intention), or the decision might be made when she is visiting a doctor on another matter and therefore would take place only a few minutes before having the test. Screening decisions are probably made afresh each time the opportunity arises and are unlikely to be an habitual response. Studies applying social cognition models assume that someone has already made the decision or makes it when they complete the questionnaire, however, this is arguably not the case. This assumption is a drawback of the models and the way in which they are measured, and may explain the relatively poor prediction of behaviour which is often observed. It is plausible that if an intention was measured just before a woman went into a clinic to have a test, then the relationship would be almost perfect.

A further point is that in prospective studies of uptake of screening, including the current two studies, there may be an influence of the timing of a cue to action (e.g. an invitation letter to attend for screening) in relation to when the (proxy measure of) intention is made. If it is agreed that an actual decision about whether or not to have a smear test, for example, is made after a letter is received, then for some women their reported intention and their actual decision will be closer in time than for other women (i.e. those women who respond quickly to participation in a study will have a longer gap between reporting their intention and the time when they might actually make a decision). This difference in proximity could have an effect on the strength of association between intentions and behaviour. However, it would be fairly problematic to assess the impact as it would be difficult in studies such as the current ones, to control exactly when women are posted a letter, when they receive them, and when they read them in relation to when they report their intentions.

Behaviour may also be poorly predicted because intentions change after measurement. Something may occur in the temporal gap between intentions and behaviour, which might prevent intentions being translated into behaviour. For example, there may be unforeseen practical barriers which occur and women may have different opportunities to attend. They may receive new information or have discussed screening with someone and therefore their intentions may change. It would be possible (although open to the criticism of it being a post hoc justification) to ask women about their reasons for their behaviour after the event in order to clarify this.

One reason for intentions changing for some women and not others may be personality differences; in that some people simply change their intentions (possibly about many things) more readily than others (Snyder, 1974; 1982). Snyder suggests that people differ in how far their behaviour is susceptible to situational cues as opposed to inner dispositions. Those who are more sensitive to external cues would be more likely to have their intentions changed by an event which occurs after they have reported these and before they have had a chance to act. The intentions of individuals who are more sensitive to internal states should be more stable.

If intentions to attend for screening are not very strong it certainly seems plausible that they might change. However, in the current studies many women had strong intentions but still did not carry them out. Therefore, in addition to examining factors affecting the stability of intentions, it would be interesting to explore whether anything could be measured at the time of assessing intentions which might increase the variance in behaviour explained, and which is currently omitted from social cognition models. It is possible that some women had put more 'cognitive work' into the completing of their intentions in the questionnaire. Some theoretical perspectives in fact argue that further cognitive activity is required to translate an intention into action (e.g. Bagozzi and Warshaw's 1990 theory of trying and Gollwitzer's 1993 implementation intentions). This last perspective is discussed in more detail in terms of its application to future research, in section 11.5 below.

So whilst the application of social cognition models to uptake of screening is certainly useful, there are some aspects of the models which need improvement.

11.4 Practical implications of the research

This section explores how the findings of the studies in this thesis could be usefully applied to initiatives to increase uptake of cervical screening. Some of the practical implications of the current research may also be applied to increasing the use of other types of screening. These possible applications are discussed below.

Despite the doubts about the efficacy of cervical screening amongst health professionals, the women who participated in the studies in this thesis, on the whole, had a positive attitude towards screening. Among those who perceived screening more negatively were women who had never been screened. Therefore it is not a negative experience which has caused this less positive opinion (as would be predicted by social learning theory). Although potentially unrepresentative samples of women participating in the studies may have given a particularly positive view, the studies nonetheless suggest that for many women screening is not perceived to be harmful and uptake should be encouraged. A point to mention here is that an aim of health education should be informed choice. This means that before deciding whether or not to have a smear test a woman should be aware of the smear test procedure, the implications of both a positive and a negative result, the chances of being recalled and what to expect in the way of any subsequent treatment. Increasing uptake in this environment would therefore be the ideal.

There was some evidence from the current studies that factors associated with uptake of screening were the same as factors which increase a woman's risk of developing cervical cancer. In study 1 older women were less likely to intend to be screened and less likely to attend for a smear test, despite the fact that increasing age is associated with a greater chance of developing cervical cancer. Secondly, in both studies, it was found that women who had never had a smear test were less likely to intend to be screened and to actually be screened (in study 1) and these are the women most at risk of dying from cervical cancer. These results indicate the necessity of emphasising the need for *all* women to attend regularly for screening.

Due to the fact that in both studies ever having been screened was an important indicator of future intentions and behaviour, it is necessary to identify what would encourage women to attend for screening for the first time in order to increase the numbers of women being screened regularly. The studies suggest that some non-attenders have never been screened and do not intend to be and therefore it is necessary to develop an effective method to tackle this behavioural inertia. Once attendance has been established, having a positive attitude to screening seems to be associated with re-attendance. This therefore indicates that the screening experience itself should be as benign as possible.

The practical implication of the influence of past behaviour on intentions and future behaviour may also apply to other types of repeatable screening where regular uptake is required. For example, previous experience of breast screening, general health screening and hypertension screening may be important for predicting future behaviour and therefore establishing predictors of this first time behaviour would be useful for developing ways of increasing uptake.

It should be noted that in drawing practical implications from the results of the current research an assumption has necessarily been made about the direction of causality. It is argued that a change in beliefs would have an impact on the strength of an individual's intention and on their behaviour. However, the current studies, and nearly all studies using TRA/TPB and HBM are cross sectional with respect to factors associated with intentions. It would, in principle, be better to carry out an experimental study before suggesting practical implications of the research findings. However, this type of study is difficult. It is necessary to find out which beliefs to target first and then to subsequently manipulate these to observe the effect on intentions and behaviour. However, for screening behaviour, there may be many relevant beliefs all equally as important as one another, which is why such studies may be difficult to carry out.

The studies in this thesis have tested which beliefs would be useful to target, but this has been carried out in a cross sectional way. In the absence of an experimental manipulation of beliefs, however, some suggestions for screening programme improvements can be made.

The study findings relating to perceptions of susceptibility to cervical cancer and its severity suggest that to try to improve uptake of cervical screening among women who are familiar with screening by increasing their perceptions of the threat of cervical cancer would not be successful. Although in study 2 perceptions of susceptibility were predictive of intentions to have a smear test when examined alongside only other HBM variables, when added to a model including TPB variables susceptibility perceptions did not significantly contribute to the prediction of intentions. No effects on intentions or behaviour in either study were found for perceived severity of cervical cancer.

However, there is considerable research evidence to show that inducing fear is effective in achieving behaviour change and that the more fear which is induced the greater the change in behaviour (Sutton, 1992b). So although in the current studies when examined multivariately, threat perceptions did not distinguish between attenders and non-attenders, it is possible that a certain level of fear would be necessary before a behaviour is undergone. As Schwarzer (1992) argues, such perceptions may be fairly well ingrained in individuals who are familiar with screening. It remains possible, however, that to increase risk perceptions among women who have never been screened for cervical cancer might be useful to increase uptake.

It is likely too that a certain level of threat would be necessary to achieve uptake of other routine screening, such as mammograms and general health screening, among those who have carried out the behaviour in the past. It may also prove to be useful to target threat perceptions among potential first time users of screening tests.

The current study findings relating to the perceived costs and benefits of screening and attitude towards the behaviour provide more scope for intervention and screening programme changes. The study results indicate that concentrating on highlighting the benefits of screening and reducing perceived costs would be an effective way of increasing uptake of cervical screening, both among women who have never been screened and among those who have. Future attempts to encourage attendance and remove the obstacles to attendance or re-attendance for cervical screening should therefore address these potential benefits and costs. The costs and benefits of cervical screening are complex and consist of a variety of beliefs. However, the results of study 1 indicate that in particular the inconvenience of screening and perceptions of the fear associated with the smear test would be costs to consider. For perceived benefits highlighting the reassurance that can come from being screened and that cervical screening is effective in detecting abnormalities early may be useful in encouraging uptake.

In a national screening programme it is important that letters requesting women to attend for screening and any accompanying leaflets are as effective as possible in persuading women to be screened. Yet, these tend to focus solely on the long term benefits of screening (see Appendices 2a and 2b), instead of in addition tackling the potential costs. Consequently they may not encourage women to attend for a test if the women envisage screening to involve many costs, even if they also believe that screening is a beneficial procedure. These letters and leaflets perhaps should acknowledge the possibility that some women do find the experience of undergoing a smear test costly. Ways to minimise these costs should also be devised in order to avoid the acknowledgement of potential costs of screening simply confirming women's worst fears about it. For example, reassurance should be given in the letters that women will have privacy during the test and a variety of clinic times should be provided, with details of the likely amount of waiting which will be involved. This is important as although the test itself may only take a few minutes there can be long waiting times beforehand.

As well as acknowledging the perceived costs of screening in invitation letters, it is important to ensure that the smear test itself is acceptable to women and convenient. This would be more likely to achieve re-attendance by avoiding a negative experience simply resulting in a reduced likelihood of repeating the behaviour. It is also important to provide what is promised in the invitation letters. Research by Vaile *et al* (1993) found that the type of service women received when attending for a mammogram and how satisfied with this they were influenced their intentions to have a mammogram in the future.

Whilst both perceived costs and perceived benefits would be useful beliefs to target, studies have demonstrated that behaviour is affected more strongly by its short term consequences than by its long term ones (Weinstein, 1988) as would be expected from learning theory, and that individuals tend to give more weight to certain outcomes than to possible ones (Kahneman and Tversky, 1979). The costs of screening are mostly immediate such as emotional distress and pain and inconvenience, although long term effects can occur, e.g. morbidity following treatment. In contrast, the benefits are mostly delayed – such as a reduced chance of illness in the future, although there are some immediate benefits such as a feeling of reassurance even before results are received. In addition, costs are usually certain, for example the time it will take to be screened, whereas benefits are mainly hypothetical as the illness may never occur and therefore the precaution may appear to have been taken for nothing. Consequently costs may be a more important influence on future behaviour than benefits and the perception of these certainly seemed to be the most important for predicting intentions and uptake in the current studies. Attempts are being made to tackle these costs. The UK Department of Health in 1994 reminded GPs how to perform the smear test and arranged for district based training of those health professionals responsible for the cervical screening programme to ensure that the test is as quick and painless as possible. During the procedure women should be treated with respect.

These implications are also likely to be more widely applicable. A belief that the test which is being considered is not 'costly' and a belief that it is beneficial would seem to be important for uptake of many types of screening. However the relative importance of these elements may differ between different screening programmes depending on the type of test involved. For example, some screening tests require an intimate examination, e.g. mammograms and sigmoidoscopies, and the perceived costs of these may be more important than the perceived benefits of the screening. However, other screening simply requires a blood test, e.g. cholesterol screening in a general health check, and the perceived benefits of tests such as this may be more important than perceived costs. Empirical tests of the relative importance of beliefs would be necessary in order to highlight which are likely to be the most effective to be targeted in efforts to increase uptake.

Finally, as the studies in this thesis were based on uptake in an organised programme the above suggestions are based on encouraging attendance under these circumstances. However, the finding in study 2 that frequency of contact with a GP is related to behaviour implies that opportunistic screening of unscreened women would also be helpful, particularly among inner city women who may frequently contact their GP. Although different approaches would be necessary to achieve agreement to an opportunistically offered test, research suggests that acceptance under these circumstances would be high (e.g. Cockburn *et al*, 1990; Marteau, 1993). The role of opportunistic invitations in increasing uptake of tests would also apply to other screening carried out at a GP surgery such as general health screening and hypertension screening. In addition, previous research suggests that the recommendation by a GP may be important for uptake of mammograms and therefore more frequent contact with a GP would provide the chance for women to be reminded of the benefits of having regular mammograms.

11.5 Future research

The results of the current studies identify areas where social cognition models could be developed to improve the prediction and explanation of behaviour. As discussed earlier, the prediction of behaviour from intentions can be weak, suggesting that other factors influencing behaviour may have been omitted from the models used. There is some evidence to suggest that asking women to specify implementation intentions may improve the prediction of behaviour (Gollwitzer, 1993). Gollwitzer distinguishes between goal intentions (I intend to do x) and implementation intentions (I intend to do x when situation y is encountered). Goal intentions encompass the 'what?' of a decision whereas implementation intentions encompass the 'when, where and how?'. Therefore the latter commit an individual to a particular course of action when certain environmental conditions are met, and help translation of intention into behaviour, i.e. goal intentions will not necessarily lead to action, for this the individual needs to have formed implementation intentions. Gollwitzer argues that implementation intentions are particularly important when the behaviour is not habitual and where there is still conflict between acting here or there, now or later etc. Therefore it is plausible that implementation intentions would be a useful additional measure in social cognition models when these are being used to predict non-habitual and infrequent behaviours such as attending for screening.

Gollwitzer's theory provides some explanation as to why some women with strong intentions would attend for a smear test while others would not. Women who have furnished their intentions with implementation intentions (i.e. those who have carried out more 'cognitive work') should be, according to the theory, more successful in achieving their goal, i.e. having a smear test. A series of experiments carried out by Gollwitzer and colleagues demonstrated that behaviour was more likely among individuals who, in addition to goal intentions (to achieve a personal project such as writing a seminar paper), had also formed implementation intentions (stating when and where to get started on the project). Other possible facilitators of the project completion were also assessed and it was found that when those which were significantly related to behaviour were removed from the analysis, such as how close the individuals where to completing the project, those individuals who had made implementation intentions remained the most likely to complete the project.

A variety of reasons are given by Gollwitzer for the superior relationship between implementation intentions and behaviour, among these is the suggestion that if an individual has formed an implementation intention they are less likely to forget that they made an intention to act. In addition, an individual would be more likely to notice relevant cues - referred to as perceptual readiness - if they had made implementation intentions.

In the current studies intention measures were specified as attending for a smear test 'in the future' (study 1) and 'in the next three months if given the chance' (study 2). If women had been asked to provide implementation intentions this may have encouraged them to contemplate how they would practically attend and where they would go. It is plausible that more women who did this would have attended for screening. There are few empirical tests of Gollwitzer's theory in the literature, his own work consists mainly of experimental studies with undergraduates. However, Orbell and Hodgkins (1994) applied the theory to the carrying out of breast self examination among female undergraduates. Half of the women were asked to say when and where they would examine their breasts in the next month (implementation intentions) in addition to all women being asked to specify their intentions to examine their breasts. It was found that 64 per cent compared with 16 per cent who had not made these implementation intentions performed breast self examination, although there was no difference between women for their goal intentions.

It would be interesting to devise a study which incorporated an assessment of implementation intentions, in addition to the more traditional goal intention measures and social cognitions. Regarding screening participation in particular, it would be worthwhile to look at the natural variation in behaviour among women with strong intentions, some of whom go on to attend for screening and some who do not, and to establish whether the presence or absence of implementation intentions may provide a reason for this variation. As these type of measures have not been extensively used with a general population sample, their acceptability could also be established by such a study.

The studies in this thesis also indicate areas where future research could usefully be conducted to increase our understanding of screening behaviour. In a national screening programme, women not attending for screening when they are invited poses a problem for GPs in that if they fail to screen the targeted population they do not receive a payment. The current studies highlight potential predictors of behaviour under these circumstances. However, persistent non-attendance for cervical screening is the main problem in terms of mortality from cervical cancer as there is evidence that even infrequent attendance can protect women from this disease (e.g. Day, 1989; Smith and Chamberlain, 1987). The results of the current studies show that a different type of study design is required to be able to successfully explore the predictors of persistent non-attendance.

Examining the predictors of intentions and behaviour separately for women who have been screened in the past and for those who have never been screened would have two advantages. Firstly, it would allow the identification of factors to target to encourage uptake and secondly, from a theoretical viewpoint, it may show that social cognition models work differently among groups of individuals with differing levels of experience with a behaviour.

Future research could concentrate on identifying women from GP records who have no cytology record despite being eligible for cervical screening. These women could then be contacted to let them know that they would be interviewed in the near future about their beliefs about screening. Any woman not wishing to participate would be asked to 'opt out' of the study. Research by Orbell *et al* (1996) suggests that this method would achieve a reasonable response rate. It would also be useful to identify a group of women just reaching the age at which they would be called up for screening and to explore these women's beliefs, which may be very different to those of persistent non-attenders who have possibly made an active decision to refuse screening. Identifying beliefs which are associated with initial involvement in the screening programme would be very valuable for encouraging continued attendance.

A further study could concentrate on examining the psychological impact of screening in addition to exploring its effect on cognitions, in order to highlight where adjustments should be made to the screening service to avoid any negative impact it may have. Whilst such research has been carried out with women receiving positive smear test results (e.g. Reelick *et al*, 1984), it would also be of interest to explore the psychological impact of screening for all women undergoing screening. Since the introduction of GP payments for screening in the UK (and the observed increase in the number of women being screened) women may undergo screening without being fully informed as to the implications of having a test.

The current studies focused on individual motivations to attend for a smear test, however there is compelling evidence that the behaviour of GPs may also influence screening uptake (e.g. Austoker, 1994a; Bekker and Marteau, 1994). In a future study it would be helpful to explore both the individual motivations of women and to look at the attitudes of the GPs who are delivering the screening service, as such a two sided investigation may explain more variance in screening behaviour.

11.6 Conclusion

Mortality from cervical cancer will be reduced if women attend for cervical screening. In the UK the screening programme itself is being improved to increase its effectiveness in combating the disease. The present studies demonstrate that the application of social cognition models to the prediction and explanation of cervical screening behaviour is useful in terms of highlighting potential ways of encouraging uptake of screening.

Appendices

Appendix 1

A history of the cervical screening programme in the UK

- early 1960s — Individual Health Authorities introduced cervical screening.
- 1967 — Introduction of NHS programme on a national level. This included screening women over 35 years old every five years. Ad hoc arrangements were operated by individual Health Authorities for calling women to be screened and previously screened women were recalled.
- 1973 — The group of women to be screened was extended to include those under 35-years-old who had had more than three pregnancies.
- 1981 — There was a concern about the lack of impact the programme was having on death from cervical cancer.
- 1983 — The national scheme was abandoned in favour of local recall systems.
- 1984 — The group to be screened was extended still further to include women presenting for the first time for contraceptive advice, regardless of their age.
- 1985 — Health Authorities were advised by the Department of Health to plan for the introduction of a computerised call/recall system.
- 1988 — Details of the introduction of the current screening programme were circulated to Health Authorities stating that screening should include all women aged between 20 and 65 and be carried out at intervals of 5 years or less. Advice was given about the operation of the call/recall system. Attention was drawn to quality issues, training requirements and the need for early and effective treatment facilities.
- 1990 — New guidelines were introduced. Target payments were offered to GPs for coverage of population.

Source: National Audit Office 1992

Appendix 2a

An example of a letter sent from the Family Health Services Authority inviting women to attend for cervical screening

Dear [patient's name]

The NHS routine Screening Programme shows that you are now due to have a cervical smear test.

This is a quick and painless procedure which highlights any changes in the cells around the cervix (or neck of the womb). Please would you make an appointment at your doctor's surgery to have this test done. If you would like a female doctor to do this for you, please ask at your surgery for details. Alternatively, your local Well Woman/Family Planning Clinic can carry out the test for you. For details of the clinic nearest to you: phone [number] and ask for Information Service.

If on the other hand you have had a test done elsewhere within the last 5 years of which there is not record, please let me know on (number).

This letter originates from Croydon FHSA, [address and telephone number], who is writing to you on behalf of your own doctor.

Yours sincerely

[Name]
Screening Manager.

Appendix 2b

Leaflet produced by the Health Education Authority sent with the cervical screening invitation letter

(contents only, not layout)

[TITLE]
THE CERVICAL SMEAR TEST: WHY YOU NEED IT

[PAGE 1]
You have been invited to have a cervical smear test. You are being asked to come now either because you have never been tested, or because it is time you had another test.

What is this test? Why do you need it? What happens when you have it? This leaflet gives you the answers.

Cancer of the cervix can be prevented. The signs that it may develop can be spotted in advance, and it can be stopped before it even gets started.

Yet, more than 2000 women in Britain die form cervical cancer every year. Most of these have never had the simple, quick and painless test that might have saved their lives.

All women aged 20 to 64 are now offered the cervical smear test by the NHS

[PAGE 2]
What is the cervical smear test?
It is a test to check the health of the cervix. For most women it shows that the cells are normal and healthy, but for a few women it shows changes in the cells which might develop into cancer if left untreated.

What is the cervix?
The lower part of the womb - often called the neck of the womb. Cells here sometimes change shape and these new shapes are 'abnormal'.

Does the test hurt?
There is no pain. But if you feel tense you might feel some discomfort. If you do feel tense, try to relax during the test by taking slow deep breaths.

Who will carry out my test?
A qualified doctor or nurse will carry out the test.

Will the doctor or nurse be female?
If you would prefer a female, ask when you make your appointment.

[PAGE 3]

Will I have to undress?

You will be asked to undress from the waist down.

What exactly happens during the test?

You will be asked to lie on a couch. The doctor or nurse will then gently insert a small instrument called a speculum into your vagina to hold it open. Then a smooth, wooden or plastic spatula will be lightly wiped over the inside to pick up a few cells from the cervix. These cells will be sent away to be looked at under a microscope.

Is there anything I should do in advance?

You cannot be tested while you are menstruating so be sure to get your appointment before or after your period is due.

What about sex before the test?

If you use a spermicide or a barrier method of contraception or a lubricant jelly, you should avoid sex for 24 hours before the test as the chemicals may affect the smear.

[PAGE 4]

When do I get the results?

When you have the test you will be told how, where and approximately when you will get the results. Before you leave the clinic or surgery make sure that you have been given this information.

What does it mean if I'm called back?

Only very rarely does it mean that you have cancer. It might only be that your sample didn't show up clearly, and another smear is needed. It could point to some slight irregularity or an infection that can be treated easily. It may show abnormal cells which could develop into cancer in the future. In that case, your test is considered positive.

Can anything be done about abnormal cells?

Yes, your doctor will explain what needs to be done. You may be asked to come back for more smear tests. If the results still show abnormal cells you may be asked to go to hospital for a closer examination. The treatment of abnormal cells is quite a minor one and if the treatment is done early enough, it almost always leads to a complete cure.

[PAGE 5]

Should all women have the test?

Yes. Pre-cancer signs can develop in women of any age. If you have passed the menopause you still need to be tested to check that the cervix is healthy. If you have had a hysterectomy or if you have any other doubts about whether you still need to be tested, your doctor will advise you. Cervical cancer is rare in women who have never had sex.

How often should I be tested?
At least every five years between the ages of 20 and 64. More often, if you doctor thinks it's wise. If you are 65 or over you should ask your doctor about how often you need to be screened.

Regular smear tests are important. They pick up the early warning signals that could save your life.

Appendix 3

Social class categories

1	Higher managerial, administrative or professional.
2	Intermediate managerial, administrative or professional.
3 (Non-Manual)	Supervisory or clerical and junior management administrative or professional.
3 (Manual)	Skilled manual workers.
4	Semi-skilled manual workers.
5	Unskilled manual workers.

Appendix 4

Questionnaire used in study 1.

Sections which were added following piloting are denoted by an asterisk. Sections which were deleted following piloting have dotted lines around them.

<u>YOUR COMMENTS</u>

I would be very interested to know about any difficulties that you have in filling out the questionnaire or if there are any questions that do not make sense to you. You can write any comments next to the questions or on this page.

Thank you very much for your help.

<u>WOMEN'S HEALTH</u>

There are 5 sections in the following questionnaire. Please answer all the questions. Please do not ask anyone else what you should put for your answers.

For most of the questions you simply have to tick a box or circle a letter, but please read the instructions at the beginning of each questionnaire.

Please check at the end that you have answered all the questions. All information that you provide is strictly confidential.

Thank you very much for your assistance.

* DATE OF COMPLETION ....

<u>Section 1</u>

<u>Instructions</u>

Please complete the following information about yourself by ticking the boxes and adding extra details where necessary.

[1] How old are you? .... years old

[2] Please tick the box which best describes you.

Black-Caribbean	☐	Pakistani	☐	White	☐
Black-African	☐	Bangladeshi	☐	Other (none of above)	☐
Black-other	☐	Chinese	☐		
Indian	☐	Asian-other	☐		

[3] Please tick the box which best describes your relationship status.

married	☐	single-separated	☐
cohabiting with partner	☐	single-divorced	☐
in a non-cohabiting relationship	☐	single-widowed	☐

[4] Please tick the box which best describes your work status.

unemployed	☐	retired	☐
employed full-time	☐	student	☐
employed part-time	☐	looking after home or family	☐

[5] Please describe what type of paid work you currently, or normally, do (if you have never been employed please leave this blank).

....

....

Section 2

Instructions

Please tick the boxes in response to the following questions. Kindly add more details where appropriate.

[1] Is your GP male ☐ female ☐ *I attend a group practice ☐

[2a] Have you ever had smear test? yes ☐ no ☐ don't know ☐

(If you think you have never had a smear test please go to question 6)

[b] If YES is the person who did your last test male or female?
male ☐ female ☐

[c] Was this person your GP? yes ☐ no ☐

If NO who was this person? (please describe e.g. practice nurse, doctor at family planning clinic, gynaecologist etc.)

____

[3] Have you ever had an abnormal smear test result? yes ☐ no ☐

[4] When was your last smear test? 19 ....

[5] Thinking about your last smear test please circle a number for each part to show how you felt about it.

	not at all				extremely
was it painful?	1	2	3	4	5
was it simple?	1	2	3	4	5
was it embarrassing?	1	2	3	4	5
was it quick?	1	2	3	4	5
was it worrying?	1	2	3	4	5
was it reassuring?	1	2	3	4	5

[6] Do you intend to go for smear tests in the future?

yes, definitely ☐ yes, probably ☐ no ☐

[7] Do most of the female members of your family (e.g. mother, daughter, sister) have regular smear tests?

yes ☐ no ☐ don't know ☐ not applicable ☐

[8] Do most of your friends have regular smear tests?

yes ☐ no ☐ don't know ☐

[9] Does your partner think that it is a good idea to have smear tests?

yes ☐ no ☐ don't know ☐ not applicable ☐

[10] Do you personally know anyone who has had an abnormal smear test result?

yes ☐ no ☐

If yes who are they? (please tick all boxes which apply)

sister ☐ other female relative ☐ acquaintance ☐ other ☐
mother ☐ friend ☐ work colleague ☐

[11] Do you personally know anyone who has had cervical cancer?

yes ☐ no ☐

If yes who are they? (please tick all boxes which apply)

sister ☐ other female relative ☐ acquaintance ☐ other ☐
mother ☐ friend ☐ work colleague ☐

Section 3

Instructions

Please read the following questions and tick the box that is next to the answer that you think is correct.
PLEASE TICK ONLY ONE BOX FOR EACH QUESTION.
Do not worry if you are not sure of the answers, in this case just tick the 'don't know' box.

[1] Where is a woman's cervix?

- ☐ don't know
- ☐ at the opening to her vagina
- ☐ at the neck of her womb
- ☐ around her ovaries

[2] Who should have a cervical smear test?

- ☐ don't know
- ☐ any woman over 20 years old
- ☐ only married women
- ☐ only women over 40 years old

[3] How often should a woman have a smear test?

- ☐ don't know
- ☐ once
- ☐ every 3-5 years
- ☐ every 6-9 months

[4] How can a woman get a cervical smear test?

- ☐ don't know
- ☐ she can ask her GP for a test
- ☐ she can do one herself at home
- ☐ she must visit a hospital

[5] Which of the following describes the purpose of the smear test?

- ☐ don't know
- ☐ it detects abnormal cells
- ☐ it detects cervical cancer
- ☐ it establishes if the woman is a virgin

[6] What does the smear test involve?

- ☐ don't know
- ☐ looking at the woman's cervix
- ☐ cutting away a small piece of cervix
- ☐ collecting cells from the cervix

[7] When can a smear test <u>not</u> be done?

- ☐ don't know
- ☐ when the woman is overweight
- ☐ when the woman is having her menstrual period
- ☐ when the woman is on antibiotics

[8] Which of the following is an early warning signal for cervical cancer?

- ☐ don't know
- ☐ a burning sensation in the vaginal area
- ☐ vaginal bleeding after sexual intercourse
- ☐ vaginal itching

[9] In the last ten years what has happened to the number of cases of cervical cancer?

- ☐ don't know
- ☐ the number has increased
- ☐ the number has decreased
- ☐ the number has stayed the same

[10] Which of the following factors makes a woman more likely to develop cervical cancer?

- ☐ don't know
- ☐ using tampons
- ☐ beginning the menopause before age 40
- ☐ having had unprotected sex with several partners

[11] Does a woman smoking have an effect on her chances of developing <u>cervical</u> cancer?

- ☐ don't know
- ☐ yes, her chances are increased
- ☐ yes, her chances are decreased
- ☐ no, smoking has no effect on her chances

Section 4

Instructions: Part 1

The following statements are about attitudes people have to their health. Please read each statement and then indicate the extent to which you agree or disagree with it by circling a number. If you are unsure please circle number 4. There are no right or wrong answers.

So for example if you strongly disagreed with a statement you would circle number 1, or if you agreed somewhat with a statement you could circle number 5.

	strongly agree						strongly disagree
1. If you don't have your health you don't have anything	1	2	3	4	5	6	7
2. There are many things I care more about than my health	1	2	3	4	5	6	7
3. Good health is of only minor importance in a happy life	1	2	3	4	5	6	7
4. There is nothing more important than good health	1	2	3	4	5	6	7

Instructions: Part 2

Please rank the following things in terms of their importance to you. Write a number between 1 and 10 next to each item to indicate which is most important (1), second most important (2), third most important (3) etc. up until the least important thing to you (10).

A sense of accomplishment	....	A comfortable life	....
A world at peace	....	Equality	....
An exciting life	....	Social recognition	....
Pleasure	....	Salvation	....
A world of beauty	....	National security	....
Freedom	....	Happiness	....
Inner harmony	....	Health	....
Mature love	....	Wisdom	....
Family security	....	Self respect	....

Section 5

Instructions

The following statements are about women's attitudes to cervical cancer and cervical smear tests. Please read each statement and then circle the letter (s) according to how true each statement is of you. If you do not understand some of the statements this does not matter, please just answer as many as you can. There are no right or wrong answers.

So, for example, if you strongly agreed with a statement you would circle the SA letters, i.e. SA

KEY

Strongly Agree	SA
Agree	A
Uncertain	U
Disagree	D
Strongly Disagree	SD

1. My physical health makes it likely that I will get cervical cancer	SA	A	U	D	SD
2. I am afraid to even think about cervical cancer	SA	A	U	D	SD
3. My lifestyle makes it likely that I will get cervical cancer	SA	A	U	D	SD
4. My chances of getting cervical cancer are small	SA	A	U	D	SD
5. I am very afraid of having a smear test	SA	A	U	D	SD
6. I think that cervical cancer is no more serious than other diseases	SA	A	U	D	SD
7. Getting cervical cancer would interfere with my sex life	SA	A	U	D	SD
8. There is nothing I can do to detect cervical cancer	SA	A	U	D	SD
9. I believe that a smear test will only find evidence of cervical cancer when it is too late to treat it	SA	A	U	D	SD

10. I do not see myself getting cervical cancer in the next year	SA	A	U	D	SD
11. Having a smear test is too inconvenient for me	SA	A	U	D	SD
12. If I have regular smear tests cervical cancer will be found before it is advanced	SA	A	U	D	SD
13. Having smear tests prevents future problems for me	SA	A	U	D	SD
14. My friends and family would treat me negatively if I got cervical cancer	SA	A	U	D	SD
15. I believe that my chances of getting cervical cancer are high	SA	A	U	D	SD
16. Having a smear test would not give me peace of mind	SA	A	U	D	SD
17. Having cervical cancer would not endanger my marriage/intimate relationship	SA	A	U	D	SD
18. If I got cervical cancer I would have problems which would last a long time	SA	A	U	D	SD
19. I am flustered whenever I have a smear test	SA	A	U	D	SD
20. Having regular smear tests is not a good idea	SA	A	U	D	SD
21. If I got cervical cancer my whole life would change	SA	A	U	D	SD
22. My feelings about myself would not change if I got cervical cancer	SA	A	U	D	SD
23. Getting a smear test does not interfere with my other activities	SA	A	U	D	SD

24. Getting a smear test is time consuming	SA	A	U	D	SD
25. With my family history I am unlikely to get cervical cancer	SA	A	U	D	SD
26. There is a good possibility that I will get cervical cancer	SA	A	U	D	SD
27. I don't mind giving up my time to have a smear test	SA	A	U	D	SD
28. I am rarely embarrassed when I have a smear test	SA	A	U	D	SD
29. My age makes it unlikely that I will get cervical cancer	SA	A	U	D	SD
30. Cervical smear tests can detect abnormal changes before I would notice any symptoms	SA	A	U	D	SD
31. Cervical cancer is not a hopeless and incurable disease	SA	A	U	D	SD
32. Getting cervical cancer would not be a problem for me	SA	A	U	D	SD
33. I have a lot to gain by having regular smear tests	SA	A	U	D	SD
34. I find that smear tests are painful	SA	A	U	D	SD
35. I worry a lot about getting cervical cancer	SA	A	U	D	SD
36. I do not think that I am the sort of woman who would get cervical cancer	SA	A	U	D	SD
37. I would be reassured about cervical cancer if I had smear tests regularly	SA	A	U	D	SD

38. The way a smear test is performed causes me distress	SA	A	U	D	SD
39. Cervical smear tests are no good at detecting cervical cancer in its early stages	SA	A	U	D	SD
40. I am never made to feel uncomfortable when having a smear test	SA	A	U	D	SD

PLEASE CHECK THAT YOU HAVE ANSWERED ALL THE QUESTIONS

THANK YOU VERY MUCH FOR YOUR HELP

Appendix 5

Letter sent to women requesting their participation in phase I of study 1

(on headed paper)

November 1991

Dear Madam

I am conducting a study about women's health in order that health services for women may be improved.

I am contacting all women over 20 years old in the Croydon area to ask them to complete a set of simple questionnaires. The research is being carried out by City University. This letter has been sent to you via the Croydon Family Health Services Authority and I do not know your name or address as the Authority has kindly posted you this letter on my behalf.

If you would be willing to complete the questionnaires please fill out Part A of the form which is attached to this letter and return it to me in the stamped addressed envelope provided. The questionnaires should only take about 20 minutes to complete and your help would be greatly appreciated. Any information you provide is strictly confidential and will not be disclosed to the Croydon Health Authority or your GP. If, however, you do not wish to complete the questionnaire please return Part B of the form and send it back to me. This is just so that I know how many people have received this letter but do not want to take part. It would be very helpful if you could respond within 10 days.

If you would like any further information about the study, please feel free to give me a ring on 071 477 8000 extn 4593 or write to me at the above address. I will be happy to answer your questions. I thank you for your assistance and look forward to your reply.

Yours faithfully

Alison Bish

enc.

Form attached to request letter

PART A

I would be willing to receive and complete a set of questionnaires about women's health.

Name: Mrs/Miss/Ms/Dr (surname) ....

(first name) ....

Address: ....

....

....

....

Telephone number ....

PART B

I have received the letter about the women's health study but I do not wish to take part in this study.

Appendix 6

Letter sent with questionnaire for phase II of study 1

(on headed paper)

November 1992

Dear (name)

You may recall that towards the end of last year you kindly completed a set of questionnaires about women's health and cervical screening. I would like to thank you very much for your help with this.

The initial stage of the study is now completed, however I am currently recontacting everybody to request that they complete the attached questionnaire in order that the study may be finalised. Once again the questionnaire is concerned with women's health and specifically cervical screening. I am interested to know about women's opinions of the cervical screening service and it does not matter whether or not individual women have attended for a test. May I stress that all information you provide will be treated as strictly confidential and will not be disclosed to your doctor or to the Family Health Services Authority. I would be very grateful if you could fill the questionnaire in for me and send it back in the envelope provided as soon as possible.

Should you have any queries please do not hesitate to contact me on 071 477 8000 extn 4593 or write to me at the above address.

Thank you once again for your continued assistance and I look forward to receiving your completed questionnaire.

Your sincerely

Alison Bish

enc.

Appendix 7

Correlation matrix of variables used in the multiple regression analyses in study 1, showing values of r

	Intentions	Behaviour	Benefits	Costs	Susceptibility	Severity	Knowledge	Ever had test	Has partner
Behaviour	0.462								
Benefits	0.184	0.211							
Costs	-0.232	-0.294	-0.425						
Susceptibility	0.102	0.015	-0.037	-0.051					
Severity	0.047	0.012	0.216	0.216	0.062				
Knowledge	0.017	-0.165	-0.145	-0.145	-0.147	-0.058			
Ever had test	0.602	0.327	0.179	-0.232	-0.030	0.010	0.148		
Has partner	0.203	0.278	0.062	-0.160	0.092	0.023	-0.018	0.185	
Age	-0.186	-0.070	0.030	0.045	-0.302	0.063	-0.137	-0.067	-0.049

Appendix 8

Questionnaire used in study 2

What do you think of cervical smear tests?

This questionnaire is about what you think of cervical smear tests. It does not matter if you have never had a smear test, have only had one or two, or have had several. Some women find it difficult to have cervical smear tests whereas other women do not.

We are interested in:

- how you feel about smear tests
- what makes it easy or difficult for you to have a test
- what you intend to do in the future

The aim of the project is to improve the service for all women.

The questionnaire has 6 sections. Please complete every section. There are no right or wrong answers. All your responses are completely confidential.

The code number at the bottom of the page means that you do not have to put your name or address on your completed questionnaire when you return it. Please send this questionnaire back as soon as possible. Thank you very much.

Please return your questionnaire in the
FREEPOST envelope (no stamp required) to:

Alison Bish
Department of General Practice
FREEPOST
5 Lambeth Walk
London SE11 6BR

Code ....

Instructions for completing this questionnaire

The questionnaire has 6 sections. Sections 1-4 contain a number of statements. Please read each statement and circle the words or letters to indicate how you feel about it.

So, for example if you strongly agreed with a statement you would circle the letters SA, i.e.

[1] My physical health makes it likely that I will get cervical cancer ....SA A U D SD

And if you thought that attending for a smear test would be 'fairly important' you would circle those words i.e.

[1] Attending for a smear test in the next three months if given the chance would be:

(a)	extremely important	fairly important	in-between	fairly unimportant	extremely unimportant

For Sections 5 and 6 you mainly have to tick boxes.

Section 1

Please circle <u>one set</u> of words for <u>each</u> question about your future use of smear tests.

[1] If given the chance, do you intend to attend for a smear test in the next three months?

no, definitely not no, probably not unsure yes, probably yes, definitely

[2] How likely is it that you will attend for a smear test in the next three months if given the chance?

extremely likely fairly likely in-between fairly unlikely extremely unlikely

[3] How difficult would it be for you to attend for a smear test in the next three months if given the chance?

extremely difficult	fairly difficult	not very difficult	not at all difficult

[4] If you were given the chance, how confident are you that you could attend for a smear test in the next three months?

not at all confident	not very confident	fairly confident	extremely confident

[5] How much control do you feel you have over whether or not you attend for a smear test in the next three months if given the chance?

no control	some control	a lot of control	complete control

Section 2

The following statements have been made by women about cervical cancer and having smear tests. Please read each statement and then circle the letter(s) according to how true each statement is for you. If you have never had a smear test please answer imagining how you would feel if you did. Please answer every question.

Key:
strongly agree (SA); agree (A); unsure (U); disagree (D); strongly disagree (SD).

[1] My physical health makes it likely that I will get cervical cancer	SA	A	U	D	SD
[2] My lifestyle makes it likely that I will get cervical cancer	SA	A	U	D	SD
[3] My chances of getting cervical cancer are small	SA	A	U	D	SD
[4] I am very afraid of having a smear test	SA	A	U	D	SD
[5] Getting cervical cancer would interfere with my sex life	SA	A	U	D	SD
[6] There is nothing I can do to detect cervical cancer	SA	A	U	D	SD
[7] I believe that a smear test will only find evidence of cervical cancer when it is too late to treat it	SA	A	U	D	SD

[8] I do not see myself getting cervical cancer in the next year	SA	A	U	D	SD
[9] Having a smear test is too inconvenient for me	SA	A	U	D	SD
[10] If I have regular smear tests cervical cancer will be found before it is advanced	SA	A	U	D	SD
[11] I believe that my chances of getting cervical cancer are high	SA	A	U	D	SD
[12] Having a smear test would not give me peace of mind	SA	A	U	D	SD
[13] If I got cervical cancer I would have problems which would last a long time	SA	A	U	D	SD
[14] I am flustered whenever I have a smear test	SA	A	U	D	SD
[15] Having regular smear tests is not a good idea	SA	A	U	D	SD
[16] If I got cervical cancer my whole life would change	SA	A	U	D	SD
[17] My feelings about myself would not change if I got cervical cancer	SA	A	U	D	SD
[18] Getting a smear test does not interfere with my other activities	SA	A	U	D	SD
[19] Getting a smear test is time consuming	SA	A	U	D	SD
[20] With my family history I am unlikely to get cervical cancer	SA	A	U	D	SD
[21] There is a good possibility that I will get cervical cancer	SA	A	U	D	SD

[22] I don't mind giving up my time to have a smear test	SA	A	U	D	SD
[23] I am rarely embarrassed when I have a smear test	SA	A	U	D	SD
[24] Cervical smear tests can detect abnormal changes before I would notice any symptoms	SA	A	U	D	SD
[25] Getting cervical cancer would not be a problem for me	SA	A	U	D	SD
[26] I have a lot to gain by having regular smear tests	SA	A	U	D	SD
[27] I find that smear tests are painful	SA	A	U	D	SD
[28] I worry a lot about getting cervical cancer	SA	A	U	D	SD
[29] I do not think that I am the sort of woman who would get cervical cancer	SA	A	U	D	SD
[30] I would be reassured about cervical cancer if I had smear tests regularly	SA	A	U	D	SD
[31] The way a smear test is performed causes me distress	SA	A	U	D	SD
[32] Cervical smear tests are no good at detecting cervical cancer in its early stages	SA	A	U	D	SD
[33] I am never made to feel uncomfortable when having a smear test	SA	A	U	D	SD

Section 3

Please read the following statements and then circle the one set of words for each part of the question which best describe your feelings.

[1] Attending for a smear test in the next three months if given the chance would be (please circle your response for each part):

(a)	extremely important	fairly important	in-between	fairly unimportant	extremely unimportant
(b)	extremely harmful	fairly harmful	in-between	fairly beneficial	extremely beneficial
(c)	extremely foolish	fairly foolish	in-between	fairly wise	extremely wise
(d)	extremely safe	fairly safe	in-between	fairly unsafe	extremely unsafe
(e)	extremely good	fairly good	in-between	fairly bad	extremely bad

[2] How would you feel if you did not attend for a smear test in the next three months when given the chance? (please circle your response for each part):

(a)	extremely tense	fairly tense	a bit tense	not at all tense
(b)	extremely guilty	fairly guilty	a bit guilty	not at all guilty
(c)	extremely worried	fairly worried	a bit worried	not at all worried
(d)	extremely regretful	fairly regretful	a bit regretful	not at all regretful

Section 4

Please read the following statements and circle the letter(s) to indicate how you feel about them.

Key:
strongly agree (SA); agree (A); unsure (U); disagree (D); strongly disagree (SD).

[1] Most people who are important to me would think I should attend for a smear test in the next three months if I am given the chance	SA	A	U	D	SD

[2] Most people who are important to me would approve of me attending for a smear test in the next three months if I am given the chance	SA	A	U	D	SD
[3] Most women who are important to me attend for smear tests	SA	A	U	D	SD

[4] How likely it is that the people listed below would want you to attend for a smear test in the next three months, if you were given the chance? (Please circle the letters for each part)

	extremely likely	fairly likely	inbetween	fairly unlikely	extremely unlikely
(a)Your doctor...............................	EL	FL	IB	FUL	EUL
(b)Your friends	EL	FL	IB	FUL	EUL
(c)Your female relatives	EL	FL	IB	FUL	EUL
(d)Your husband/partner (if applicable) .	EL	FL	IB	FUL	EUL

[5] With regard to health matters how much do you want to do what the people listed below think you should? (Please circle the letters for each part).

	not at all	a bit	a fair amount	very much
(a)Your doctor	NAA	AB	AFA	VM
(b)Your friends	NAA	AB	AFA	VM
(c)Your female relatives	NAA	AB	AFA	VM
(d)Your husband/partner (if applicable)	NAA	AB	AFA	VM

[6] If you got a letter inviting you for a smear test how likely would you be to want to discuss whether or not you should attend with the people listed below? (please circle the letters for each part).

	extremely likely	fairly likely	inbetween	fairly unlikely	extremely unlikely
(a)A friend	EL	FL	IB	FUL	EUL
(b)A female relative	EL	FL	IB	FUL	EUL
(c)Your husband/partner (if applicable) .	EL	FL	IB	FUL	EUL

[7] If you got a letter inviting you for a smear test and wanted to discuss it with someone, how willing would the people listed below be to discuss it with you? (please circle the letters for each part).

	extremely willing	fairly willing	inbetween	fairly unwilling	extremely unwilling
(a)A friend ……………………………….	EW	FW	IB	FUW	EUW
(b)A female relative ………………………	EW	FW	IB	FUW	EUW
(c) Your husband/partner (if applicable) .	EW	FW	IB	FUW	EUW

[8] If you were ill how much practical help and support (e.g. help with children, household chores, shopping, cooking etc., lifts to the doctor, financial help) do you think you would get from the following people? (please circle the letters for each part).

	none at all	a bit	a fair amount	a great deal
(a) Your friends………………………………………………………	NAA	AB	AFA	AGD
(b) Your female relatives………………………………………………	NAA	AB	AFA	AGD
(c) Your male relatives …………………………………………………	NAA	AB	AFA	AGD
(d) Your husband/partner (if applicable) ………………………	NAA	AB	AFA	AGD

[9] Do you have anyone other than your GP with whom you can discuss your health?

yes ☐ no ☐

If yes, who is this person? (e.g. partner, friend, mother, etc.) ______________________

[10] Do you have any children? yes ☐ no ☐

[11] How many people are there in total in your household (including yourself)? ______

[12] If you wanted to visit a member of your family how long would you have to travel for?

under half an hour ☐ over an hour but less than two hours ☐
over half an hour but less than an hour ☐ over two hours ☐

[13] How often do you spend time with your partner doing things you enjoy together? (if you do not have a partner please go to question 17).

every day ☐ about once a month ☐
about once a week ☐ about once every 6 months ☐
about once a fortnight ☐ less often than once every 6 months ☐

[14] How often do you spend time with other members of your family doing things you enjoy together?

every day ☐ about once a month ☐
about once a week ☐ about once every 6 months ☐
about once a fortnight ☐ less often than once every 6 months ☐

[15] How many people would you class as your friends?

none ☐ 1 or 2 ☐ 3-5 ☐ 6-10 ☐ 11-15 ☐ 15+ ☐

[16] If you wanted to visit a friend how long would you have to travel for?

under half an hour ☐ over an hour but less than two hours ☐
over half an hour but less than an hour ☐ over two hours ☐

[17] How often do you spend time with your friends doing things you enjoy together?

every day ☐ about once a month ☐
about once a week ☐ about once every 6 months ☐
about once a fortnight ☐ less often than once every 6 months ☐

[18] If you wanted to, how far do you feel you could confide in the following people? (please circle letters)

	not at all	about some things	about most things	about anything
(a) Your friends..	NAA	AST	AMT	AAT
(b) Your female relatives..	NAA	AST	AMT	AAT
(c) Your male relatives	NAA	AST	AMT	AAT
(d) Your husband/partner (if applicable)	NAA	AST	AMT	AAT

[19] Is there anyone you would particularly choose to confide in?

yes ☐ no ☐

If yes, who is this person? (e.g. partner, friend, mother, etc.) ____________________

Section 5

Please answer the following questions about your use of smear tests.

[1] How many smear tests have you had?

none ☐ 1-5 ☐ 6-9 ☐ 10+ ☐

[2] When was your last smear test?

less than 6 months ago ☐ over 3 years but less than 5 years ago ☐
over 6 months but less than a year ago ☐ over 5 years ago ☐
over a year but less than 3 years ago ☐ have not had any ☐

[3] Have you ever had an abnormal smear test result? yes ☐ no ☐

[4] Do you personally know anyone else who has had an abnormal smear test result?

yes ☐ no ☐

If yes who are they? (please tick all boxes which apply)

sister ☐ other female relative ☐ acquaintance ☐ other ☐
mother ☐ friend ☐ work colleague ☐

[5] Do you personally know anyone who has had cervical cancer?

yes ☐ no ☐

If yes who are they? (please tick all boxes which apply)

sister ☐ other female relative ☐ acquaintance ☐ other ☐
mother ☐ friend ☐ work colleague ☐

Section 6

Finally, your response to the following questions about yourself would be very helpful. Please tick the boxes or write on the dotted lines.

[1] How old are you? .... years old

[2] Please tick the box which best describes you.

Black-Caribbean ☐ Pakistani ☐ White ☐
Black-African ☐ Bangladeshi ☐ Other (none of above) ☐
Black-other ☐ Chinese ☐
Indian ☐ Asian-other ☐

[3] Please tick the box which best describes your relationship status.

married ☐ single-divorced ☐
cohabiting with partner ☐ single-widowed ☐
in a non-cohabiting relationship ☐ single-never married or cohabited ☐
single-separated ☐ single-never had a relationship ☐

[4] How old were you when you left full time education? .... years old

[5] Please tick the box which best describes your work status.

unemployed ☐ retired ☐
employed full-time ☐ student ☐
employed part-time ☐ looking after home or family ☐

[6] Please describe what type of paid work you currently, or normally, do (if you have never been employed please go to question 7).

....

[7] How many times have you visited your GP in the last 12 months?

not at all ☐ 2-3 times ☐ 7-12 times ☐
once ☐ 4-6 times ☐ over 12 times ☐

[8] Do you have any long term illnesses? yes ☐ no ☐

Please write the date on which you completed this questionnaire ....../....../96

Thank you very much for your help with this survey.
Please post your questionnaire in the envelope provided

Appendix 9

Letter sent to women with questionnaire for study 2

(date)

Dear Madam

What do you think about cervical smear tests?

In the UK, women between the ages of 20 and 65 are invited every 3 to 5 years to have a cervical smear test, which is free of charge. This is to try to discover and treat any cervical abnormalities early, before they cause ill health. You may have had a smear test yourself at some point.

I am writing to invite you to take part in a study we are carrying out. We are asking our female patients to say what they feel about smear tests and having a test themselves. We hope to find out from this project whether or not women are happy with the service and to use your views to make the service we offer better for local women. The study is being organised by a psychologist, Alison Bish, who is based at the Department of General Practice at UMDS (United Medical and Dental Schools of Guy's and St. Thomas' Hospitals).

I am enclosing a questionnaire for you to complete. I would be very grateful if you could fill this in and send it to the Department of General Practice in the FREEPOST envelope provided in the next two weeks. You do not need a stamp. Your response will be kept confidential. We are interested in the views of every woman and it does not matter if you have never had a smear test or have had several.

If you have any queries about the study please ring Alison Bish on **0171 735 8881 ext. 218** (not the main surgery number).

Thank you very much for your help.

Yours faithfully

(female GP)

Appendix 10

Correlation matrix of variables used in the multiple regression analyses in study 2, showing values of r

	Intentions	Behaviour	Benefits	Costs	Suscept-ibility	Severity	Attitude to behaviour	Injunctive norm	Self efficacy	Ever had test	GP visits
Behaviour	0.220										
Benefits	0.240	0.145									
Costs	-0.306	-0.143	-0.541								
Susceptibility	0.293	0.003	0.155	-0.079							
Severity	-0.518	-0.008	-0.502	0.221	-0.202						
Attitude to behaviour	0.748	0.213	0.480	-0.457	-0.351	-0.117					
Injunctive norm	0.604	0.154	0.294	-0.268	0.319	-0.027	0.729				
Self efficacy	0.322	-0.009	-0.392	-0.467	-0.033	-0.032	0.319	0.246			
Ever had test	0.378	0.167	0.266	-0.332	0.183	0.061	0.309	0.291	0.206		
GP visits	0.225	0.256	-0.034	-0.098	0.171	-0.147	0.118	0.016	-0.072	0.225	
Years of education	-0.259	-0.264	0.015	0.089	-0.216	0.247	-0.233	-0.628	-0.065	-0.062	-0.285

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