REDUCING COMMUNITY SMOKING PREVALENCE: A BEHAVIOURAL-EPIDEMIOLOGIC PERSPECTIVE.

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For Stanley George Joseph Brown.

This work contains no material which has been accepted for the award of any other degree or diploma in any university or tertiary institution and, to the best of my knowledge and belief, contains no material previously published or written by another person, except where due reference has been made in the text.

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ABSTRACT

High levels of smoking prevalence are a substantive public health problem in most industrialised countries. Psychological perspectives and theories may be relevant to the identification of factors which influence population smoking prevalence. Such theories are, however, designed for application at an individual, not a population level. Behavioural epidemiologic research using population surveys and intervention trials may assist to examine psychological factors which influence health-related behaviours in specific populations. In this thesis, issues involving the collection of psychological data which are representative of the population under study, the identification of variables associated with future cessation, the testing of psychological variables in a population context, the integration of psychology with perspectives from other disciplines, and the study of intervention techniques applicable to large populations are examined.

Six empirical studies were conducted. Study 1 found that a population-representative sample of smokers exhibited different characteristics to a self-selected sample, as they were generally lighter smokers and were less likely to be dependent upon nicotine. This suggests possible limitations on the generalisability of psychological theories which have been established using such samples. Study 2 involved the examination of variables such as intention to quit, readiness to quit and confidence upon the initiation and outcome of future cessation attempts in a population-representative sample. These variables were predictive of future behavioural change - a finding which supports their use as outcome indicators in cross-sectional population studies used in this thesis. Study 3 showed associations between the number and duration of past cessation attempts and smokers' confidence and their perceptions of difficulty of future cessation. Campaigns which encourage immediate cessation attempts in smokers may be counter-productive for people who have previously shown an inability to stop, and a range of intervention options for these smokers is discussed. Study 4 showed small but significant associations between social status and some psychological variables which are predictive of future cessation, suggesting that broad social factors may have a role in influencing smoking behaviour by influencing characteristics of smokers and their environments. Studies 5 and 6 examined smokers' adherence

to the content of self-instructional cessation materials. Smokers did not utilise a large amount of these materials' content, and an intervention based upon the use of telephone prompts improved neither compliance nor the likelihood of cessation.

These findings are viewed as supporting use of behavioural epidemiology as a framework for the integration of psychological theory into public health research. The theoretically-derived variables were shown to have some efficacy in the prediction of smoking behaviour, and may be used for targeting sub-groups of smokers, the identification of processes which maintain smoking and in the design of interventions. It is argued that the utility of a behavioural epidemiologic framework may be enhanced by the use of theories which stress the actions of social and contextual factors on smoking behaviour. The potential of behavioural epidemiology to assist in the alleviation of behaviourally-based public health problems is discussed.

REDUCING COMMUNITY SMOKING PREVALENCE: A BEHAVIOURAL EPIDEMIOLOGIC PERSPECTIVE.

OVERVIEW

Public health approaches to smoking control aim to reduce the prevalence of cigarette smoking in the population and defined sub-populations. The conduct of mass-reach strategies which encourage and support voluntary smoking cessation is an important part of this endeavour. As voluntary smoking cessation is largely an issue of behavioural self-control, psychological theories and perspectives can make important contributions to reducing smoking prevalence. However, there is a need to recognise that the study of behaviour within a large population may require different conceptual frameworks to those used for individuals and small groups. Behavioural epidemiology involves the use of epidemiological perspectives and techniques to study the causes and progression of behaviourally-related health problems within populations. This includes the use of population sampling techniques, the study of factors which may explain behaviours at a population level and the development of effective minimal-contact intervention techniques. These strategies may assist in the challenging task of integrating psychological theory into a population context. This thesis will address the theoretical, methodological and practical implications of studying smoking cessation in a population, as opposed to an individual, context.

Much of the research in the smoking cessation area has used clinical or other opportunistic samples which may not be representative of the general smoking population. Interventions with populations may be better served if they are developed from theories which have been tested on representative samples. Study 1 examined characteristics of a sample of volunteers for a self-instructional smoking cessation programme and compared them with characteristics of a population-representative sample. The volunteer sample consisted of heavier smokers who were more likely to experience difficulty stopping, but they had made more attempts to stop smoking and may have been more motivated to stop. Future research

would benefit from the use of samples which are properly representative of the populations under study.

One problem with research on population-representative samples is that surveys are usually cross-sectional and do not allow for the prediction of short or long term cessation. The identification of measures which are associated with future cessation, and may serve as outcome variables is important. Study 2 used data from a 12-month longitudinal population survey to examine the associations of smokers' readiness to quit, intention to quit and confidence in being able to stop, with the initiation and outcome of subsequent cessation attempts. A measure of behavioural intention was shown to predict whether a cessation attempt was subsequently made, but did not predict the outcome of that attempt. Measures of confidence and readiness to quit predicted both the initiation and outcome of cessation attempts at a 12-month follow-up. Due to their association with future smoking status, it was concluded that confidence and readiness to quit could serve as dependent variables in cross-sectional population surveys. They could also be useful as outcome criteria for intervention programmes. The impact of a broad population-based intervention, on each individual smoker, is not great, but may contribute to changes in attitudes and intentions which can lead to future cessation. Such changes, if they can be shown to lead to future cessation, can identify potentially important outcome criteria for mass-reach interventions. The theoretical significance of these results was also discussed

Mass-reach strategies rely upon stimulating cessation attempts in smokers. Designers of these programmes should consider the ability of smokers to respond to prompts to stop smoking and the consequences of them doing so. Unsuccessful attempts to stop smoking may result in a reduced likelihood of future cessation as confidence is undermined, although there has been some speculation that smokers may learn from unsuccessful attempts. Data from a cross-sectional population survey were used to examine these propositions in Study 3. Lower levels of confidence in being able to stop and greater perceptions of difficulty in future cessation were associated with five or more cessation attempts and the inability to maintain non-smoking for a period of more than one week. These smokers were also more likely to

attribute relapse to symptoms of nicotine dependence, although they were not heavier smokers. It is concluded that these smokers may form a subgroup who require special attention, but interventions which encourage them to make premature cessation attempts may not be productive.

Low social status is strongly associated with the likelihood of a person being a smoker and inversely associated with the likelihood of a given smoker stopping. In Study 4, this was shown to be the case, particularly in males of less than forty years of age. Study 4 was also designed to test some hypotheses explaining why differences in social status are associated with differences in smoking behaviour. A number of attitudinal, behavioural and environmental variables known to be associated with smoking cessation were compared across categories of occupational prestige and educational attainment, two measures of social status. The associations, whilst significant, were very small. The expectation of a full reduction of smoking-related risk within three years of cessation was lower for all respondents in low social status groups, and males of less than forty and of a low social status were more likely to experience smokers in their immediate social environment. Whilst these associations do not prove that these variables mediate the effects of social status, there is a possibility that this is the case. Other variables which may explain social status gradients in smoking cessation were suggested.

Self-instructional smoking cessation materials represent a means whereby detailed behavioural smoking cessation programmes can be disseminated on a mass-reach basis. Chapter 4 presented a review of randomised, controlled studies which showed that such materials are successful at helping smokers to stop, although it is not clear as to why they are effective. Study 5 (Chapter 9) examined the extent to which smokers used specific techniques presented in a self-instructional programme. There were low levels of adherence to the techniques, although there was some evidence that the use of some techniques was associated with smoking cessation. An intervention study (Study 6) was then conducted to examine the effects of scheduled telephone contact upon the effectiveness of self-instructional materials. It was thought that telephone contact may facilitate effective adherence to the techniques in the

manual if a facilitator prompts and explains their use. After twelve months there were no significant differences in smoking behaviour between a telephone-contact and a manual-only conditions. This failure to demonstrate increased effectiveness for the telephone contact condition may have been due to a number of factors such as the inability to prompt a high level of adherence to the manual's contents. However, a number of recent studies have shown that conditions emphasising social support or other aspects of social facilitation are capable of increasing cessation rates compared to manual-only conditions.

Psychologically-derived variables were shown to be meaningfully associated with smoking behaviour in a population context. It was argued that a behavioural epidemiologic framework may assist in overcoming problems with research designs, help to emphasise the role of contextual factors such as social status in the behavioural change process, and provide an interface with public health research. A case was made for the expansion of research into two areas. Firstly, the range of psychological theories applied to the problem of smoking cessation in populations should be extended to incorporate analyses of person-environment interactions and broader social and cultural perspectives. Secondly, there is a need for intervention studies which test the usefulness of theoretical perspectives. Applications of the current findings to mass-reach intervention and the future of behavioural epidemiology were also discussed.

CHAPTER 1

CIGARETTE SMOKING AS A PUBLIC HEALTH PROBLEM

In most developed countries, the prevalence of cigarette smoking is a serious public health problem. The content of this chapter will address the magnitude of this problem, review current methods of increasing the incidence of voluntary smoking cessation, and argue that perspectives from psychology are valuable in the study of factors affecting smoking behaviour within populations.

The remainder of the thesis will be devoted to the argument that such perspectives are most useful in the study of voluntary smoking cessation within populations, if they are tested in a population - as opposed to an individual - context. Behavioural epidemiology involves the study of factors which affect the prevalence health-related behaviours (and their consequences) in populations and provides a useful framework for the integration of psychological theories into a public health framework.

1.1. Smoking and health

There is evidence from epidemiological, clinical and animal studies that cigarette smoking contributes to premature mortality and morbidity in smokers (U.S. Department of Health, Education and Welfare, 1979). Large scale, prospective epidemiological surveys have shown that smokers are more likely than non-smokers to suffer from life threatening disorders such as coronary heart disease (CHD), stroke, complications of peripheral vascular disease, respiratory tract cancers, chronic bronchitis, asthma and emphysema (Doll & Peto, 1976; Rogot & Murray, 1980; Shinton & Beevers, 1989). In 1985, 31.6% of male and 13.8% of female Australian deaths, between the ages of 35 and 69, were attributable to smoking (Peto, Lopez, Boreham, Thun, & Heath, 1992). For the state of Western Australia (population approx. 1,000,000) it has been calculated that the number of deaths attributable to smoking during the period of 1979 to 1983 was 2,408 (of a total 9,540 deaths) for cancer, 4,898 (of

19,110) for circulatory disease and 1,200 (of 1,658) for bronchitis and emphysema (Holman, & Shean, 1986). In Australia, during the year 1978 (when the population was approximately 15,000,000), smoking contributed to the loss of 160,000 years of life compared to traffic casualties which contributed to the loss of 150,000 years (Armstrong, 1981). This made smoking the greatest preventable cause of death for that year.

Smokers are also more likely to suffer incapacity from what are normally non-fatal conditions such as peripheral vascular disease, reduced pulmonary function, resistance to infectious disease and ulcers of the digestive tract (Doll & Peto, 1976; Rogot & Murray, 1980; Kikendall, Evaul, & Johnson, 1984). Maternal smoking during pregnancy has been associated with low birthweight (less than 2,500 grammes), perinatal morbidity, spontaneous abortion and congenital malformation (Gritz, 1980).

Passive smoking, or the inhalation of 'side stream' smoke, by non-smokers is associated with adverse health consequences. Hirayama (1981, 1984), Correa, Pickle, Fantham, Lin, and Haentsze (1983), Humble, Samet, and Pathak (1987) and Trichopolous, Kolondidi, and Sparros (1983) have all found elevated lung cancer risks among non-smokers whose spouses smoke compared to those whose spouses do not. Furthermore, the risk is proportional to the smoking rate of the spouse. Non-smokers whose spouses smoke also face a greater risk of death from coronary heart disease and respiratory disorders than matched non-smokers whose spouses do not (Sandler, Comstock, Helsing, & Shore, 1988).

Some of the health risks of smoking are reduced by its permanent cessation. Lung function has been shown to improve after three months abstinence (Emmons, Weiner, Foster, & Collins, 1992). Findings from the Multiple Risk Factor Intervention Trial (a ten-year longitudinal study which included 12,866 smokers) suggest that smoking cessation decreases the risk of death from coronary heart disease but not lung cancer (Multiple Risk Factor Intervention Trial Research Group, 1982; Ockene, Kuller, Svendsen, & Meilahn, 1990). A relative CHD mortality risk of 0.63 was evident after one year of cessation and, 0.38 after three years. The three year relative-risk figure represents a reduction of CHD risk in the order

of almost two thirds. The long development time of lung cancer (about 20 years) and its rarity compared to CHD means that larger scale, longer term studies with greater statistical power are needed to demonstrate that changes in lung cancer incidence are associated with changes in smoking behaviour.

1.2 Smoking prevalence in Australia

Population surveys have shown a progressive decline of adult smoking prevalence in Australia and other western countries since 1955, although there have been recent increases in the smoking prevalence of women in the 20 to 24 age group (Pierce, 1989). Smoking prevalence is, however, still high. The most recent national survey, in 1989, showed that 30.2% of males and 27% of females smoke (Hill, White, & Gray, 1991). In South Australia the South Australian Health Commission has implemented a number of population prevalence surveys. The 1989 survey showed a smoking prevalence of 32.5 % for males and 22.7% for females (Wakefield & Wilson, 1991). In numerical terms, these percentages lead to a figure of between three and four million Australians who smoke. These statistics are similar to those obtained in other English speaking nations and in some parts of western Europe (Pierce, 1989).

The downward trend in smoking prevalence is not consistent throughout society. Smoking prevalence is declining at a faster rate in the general population than it is in groups of a low social status. Furthermore, members of these groups are, on average, heavier smokers than members of the general population and are less likely to be ex-smokers (Hill, White, & Gray, 1991). As a result, social class gradients in mortality from heart disease, cerebrovascular disease, respiratory tract cancers, bronchitis, emphysema and asthma are, in part, attributable to smoking (McMichael, 1985). In the U.S.A., projections to the year 2000 suggest that smoking will be, almost exclusively, practised by socially disadvantaged groups (Pierce, Fiore, Novotney, Hatziandreu, & Davis, 1989). There have also been recent increases in smoking prevalence among women between the ages of sixteen and thirty. Smoking

prevalence among this group has increased from 37.6% in 1974 to 40.6% in 1986 (Pierce, 1989) and is still high (Hill, White, & Gray, 1991).

1.3 Population approaches to smoking cessation

The objective of this thesis is to critically examine the role of psychological theory in understanding factors which maintain smoking behaviour in a population and understanding the effects of mass-reach smoking-cessation strategies. Currently, most applications of psychological theory to smoking cessation have been directed at the level of the individual smoker and not to large populations of smokers, although this is now starting to change (Lichtenstein & Glasgow, 1992). However, the problem of population smoking prevalence is unlikely to be adequately addressed by intensive intervention with individual smokers, as such methods are not cost-effective. Mass-reach smoking cessation methods, however, are designed to provide minimal, but effective, services to large numbers of smokers. Altman, Flora, Fortmann, and Farquhar (1987) compared the cost-effectiveness of treating smoking behaviour using a smoking cessation class, an incentive-based competition and printed self-instructional materials. The self-instructional approach was shown to cost less for each successful quitter, followed by the competition and, finally, the class. For this reason, mass-reach, minimal contact interventions have been used to influence the prevalence of smoking and other health-related behaviours in large populations (Winett, King, & Altman, 1989).

Mass-reach interventions are designed to persuade, encourage and assist smokers to make cessation attempts. These interventions include the use of regulatory procedures traditionally associated with public health intervention such as taxation increases (Warner, 1986), advertising restrictions (Chapman & Reynolds, 1987) and sales restrictions (Wilson, Wakefield, Esterman, & Baker, 1987). These measures have been used to decrease the consumption of cigarettes by affecting price, supply and consumer demand. Because of what is known about the health effects of passive smoking (see section 1.1) smoking has recently been prohibited in some Australian public buildings and worksites (Borland, Chapman, Owen, & Hill, 1989).

The focus of this thesis is on the use of psychological theory to better understand factors affecting smoking prevalence and the impact of strategies aimed at stimulating, encouraging and supporting volitional smoking cessation. The focus upon strategies based on volitional approaches to cessation acknowledges the importance of psychological factors in smoking behaviour (Glynn, Boyd, & Gruman, 1990). Such strategies use minimal-contact intervention techniques aimed at reducing smoking prevalence in target populations by a combination of persuading people to attempt cessation, providing them with minimal levels of assistance to do so, and attempting to modify social values and attitudes related to smoking. For example, the mass media have been used to provide information on the health consequences of smoking, to conduct cessation campaigns and to provide some level of instruction in behavioural-change techniques (Cummings, Sciandra, & Markello, 1987; Flay, 1987). Programmes have also been administered using existing community networks such as general practitioner consultations (Richmond & Heather, 1990) and worksite interventions (Fielding, 1991).

Social marketing perspectives have been used to provide a conceptual and strategic framework for the development and delivery of programmes aimed at encouraging smoking cessation. Marketing techniques are used to determine the structure of the service delivery organisation and to direct its operations in a way that reflects consumer needs. Lefebvre and Flora (1988) argue that the consumer may be best seen as an independent entity who is able to exchange resources for gains such as future improvements in health (in the smoking case these resources will involve time, effort and the experience of physical discomfort rather than money). The social marketing view of health promotion emphasises a client-driven approach, as services are seen to be operating in an environment where they must compete for consumers' attention, time, effort and loyalty. The important task, for the practitioner, is to determine the community's actual and perceived needs, to design services which address those needs and to present the services in a cost-effective manner (Donovan, Jason, Gibbs, & Kroger, 1991; Hastings & Haywood, 1991; Ling, Franklin, Lindsteadt, & Gearon, 1992; Donovan & Owen, in press). When applied to smoking, the social marketing perspective emphasises the importance of research on characteristics of the client group such as their

readiness to stop (Beiner & Abrams, 1991), effective methods of gaining that group's participation (Owen & Davies, 1990), personal and social barriers to change (Green, 1984), appropriate goals (Winett, King, & Altman, 1989) and the efficacy of various behavioural change agents (Flay, 1986). By treating the consumer as an active, rather than passive, entity, social marketing approaches add another dimension to traditional public health models which tend to rely upon legislative restriction rather than stimulating volitional behavioural change. One objective of this thesis is to identify key target groups within the population who are most in need of intervention, and to identify processes which may influence the maintenance and change of smoking behaviour in these groups.

The implementation of well-conducted mass-reach cessation programmes may reduce smoking prevalence in target groups by up to twenty per cent, although a figure of ten per cent would usually be seen as representing a successful outcome (Flay, 1987; Richmond & Heather, 1990). Minimal intervention procedures are more cost-effective than either group or individual therapy (Altman, Flora, Fortmann, & Farquhar, 1987) and may also contribute to the maintenance of smoking cessation because participants are more likely to attribute behavioural change to their own efforts (Harackiewitz, Sansone, Blair, Epstein, & Manderlink, 1987). Most smokers do, in fact, stop smoking by themselves rather than use a formal programme and there is also evidence that a large number of smokers in the community actually prefer to stop smoking under their own direction (Owen & Davies, 1990). Owen and Halford (1988) suggest that psychologists working in the smoking area should give priority to using their skills and knowledge for the development of mass-reach programmes to influence the behaviour of a greater number of smokers. Subsequent chapters of this thesis critically examine the role of psychological theory in the understanding of mass-reach interventions which attempt to increase the incidence of smoking cessation. Current theoretical, methodological and practical difficulties in the application of psychological theory to mass-reach contexts will be examined.

Currently, mass-reach smoking cessation programmes have been implemented in three major settings: 'Quit' campaigns promoted through the mass media, structured intervention

programmes administered through worksites and structured cessation programmes administered during the course of general practitioner consultations.

1.3.1 Community-wide smoking cessation campaigns

Large-scale smoking cessation campaigns are employed to reduce the prevalence of smoking in defined populations. The aims of these campaigns are; to increase public knowledge of the health consequences of smoking, to teach behavioural skills relevant to smoking cessation, to stimulate the initiation of cessation attempts and to create physical and social environments which are supportive of cessation attempts (Winett, King, & Altman, 1989).

Use of the mass media has been a common feature of the implementation of quit campaigns (Flay, 1987) because it provides a vehicle for the presentation of organised health promotion campaigns to large numbers of people. The main media involved in these programmes are electronic (radio and television) and print (newspapers and magazines) media. A recent study in the U.S.A. has shown that televised interventions can be directed at low income, non-European smokers; groups who are normally difficult to recruit into other cessation programmes (Ramirez & McAlister, 1988; Warnecke, Flay, Kviz, Gruder, Langenberg, Crittenden, et al., 1991). It has also been shown that such programmes are equally effective at stimulating cessation in people of a low as well as a high educational background (Macaskill, Pierce, Simpson, & Lyle, 1990).

Flay (1987) reviewed the evaluations of 40 mass media based programmes and concluded that the programmes were generally effective at stimulating attitude change, cessation attempts and modest rates of actual smoking cessation compared to control conditions. However, Flay points out that few specific factors important for programme effectiveness have been identified, limiting the development of an adequate theoretical framework for these interventions. There is a need for research which systematically varies the nature of messages, the nature of audiences and the media used to present campaigns.

Quit campaigns also feature a number of activities designed to enhance the effects of media campaigns by providing assistance to smokers who have decided to attempt cessation. The use of printed self-instructional behaviour-change materials is now common in smoking cessation campaigns (Cohen, Lichtenstein, Prochaska, et al., 1989). The effectiveness of these materials has been enhanced by telephone counselling (Ossip-Klein, Giovino, Megahed et al., 1991; Brown & Owen, 1992), providing personal feedback on the participants' progress (Ossip-Klein, et al., 1991) and incentive-based community competitions (Elder, McGraw, Rodrigues, Lasater, Ferreir, et al., 1987).

Findings from evaluations of large scale smoking cessation programmes which use a wide variety of methods are now available. The more useful (from a research point of view) studies compare intervention conditions in matched but separate communities, so as to determine the efficacy of each component (Flay, 1987). Meyer, Nash, McAlister, Maccoby and Farquhar (1980) used a quasi-experimental design to compare an intensive behavioural intervention plus media condition, targeting a range of CVD risk behaviours (including cigarette smoking) in high-risk populations, with media-only and non-intervention conditions. One of three small Californian towns was assigned to each condition. The intensive intervention condition involved a personal visit by a physician and subsequent personal and group training programmes. This was administered to a randomly-chosen sub-sample in one of the towns to enable a comparison within the town itself, as well as between towns. The results showed that participants in the intensive intervention condition experienced greater reduction in risk factors than the media-only condition who fared better than the control. Fifty per cent of smokers in the intensive intervention condition were abstinent after three years which was a superior rate to the media-only condition (11.3%). This study represents an early trial with an intervention strategy that may be minimally cost effective given the high level of resources needing to be spent on each smoker. In a later intervention, the same research team (Farquhar, Fortmann, Flora, et al., 1990) conducted an education campaign in two communities and compared them to two communities that did not receive the campaign. The campaign involved comprehensive electronic and print media interventions, education classes and the provision of self-instructional materials. After a five year follow-up smoking

prevalence had fallen by 7.7% in the intervention group, a significantly greater reduction than the 3.7% reduction observed in the control.

A mass-reach programme to modify behaviourally-related CHD risk factors (including cigarette smoking) was implemented in North Karelia, a province of Finland (Puska, Nissinen, Tuomilehto et al., 1985). The intervention programme included radio and newspaper advertising, training health professionals and community leaders to advocate healthy lifestyles and the use of community organisations to promote cardiovascular health. Compared to a matched control community the intervention succeeded in decreasing the prevalence of almost all behaviourally related risk factors and associated morbidity. A greater reduction of smoking prevalence, smoking rate amongst continuing smokers and the number of cessation attempts was noted for the intervention compared to the control community. Over a ten year period, smoking prevalence in males reduced from 52% to 38%, although a slight increase was observed for females.

Egger, Fitzgerald, Frape et al., (1983) evaluated a smoking cessation campaign conducted in northern New South Wales, Australia. In one large country town, they implemented a mass media anti-smoking campaign and combined it with a number of community events. The community events involved the distribution of self-instructional materials, cessation groups, a quit-line and organised fun runs. They compared this condition with two other country towns, one of which received the media campaign only whilst the other received no intervention at all. During the year of the campaign smoking prevalence declined in the two intervention conditions compared to the control. At a one year follow-up smoking prevalence in the two intervention conditions was still lower than in the control but after three years, only the media plus community events condition had a lower prevalence than the control. Overall three year reductions in prevalence in the media plus community intervention condition ranged from 6% to 15.7%, 6% to 11% in the media only condition, and 2% to 5% in the control. The results of this study suggest that mass media interventions can be successful at influencing population behavioural change and that such changes are maximised if the media campaigns are augmented with community programmes.

1.3.2 Worksite smoking-cessation interventions

Worksites have often been used as settings for mass-reach smoking-cessation programmes (Fielding, 1991). They may be seen as homogenous communities with their own social and professional norms, values and communication networks. Such factors may be favourable toward programme publicity, recruitment and retention (Hallett, 1986). The potential of worksite smoking cessation programmes may be great if standardised, easy to administer, intervention packages are developed. Additionally, worksites provide ready access to lower socioeconomic groups; members of which are more likely to smoke and to suffer from smoking-related diseases (McMichael, 1985).

Fisher, Glasgow and Terborg (1990) conducted a meta-analysis of findings from 20 randomised and controlled evaluations of worksite-based cessation programmes, showing an overall cessation rate of 13% after 12 months, which was significantly higher than various control conditions. Their review showed that the difference between treatment and control conditions was greater for more intensive interventions, especially those based upon smoking cessation groups. The provision of nicotine gum augmented initial cessation rates but not long term abstinence rates. In one of the largest studies currently available, Breslow, Fielding, Herrman, and Wilbur (1990) conducted a quasi-experimental evaluation of the programme conducted at the Johnson and Johnson corporation. In four treatment worksites they offered 2,600 staff an individual health appraisal, three hour seminar on cardio-vascular health and voluntary treatment programmes including a smoking-cessation course. The control condition was composed of 1,700 staff at three worksites who received only the appraisal and the seminar. After two years, 22.6% of smokers in the treatment sites were abstinent compared to 17.4% of the control sample. Of those staff known to have a high risk of CHD, 32% of the treatment sample were abstinent and 12.9% of the control sample. Programmes may be designed to take advantage of inter- and intra-corporate rivalry. Klesges, Vasey and Glasgow (1986) implemented smoking cessation competitions between various sub-groups within branches of a large bank. They compared this with branches without the competitions. They found superior levels of recruitment to the competition condition (88% of smokers versus

53%) and, after a 6 month follow-up, a cessation rate of 16% in the competition condition compared to 7% in the control.

1.3.3 Programmes administered through medical consultations

When attempting to stop , 23.7% of South Australian smokers have reported that they would prefer to participate in a programme administered by their own doctor or another health professional (Owen & Davies, 1990). A study from New Zealand suggests that health information delivered by a general practitioner is seen to be more reliable than that gained from other sources (Worsley, 1989). If standardised, easy to administer interventions can be developed for use in medical practice there is a potential for large numbers of smokers to be helped, as most Australians are in contact with their general practitioner at least once a year (Bridges-Webb, 1987). A survey conducted in the U.S.A. has suggested that general practitioners would be willing to implement smoking cessation programmes with their clients (Rimer, Strecher, Keintz, & Engstram, 1986).

Medical practitioners may be taught to offer a range of behavioural interventions to their clients. These may include the provision of information on the health consequences of smoking, brief counselling, self-instructional materials and the prescription of nicotine gum. There have been several comprehensive reviews of studies of minimal interventions by general practitioners. Generally, the effectiveness of such interventions is related to their intensity, complexity and comprehensiveness (Kottke, Battista, De Friese, & Brekke, 1988; Richmond & Heather, 1990). Nicotine gum has been shown to enhance the effectiveness of behaviourally based interventions, but intense supervision of smokers using gum is required to ensure success in a general practice setting (Lam, Sze, Sacks and Chambers, 1987).

1.4 Using psychological theory to improve the effectiveness of mass-reach interventions

Mass-reach interventions rely upon the use of minimal contact procedures to facilitate self-directed behavioural change. Contact with, or supervision of, smokers making cessation

attempts is difficult due to the large numbers involved (Warnecke et al, 1991). This differentiates mass-reach methods from other, more common, modes of psychological intervention such as individual or group work formats. Mass-reach methods do not often enable the practitioner to directly assess, monitor, counsel and teach skills to smokers, nor do they offer opportunities to tailor programmes to individual needs (Owen & Lee, 1986a). The practitioner is not able to assume a reasonable level of commitment to change in the target group. Because of this, psychologists who work in population contexts depend upon psychological theory for guidance regarding factors contributing to smoking behaviour in the target population and appropriate intervention strategies.

In 1982 Matarazzo advocated that psychologists should contribute their theoretical knowledge to the development of mass-reach public health interventions. During the 1980s the use of psychological theory in the design and evaluation of these intervention procedures has increased (Owen & Lee, 1986b) leading to increases in their sophistication and effectiveness. However, mass-reach, minimal-contact interventions stimulate cessation rates of between five and ten per cent which, although representing a large number of smokers, are quite low. It has also been shown that smokers who do manage to stop smoking tend to be those who smoked fewer cigarettes, were less dependent upon nicotine and more confident of success and, therefore, more likely to stop without the assistance of a programme (Glasgow, Klesges, Mizes, & Pechacek, 1985). Improvement of these cessation rates is possible and a priority for the reduction of smoking prevalence (Glynn, Boyd, & Gruman, 1990). There are two aspects to this problem; interventions should aim to increase the number and motivation of smokers who wish to stop and to increase the percentage of those who succeed when they attempt cessation. Priority must be given to increasing the effectiveness of mass-reach smoking cessation programmes.

One strategy for augmenting the effectiveness of mass-reach programmes is to improve the quality and breadth of interventions directed at assisting smokers who are considering smoking cessation (Glynn, Boyd, & Gruman, 1990). Bettinghaus (1986) comments that mass-reach health promotion programmes are most effective at stimulating

changes in attitudes, cognitions and emotions toward smoking. It is then assumed that those smokers will be more likely to attempt to change their smoking behaviour in order to be consistent with their new attitudes. Empirically, Bettinghaus points out, attitude and behavioural change are only weakly related. This explains why interventions emphasising attitude change lead only to minor effects upon actual smoking behaviour.

Prochaska and his colleagues (Prochaska & Di Clemente, 1983; Prochaska, Velicer, Di Clemente, & Fava, 1988; Di Clemente, Prochaska, Fairhurst, Velicer, Velasquez, & Rossi, 1991; Prochaska, Di Clemente, & Norcross, 1992) propose that people progress through five main stages of smoking cessation: precontemplation, contemplation, preparation, action and maintenance. Precontemplators are smokers who report that they are, at the time, giving no thought or consideration to attempting cessation. Smokers at the contemplation stage are considering attempting cessation whilst those at the preparation stage are making active preparations to stop smoking. The action stage is composed of smokers who are currently stopping, about to do so or those who have recently stopped. Finally, smokers must face a maintenance stage where they may either remain non-smokers or resume smoking. Prochaska and his colleagues have studied relationships between stage membership and the nature of cessation strategies adopted by smokers making self-initiated cessation attempts. Using prospective research designs they have identified psychological strategies and techniques which are associated with smokers' movement through each of the stages. They argue that different strategies and techniques are required for success at each stage, and that progress through each of the stages may involve qualitatively different psychological processes. Movement between precontemplation, contemplation and preparation stages is associated with searching for, finding and evaluating information concerning the effects of smoking and making decisions to stop smoking (Prochaska, Di Clemente, Velicer, Ginpil & Norcross, 1985; Velicer, Di Clemente, Prochaska & Brandenburg, 1985; Beiner & Abrams, 1991). Movement through the later stages of the process is associated with the acquisition of behavioural skills such as stimulus control, contingency management and seeking social support (Prochaska et al., 1985; Mermelstein, Cohen, Lichtenstein, Baer, & Kamark, 1986; Swan & Denk, 1987, Ahijeuych & Wewers, 1992).

According to this model, attitude change will be only weakly related to behavioural change unless specific strategies are aimed at enhancing progress through the action and maintenance stages of change. Glynn, Boyd and Gruman (1990) strongly recommend that mass-reach interventions be targeted to all stages in the behavioural change process. However, mass-reach interventions may not be as well equipped to facilitate actual behavioural change or to assist recent ex-smokers prevent relapse as they are to stimulate cessation attempts in the first place. There are two lines of evidence for this. Firstly, there is a great number of smokers in the contemplation and preparation stages who are, presumably, aware of the benefits of cessation, yet are still smoking. Studies of middle-aged male, blue-collar and ethnic groups in Finland and the United States have shown that between 27% and 34% are either in the contemplation or preparation stages of the cessation process (Pallonen, Fava, Salonen, & Prochaska, 1992). A recent population-representative survey in Australia has shown that the majority of smokers claim to be in the contemplation (47.2%), preparation (15.8%) or action (12.9%) stages (Owen, Wakefield, Roberts, & Esterman, 1992). Secondly, only a small proportion of people who want to stop are actually capable of doing over a short time period. Hughes, Gulliver, Fenwick, et al. (1992) observed a six-month abstinence rate of 8% in 630 smokers who had elected to make self-initiated, unassisted cessation attempts. The challenge for psychologists is to develop ways of identifying the needs of different groups of smokers and ways of helping them to attempt and succeed at permanent cessation.

There are several ways in which psychological theory may be used to help understand factors maintaining population smoking prevalence, and assist in the development of better mass-reach smoking-cessation interventions.

1. The smoking population is not likely to exist as an homogeneous group, and there is a need for research that assists in the process of targeting specific groups and identifying their needs (Lefebvre & Flora, 1988). Variables derived from psychological theory can help to explain aspects of the cessation process (Lichtenstein & Glasgow, 1992). These variables may be used to categorise subgroups of smokers according to dimensions such as nicotine dependence, confidence in being able to stop and willingness to consider cessation

(Borland, Owen, Hill, & Schofield, 1991) in order to target interventions (Novotney, Romano, Davis, & Mills, 1992). The stages of change model should be particularly important in identifying smokers who at different stages of the cessation cycle. Psychological theory can also be used to identify personal and societal barriers which act to prevent behavioural change (Lichtenstein & Glasgow, 1992).

2. Theoretical principles can be used to identify psychological processes that influence the maintenance and change of smoking behaviour in the target group. Perspectives such as nicotine dependence theory (Fagerstrom, 1978), motivational theories (Rosenstock, Strecher, & Becker, 1988) and theories explaining the process of relapse (Marlatt & Gordon, 1985) may all contribute to this. These principles may also be used to develop goals and objectives for interventions.

3. Psychological theories may be used as a basis for the development of interventions that will assist smokers to stop or to help them prepare to stop. Glynn, Boyd and Gruman (1990) state that assisting smokers to actually stop (as opposed to programmes aimed at encouraging them to consider cessation) should now be a high priority for smoking cessation researchers. Such perspectives will be important in the development of mass-reach intervention strategies.

1.5 Summary

Smoking prevalence is a major public health problem - because smoking leads to premature mortality and morbidity in large numbers of people. Mass-reach programmes provide the most cost-effective non-regulatory approach to smoking cessation. Such programmes encourage the voluntary self-regulation of behaviour and may benefit from the use of psychological theory in their conception. Psychological theories can help to identify target groups of smokers, identify psychological processes that maintain the behaviour and suggest interventions.

Several areas of psychology are able to contribute to the examination of processes that mediate behavioural change. Some of this literature has been specifically directed towards the study of smoking behaviour and the process of smoking cessation. Subsequent chapters of this thesis will examine ways of applying knowledge gained in a clinical research context to a mass-reach context in order to increase the impact of intervention strategies. Theoretical models of smoking behaviour and their applications will be reviewed. It will be argued that psychological theories relevant to smoking cessation originated in clinical contexts and that their integration into a population context, while potentially fruitful, may not be a straightforward matter. The field of behavioural epidemiology will be introduced as a way of achieving this integration, and the empirical work will seek to support the use of a behavioural epidemiologic framework.

CHAPTER 2

THE APPLICATION OF PSYCHOLOGICAL THEORY TO SMOKING CESSATION

The preceding chapter argued that theories explaining the process of behavioural change may be profitably used to guide the development of mass-reach behaviour-change interventions. These theories may be used to identify psychological processes affecting population smoking prevalence, identify appropriate target groups and to suggest appropriate interventions. There has been much psychological research on factors that influence the maintenance and cessation of smoking in clinical contexts which has provided many promising approaches. This chapter aims to identify psychological theories that may be of use in a population framework. The next chapter proposes a way whereby psychological theories can be tested and integrated into the framework of mass-reach smoking cessation strategies.

2.1 Psychological theory and smoking cessation

Smoking is a complex behaviour that is maintained by a number of differing factors, operating on several dimensions (Lichtenstein & Mermelstein, 1984). To explain smoking behaviour, theoretical perspectives need to emphasise, not only the individual determinants of behaviour, but also the actions of social, cultural and physical environments (Bandura, 1986, Stokols, 1992). Therefore, it may be inadvisable to limit the theoretical basis of intervention to any unitary perspective. The review, presented here, will examine elements of behavioural, cognitive and social psychological approaches to smoking cessation. Theoretical contributions have come from psycho-pharmacology, instrumental and operant learning theories, social learning theories, expectancy value theories, attribution and dissonance theories. An overview will be provided in an attempt to place each theory into a relative context in regard to its place in the behavioural change process. An attempt will then be made to identify some issues concerned with using psychological theory to explain smoking behaviour.

Major topics within the cessation literature include: studies of the precursors of cessation attempts (Prochaska & Di Clemente, 1983), nicotine dependence (Iwamoto, Fudala, Mundy, & Williamson, 1987), habitual behaviour (Hunt, Matarazzo, Weiss, & Gentry, 1979), the process of behavioural change (Lichtenstein & Mermelstein, 1984) and relapse prevention (Marlatt, & Gordon, 1985). It is beyond the scope of this thesis to examine all theoretical perspectives (e.g. psychoanalytic approaches or hypno-therapeutic approaches) so only cognitive-behavioural and social psychological theories will be considered, as these perspectives have been subjected to the most rigorous empirical scrutiny.

The next chapter (Chapter 3) will be devoted to the application of these theories to the study of smoking cessation in a mass-reach context. This involves the analysis of data from population representative samples, as population parameters may differ from those of self-selected clinical groups, and the identification of variables that may serve as outcome indicators for mass-reach intervention. The bias toward individually oriented models will be discussed, and a study of broader social factors influencing cessation will be introduced. Chapter 4 will deal with the use of self-instructional materials for teaching behavioural skills and techniques to smokers wanting to stop.

2.2 Behavioural and bio-behavioural theories

Learning models are often used to explain the initiation and maintenance of smoking behaviour. Nicotine is probably the primary reinforcer of smoking behaviour (Benowitz, 1988). Studies of laboratory animals have indicated that nicotine has powerful primary operant reinforcing properties (Pomerleau & Pomerleau, 1984; Iwamoto et al., 1987). In human beings nicotine produces mild euphoria, increases the speed of habituation to environmental stressors (Pomerleau & Pomerleau, 1984) and, after regular use, produces a dependence syndrome (Henningfield, Goldberg, & Jasinsky, 1987).

Cigarette smoking is an effective means of nicotine self-administration. Provided that a smoker fully inhales, up to 92% of the nicotine in the smoke is absorbed into the

bloodstream. High concentrations of nicotine are delivered to the central nervous system some seven seconds after each inhalation. Given the reinforcing effects of nicotine, the number of puffs a smoker takes per day and the latency between inhalation and the pharmacological effect, it is likely that smoking behaviour becomes highly resistant to extinction (Russell, 1987). The reinforcing effects of nicotine are especially potent with younger or lighter smokers who have not developed high levels of tolerance (Henningfield, Goldberg, & Jasinsky, 1987).

Nicotine dependence: A nicotine withdrawal syndrome may occur with the cessation of smoking. Such a syndrome is experienced as being aversive and may be mitigated by the further administration of nicotine, leading to a negative reinforcement of smoking behaviour. Russel (1987) describes a model whereby self-administration is mediated by plasma nicotine levels falling below an individually-determined point. Laboratory studies suggest that nicotine self-administration occurs as a direct and proportional response to falls in plasma nicotine levels. It has been demonstrated, under controlled conditions, that smokers increase nicotine intake when plasma nicotine levels are manipulated (eg. by increasing urinary excretion; Russell 1987). The model suggests that when these levels fall, smoking behaviour is more likely to occur. Low levels of plasma nicotine may be related to withdrawal distress which can make the cessation of smoking difficult (Fagerstrom & Schneider, 1989).

The severity of the nicotine dependence syndrome in smokers may be measured by Fagerstrom's nicotine tolerance questionnaire which includes items relating to smoking behaviour and the difficulty of refraining from smoking (Fagerstrom & Schneider, 1989). For the purposes of this thesis, nicotine dependence will be measured using the two items that are most strongly associated with dependence; smoking rate and the time elapsed between waking and smoking the first cigarette of the day (Heatherton, Koslowski, Frecker, & Fagerstrom, 1991).

Withdrawal distress may be alleviated by the use of nicotine chewing gum. The gum is designed to provide a regular dose of nicotine without the conditioning effects of high

concentrations reaching the brain shortly after the administering behaviour. Findings from placebo controlled trials illustrate the effectiveness of this method: Lam, Sze, Sacks and Chambers (1987) present a meta-analysis of 14 studies showing that, in a laboratory setting where administration is supervised, nicotine gum is more effective than is a placebo. They found that this effect is considerably weaker in a medical-practice settings. This may be due to two reasons: firstly, smokers who take the trouble to attend clinics may be more motivated to stop smoking and, secondly, the administration of the gum and supervision of smokers in the clinic will have been more intensive. Consistent with the nicotine dependence model, Fagerstrom (1978) has identified well motivated but highly dependent smokers as being most likely to benefit from the gum. The supervised use of nicotine chewing gum is, it seems, successful in producing high initial cessation rates, but smokers may experience difficulty in maintaining abstinence. Harackiewitz et al. (1987) found that, despite high initial cessation rates, the majority of smokers who were able to stop with the aid of the gum eventually relapsed.

Gottleib, Killen, Marlatt, and Taylor (1987) have pointed to flaws in the placebo control design used in the evaluation of nicotine replacement therapy. The authors argue that, when participants in a study are given an unidentified gum their natural reaction is to determine whether the gum contains nicotine or not. As nicotine is a psychoactive drug (Henningfield, Goldberg, & Jasinski, 1987) some smokers may be able to discriminate it from a placebo and successfully identify the gum. However, Gottleib et al. reasoned that, if the smokers are informed as to the nature of the gum they may not attempt to make this discrimination. They used a double blind placebo design with four groups, two receiving gum and two receiving the placebo. They told participants in one of the gum and one of the placebo groups that the gum was nicotine gum, and informed participants in the others that they were receiving a placebo. Using reported cravings and short-term cessation rates as dependent variables they found that better results were obtained in the groups who thought that they were receiving nicotine gum, compared to those who actually were receiving the gum. The manipulation of the actual nicotine content in the gum produced no effect.

Associative learning perspectives: The nicotine withdrawal syndrome may last for periods of up to a month. However, some ex-smokers report urges to smoke after periods of well over a year's abstinence (Clavel, Benhamou, & Flamant, 1987). Subjectively-experienced cravings have been reported after exposure to environmental stimuli such as cigarette smoke that are normally associated with nicotine ingestion. This phenomenon may occur through a process of associative learning where environmental cues associated with nicotine administration become conditioned stimuli (Niaura, Rosenhow, Binkoff, et al., 1988). Potential stimuli include priming doses of nicotine, cigarette smoke, the sight of cigarettes or even locations where smoking has been practised regularly. There is some evidence that strong emotions such as joy and depression may also be associated with urges to smoke (Shiffman, 1982, 1984; Zinser, Baker, Sherman, & Cannon, 1992). In laboratory studies, physiological arousal has been observed after exposure to smoking cues such as the sight of cigarettes. The magnitude of this arousal is related to the probability of future relapse (Abrams, Monti, Carey, Pinto, & Jacobus, 1988).

The probability of relapse may be reduced by a process of desensitisation to environmental cues and internal states normally associated with smoking. Clinical interventions have used cue exposure-extinction procedures, which involve presenting drug-related cues to clients whilst preventing actual administration of the drug. The association between those cues and the pharmacological effect of the drug is then weakened. There have been, as yet, no published reports of studies that use this paradigm for developing interventions in the smoking area. There has, however, been some work done in the area of other addictions. Childress, McLellan, Tand and O'Brien (1988) used these procedures to treat opiate users and claim success in reducing reports of subjective cravings. Drummond, Cooper and Glautier (1990) reviewed a number of studies using cue-exposure treatments for alcohol abuse and found some evidence of reductions in the level of physiological response to alcohol-related stimuli and reductions in drinking behaviour. However, there are few grounds from these studies to conclude that there is either adequate maintenance, or generalisation of the effect outside the treatment setting.

The cue-exposure model may be suitable for a wider application than exposure-response prevention training, as it suggests that modification of the stimulus environment may be useful in the prevention of relapse. Smokers who spontaneously practise stimulus control techniques seem to be less likely to relapse (Prochaska, et al., 1985) whilst many relapses occur in the presence of smoking-related stimuli (Shiffman, 1982, 1984). Cigarette advertising and the presence of other smokers may provide environments which are rich in smoking cues and stimuli. Future research, using this perspective, may provide an important rationale for the restriction of cigarette advertising and the restriction of smoking behaviour, such as through worksite smoking bans.

Hunt, Matarazzo, Weiss and Gentry (1979) argue that smoking behaviour may, for some smokers, be described as automated, in that it is generally practised outside the smoker's awareness, is independent of (positive) reinforcement contingencies and is heavily influenced by environmental stimuli. Automation is argued to provide a cross-situational stability to behaviour, but is associated with diminished volitional control. Smokers who report that they smoke without knowing that they are smoking probably fall into this category. Hunt et al. (1979) suggest that smoking may be brought into awareness by teaching self-monitoring techniques. This will serve to circumvent the automated nature of the behaviour pattern and allow smokers an opportunity to use coping techniques. Another strategy may be to train more appropriate behaviours, such as relaxation, to be elicited by smoking related stimuli. In a similar way to the cue reactivity models, cue exposure and extinction techniques may also be used to desensitise smokers to environmental stimuli.

2.3 Cognitive and social learning perspectives

The process of smoking cessation may be influenced by smoker's perceptions of the difficulties involved in cessation, their ability to stop smoking and the perceived costs and benefits of doing so. There are several theories and models which describe beliefs mediating the initiation and outcome of attempts to stop smoking such as the health-belief model (Rosenstock, Strecher, & Becker, 1988), the theory of reasoned action (Ajzen, 1985), subjective expected utility theory (Sutton, 1987) and protection motivation theory (Rogers,

1975). All of the models assert that voluntary behavioural change is prompted by changes in specific beliefs and expectations. Such models postulate that three major variables are relevant to changing smoking behaviour.

Risk perception and subjective expected utility. The term risk perception refers to quantified estimations of risks involved in initiating or continuing to practise a behaviour (Slovic, 1987). High levels of perceived smoking-related health risk are associated with the initiation of cessation attempts and the intention to stop smoking in the future (Rogers, 1975; Janz & Becker, 1984). According to the health belief model (Rosenstock, Strecher, & Becker, 1988) behavioural change is most likely if the health risk is seen in personal terms, not as an abstract entity. Lee (1989a) demonstrated that there is a tendency for smokers to under-estimate their personal health risk compared to the estimates they make for the 'average smoker'. Jeffery (1989) suggests that assisting people to make a realistic appraisal of personal health risks involved with different behaviours represents one of the most significant challenges for psychologists involved in health promotion.

Subjective expected utility (SEU) refers to the expected consequences of successful completion of a course of behaviour. SEU specifies two causal beliefs: an estimate of the utility, or benefit, of achieving an objective (e.g., avoiding lung cancer) and an estimate of outcome expectancy, or the probability that a given course of behaviour (e.g., stopping smoking) will lead to achieving that objective. These beliefs are an important precondition for smoking cessation although they are more closely associated with the intention to stop smoking, and to a lesser extent cessation attempts, than to cessation itself (Sutton, 1987). Several cross-sectional studies have shown that high levels of risk perception and the subjective expected utility of cessation are correlated with intention to stop smoking (Sutton & Eiser, 1984; Sutton, Marsh, & Matheson, 1990) and that experimentally-induced changes in these beliefs may be associated with future intentions to change health-related behaviours (Fruin, Pratt, & Owen, 1992).

Response costs: Making attempts to change a behaviour such as smoking may involve costs such as time, effort, discomfort and, in the case of failure, a loss of self-esteem (Rogers, 1975). It is unlikely that a smoker will make a determined cessation attempt if it is perceived that the costs outweigh the benefits (Velicer, Di Clemente, Prochaska, & Brandenburg, 1985). This is an especially salient problem with smoking because the health-related benefits of smoking cessation are achieved over a long time period, yet most of the costs are incurred almost immediately (Sutton & Eiser, 1984). Sutton, Marsh and Matheson (1990) have shown that expectancies of both positive and negative outcomes are associated with the intention to stop smoking.

Social norms: Ajzen and Fishbein (1980) propose that the intention to perform a behaviour may be affected by the perceived social norms regarding that behaviour. Smokers may be disinclined to stop smoking on the basis of its perceived health consequences, yet try to do so because they perceive that not smoking is consistent with social norms. This proposition is important because many mass-reach smoking control programmes are aimed, in part, at influencing social norms regarding smoking. Sutton's (1987) review presents some evidence suggesting that adolescents' perceptions of social norms may affect their intentions to start smoking tobacco, drinking alcohol or using illegal drugs. It must be stressed that decisions to start smoking may differ from those made to stop smoking and the role of social norms in those decisions may also differ. Findings from a study by Pierce, Dwyer, Chamberlain, Aldrich and Shelley (1987) suggest that perceptions of social norms may, in some circumstances, have a detrimental effect upon the intention to stop smoking. They found that a perception of positive social norms for smoking cessation only influenced the intention to quit if smokers actually believed that smoking was a strong threat to their health. If the smoker did not believe this, the perception of pro-smoking social norms was related to the intention not to stop smoking.

These perspectives have been used to explain and predict the initiation of cessation attempts. Both cross-sectional and longitudinal analyses have shown strong relationships between these variables, the intention to stop smoking (Ajzen, 1985) and the initiation of

cessation attempts (Borland, Owen, Hill, & Schofield, 1991). It is, however, inappropriate to equate intention and initiation with the actual completion of behaviour. In the case of behaviours that are resistant to change, the association between intention and behaviour is often neither strong nor consistent (Bettinghaus, 1986). These models may also be limited by the fact that they do not explain the independent role of variables such as affect and prior behavioural performance, have in predicting behavioural intention (Sutton, 1987).

Self-efficacy: Bandura (1986) proposes that volitional behavioural change is mediated by changes in the level of an individual's self-efficacy. Self-efficacy refers to a person's subjective belief that he or she is able to perform a specific behaviour within a specific context. According to the theory, each self-efficacy belief is specific to a particular behaviour and is highly changeable over time. Behavioural change is more likely to be attempted when self-efficacy is high than when it is low. The maintenance of behavioural change is dependent upon the smoker's perceived efficacy in dealing with problems of sustained behavioural change such as coping with temptations and stress (Baer, Holt, & Lichtenstein, 1986). Self-efficacy beliefs are derived from a combination of previous behavioural performance, observation of others performing the behaviour and mood. Incorporation of self-efficacy into models of subjective expectancy may provide a link between intention and measures of affect and prior behavioural performance, variables that are associated with cessation attempts but have not featured in the models. Affect and prior behavioural performance will influence self-efficacy and, consequently, the likelihood of the smoker forming an intention to stop (Sutton, 1987). Studies have shown consistent correlations between self-efficacy estimates and the initiation and outcome of efforts to stop smoking, even when the effects of likely co-variates are controlled (Condiotte & Lichtenstein, 1981; O'Leary, 1985; Di Clemente, Prochaska & Gilbertini, 1985; Baer, Holt, & Lichtenstein, 1986).

The nature of self-efficacy and its relationship to the process of behavioural change is not entirely clear. Items in self-efficacy scales are highly inter-correlated (Baer, Holt, & Lichtenstein, 1986), an observation which more consistent with the notion of a general construct than Bandura's concept of specific and unrelated expectancies. Secondly, the

relationships between past behaviours, modelling, affect, behaviour and behavioural intentions have been shown to be, in part, statistically independent of, rather than co-varying with self-efficacy (Baer, Holt, & Lichtenstein, 1986). This is not consistent with the mediating role attributed to self-efficacy. Whilst empirical studies have shown strong associations between self-efficacy and behaviour, it is difficult to demonstrate causality because self-efficacy cannot be manipulated independently of its precursors. It is possible that self-efficacy may only be a correlate of processes influencing behavioural change, not a causal factor as specified by Bandura (Baer, Holt, & Lichtenstein, 1986; Lee, 1989c).

As stated, there are strong relationships between self-efficacy scores and behavioural change. Some of the empirical work in this thesis uses the concept but operationalises it by employing a single-item question, asking the respondent about their confidence in achieving behavioural change. This is different to a traditional self-efficacy scale which asks respondents to estimate efficacy levels over a range of different situations. The use of a single item scale addresses the practical difficulties of including lengthy questionnaires in the population surveys used in this thesis. An implication of using a single item scale is that global rather than specific efficacy estimates may be made and, therefore, the original concept may be contaminated. The single-item approach does receive some support from the findings of Baer, Holt and Lichtenstein (1986) who showed that a single factor underlay their self-efficacy questionnaire. The measure used in this thesis requests that the respondent nominate their confidence that they can stop smoking within a defined time period. Confidence, when measured in this way is not, at present, a theoretically well defined concept and its role in behaviour-change is unknown.

Fear arousal: Most smoking-cessation campaigns have sought to elicit moderate levels of fear in smokers. The health belief model sees fear as a motivational factor interacting with cognitive factors such as outcome expectations, predisposing people to perceive and act upon health threats (Rosenstock, Strecher, & Becker, 1988). Sutton and Eiser (1984) found that subjectively reported fear influenced intentions to stop smoking. Soames Job (1989) argues that fear arousal has a positive motivational effect, provided that moderate amounts of fear are

elicited and that concrete behavioural suggestions are made whereby the fearful stimulus may be addressed. In terms of smoking behaviour, Soames Job suggests that fear of smoking's immediate consequences be aroused, provided that those consequences be mitigated upon the completion of simple behavioural sequences. Fear arousing stimuli may include demonstrations of reduced lung capacity or elevated cardiovascular reactivity which should be accompanied by information and assistance with cessation.

A cognitive-behavioural model of smoking cessation: Pechacek and Danaher (1979) have integrated subjective expectancy utility and self-efficacy theories into a model explaining the process of smoking cessation. They argue that a person who is contemplating cessation will examine their SEU and self-efficacy beliefs relevant to cessation. If SEU and efficacy beliefs are not of a high level the individual will probably not attempt to stop smoking. If these beliefs are high, the individual may attempt and perhaps succeed at smoking cessation (Condiotte & Lichtenstein, 1981; Di Clemente, Prochaska, & Gilbertini, 1985). Maintenance of cessation depends upon continued high efficacy and outcome expectations. Should the smoker relapse, further efficacy appraisals may be made to determine whether cessation should again be attempted. Should these appraisals prove to be negative the smokers may fall into a learned helplessness situation, believing that they ought to stop smoking and that there are benefits of doing so but are powerless to actually stop.

2.4 Social psychological perspectives

Attribution and dissonance perspectives. Eiser (1982) uses attribution theory to explain why smokers may perceive smoking cessation as being difficult. Smoking, he argues, is a behaviour practised in the face of a considerable risk to future health, a fact that is known and acknowledged by most smokers. This may create a state of cognitive dissonance where the smoker is aware of the dangers associated with smoking, yet does not stop doing so. In the absence of behavioural change, dissonant states may be resolved by changing attitudes in order to be consistent with behaviour (Festinger, 1957). Eiser suggests that smokers attribute their behaviour to uncontrollable factors such as addiction or being "hooked" to resolve this

dissonance. Once a behaviour has been defined as being uncontrollable it is less likely that any attempt will be made to change it. Dissonance may also be resolved by the process of ignoring information on the health effects of smoking (Taliacozzo, 1981) or by denying the risks associated with smoking (Lee, 1989b).

Marlatt and Gordon (1985) suggest that attribution and dissonance theories may help to explain why initially successful abstainers relapse to smoking. Abstainers occasionally find themselves in 'high risk' situations where they are tempted to smoke. If their ability to cope with the temptation is inadequate, they may smoke (Shiffman, 1982, 1984; Baer & Lichtenstein, 1988). This has been described as a lapse or a short reversion to smoking behaviour (Brownell, Marlatt, Lichtenstein, & Wilson, 1986). Marlatt and Gordon suggest that the lapse creates a state of cognitive dissonance between the ex-smoker's self-concept as that of an abstainer and the temporary reversion to smoking behaviour. The resolution of dissonance may be to attribute the lapse to personal or characterological factors which are outside the individual's control ("I am a weak person"). Attributions of this nature can be damaging to the person's sense of self-esteem (Seligman, Abramson, Semmel, & von Baeyer, 1979) and lead to an adverse emotional reaction. This negative emotional state, labelled the Abstinence Violation Effect, may militate against both recovery from the lapse and future cessation attempts being made.

The magnitude of the Abstinence Violation Effect depends upon two factors. Firstly, the degree to which the person is liable to perceive themselves as either a smoker or a non-smoker without "shades of grey" between the two is important. The greater the distinction the smoker draws between the categories of smoker and non-smoker the greater will be the perception of dissonance. Secondly, the degree to which the person attributes the lapse to characterological factors such as personal weakness will influence the extent to which they experience negative affect after their perceived failure. Curry, Marlatt and Gordon (1987) have shown that continued smoking after a lapse is associated with retrospective reports of making characterological attributions at the time although not prospective measures of attributional style. It has also been shown that people who have relapsed do show negative

affective states consistent with the proposed Abstinence Violation Effect (Condiotte & Lichtenstein, 1981).

According to the relapse prevention model of Marlatt and Gordon, it is particularly important that 'high-risk' situations be successfully managed by the ex-smoker (Shiffman, Read, Maltese, Rapkin, & Jarvik, 1985). Shiffman, Schumaker, Abrams, et al., (1986) review studies suggesting that there are a number of specific situations where ex-smokers are at risk of relapse. These include emotional stress, boredom, alcohol consumption and social occasions where others smoke. If the smoker does not use appropriate coping responses in these situations, relapse is more likely to occur (Shiffman, 1984). Coping responses may include: withdrawal from the situation, distraction, delaying smoking, imagery, cognitive restructuring, reminding oneself of the reasons for not smoking, or behaviour such as physical activity or relaxation.

There have been several experimental evaluations of treatments based upon the relapse prevention model, but the outcomes have been mixed. Hall, Rugg, Tunstall and Jones (1984) were successful at helping smokers to maintain abstinence using a programme based upon teaching skills to cope with 'high-risk' situations whilst Stevens and Hollis (1989) showed that the rehearsal of individually-tailored coping skills improved their prospects of maintaining non-smoking behaviour. However, neither Brown, Lichtenstein, McIntyre and Harrington-Kostur (1984) nor Davis and Glaros (1986) found differences between maintenance interventions based upon the relapse prevention model and control conditions. Curry, Marlatt, Gordon and Baer (1988) compared a relapse prevention package with an abstinence-based treatment package. They found that there were no significant improvements in the maintenance of non-smoking but they did find that smokers in the relapse prevention condition showed a greater tendency to attempt cessation after relapse. This persistence may be an important factor in the attainment of future cessation (Leukfeld & Tims, 1989).

Stress: The experience of stress has often been cited in explanations of the maintenance of, and relapse to smoking behaviour. Smokers often report that they smoke to alleviate the

effects of stress and there is evidence that nicotine does reduce the perception of some physiological states associated with stress, such as muscle tremor (Russell, Epstein, Sittenfield, & Block, 1986). Baseline levels of stress, as measured by life event type scales, have been shown to predict relapse (Ockene, Benfari, Nuttall, Horwitz, & Ockene, 1982; Swan & Denk, 1987; Baer, & Lichtenstein, 1988), whilst situations which could be described as stressful (eg. interpersonal conflict) are often precursors of relapse (Curry & Marlatt, 1985; Baer & Lichtenstein, 1988). Curiously enough, persons reporting high baseline levels of stress do not seem to be any more prone to relapsing in stressful situations, although, overall, they are more prone to relapse than others (Baer & Lichtenstein, 1988).

There are no comprehensive theories which explain the effects of stress on smoking behaviour. People who report high levels of stress may seek the euphoric effects of nicotine (Leventhal & Cleary, 1979), negative affective states may act as smoking cues - a process that may result in cravings as described by cue-exposure models (Niaura et al., 1988; Zinser et al., 1992), stressful life events may influence smokers to assign a lower priority to cessation attempts or smoking may act as a displacement behaviour exhibited under conditions of stress. Many theoretical frameworks emphasise the interactive role of individual and situational factors and stress in creating strain. These include personality factors, physiological states, behaviour patterns, attitudes and attributions. Modification of these factors, using techniques of insight, relaxation, self-monitoring and cognitive restructuring, has been shown to help individuals cope with stress with regards to work performance and physical and psychological health (Krantz, Contrada, Hill, & Friedler, 1988). These and similar techniques may be applicable to smokers who are experiencing difficulty achieving long-term cessation due to high levels of psychological strain.

Social Influence: Social influence may affect aspects of smoking behaviour in a number of ways. Influences may involve peer group identification, the provision of smoking cues (e.g., a smoker relapses because others smoke around that person) or the provision of social support.

The smoking status of a smoker's spouse (Ockene et. al., 1982; Warnecke, Langenberg, Gruder, Flay, & Jason, 1989), parental smoking habits (Swan & Denk, 1987) and the presence of other smokers in a person's social network (Warnecke et al, 1989) are all associated with the maintenance of smoking behaviour. The willingness of recent ex-smokers to solicit social support and the availability of that support have also been shown to be associated with the maintenance of smoking cessation (Prochaska et. al., 1985; Cohen & Lichtenstein, 1990). Mermelstein, Lichtenstein, Baer and Kamarck (1986) found that an inability to elicit support from friends is associated with early relapse, whilst the presence of smokers in an ex-smoker's social network is negatively related to long term cessation. The latter finding may be explained by studies of "high risk situations", which have shown that relapsers often cite pleasant social encounters as the occasion for relapse (Baer and Lichtenstein, 1988; Curry and Marlatt, 1985; Shiffman 1982, 1984).

Social support may also be seen in terms of the broader societal networks within which the smoker operates and the extent to which they are perceived to be harmonious with the individual's needs (Felton & Shinn, 1992). Correlational studies have suggested that the nature of a person's social networks is associated with their physical and psychological health (House, Landis, & Umberson, 1988; Cohen, 1988). Poorer health is associated with the lack of a partner, lack of a family network, and the inability to elicit one's own social supports. Cohen (1988) suggests that social support may fulfil a number of functions including the provision of information, providing a source of personal identity and self-esteem, influencing attitudes and values and providing tangible support such as financial assistance. Janis (1983) has suggested that social support may be an important factor in sustaining long term behaviour-change under stressful conditions.

There are, as yet, no integrated theories which explain how social factors can influence behavioural and affective states (Cohen, 1988). There are, however, a number of perspectives that may explain the role of social factors in the maintenance of cessation. Cue-exposure models suggest that the mere presence of other smokers in an ex-smokers immediate environment may increase the risk of relapse. This suggestion is supported by relapsers'

retrospective reports of the situations where they started smoking again (Shiffman, 1982;1984). Social support may act as a buffer to the effects of stress by providing emotional support to the smoker. This is, generally, the favoured explanation for the relationship between social support and health (Cohen, 1988). Non-smokers, especially ex-smokers, may also be able to provide helpful information and advice to people who are either contemplating or attempting cessation.

Lichtenstein, Glasgow and Abrams (1986) reviewed five separate studies aimed at either providing social supports (e.g., training spouses to provide appropriate supports) or training clients to elicit their own supports. None of the studies showed any effect in favour of the social support interventions over follow-up periods of a year. Windsor, Lowe, and Bartlett (1988) used a social support programme to complement the use of self-instructional materials. They encouraged smokers to recruit ex-smokers as "buddies" who were then mailed written materials instructing them how to help the smokers achieve cessation. After a twelve-month period the authors found that the 'buddy' condition was almost four times as effective as the self-instructional materials alone.

2.5 An integration of theoretical perspectives

The perspectives presented in this chapter have, to a large extent, been established and investigated using observational, clinical and laboratory studies. Interventions based on these perspectives have been reasonably intensive and have been effective, helping between 30 and 50 per cent of programme participants to be abstinent at one year follow-up observations (Glasgow & Lichtenstein, 1987).

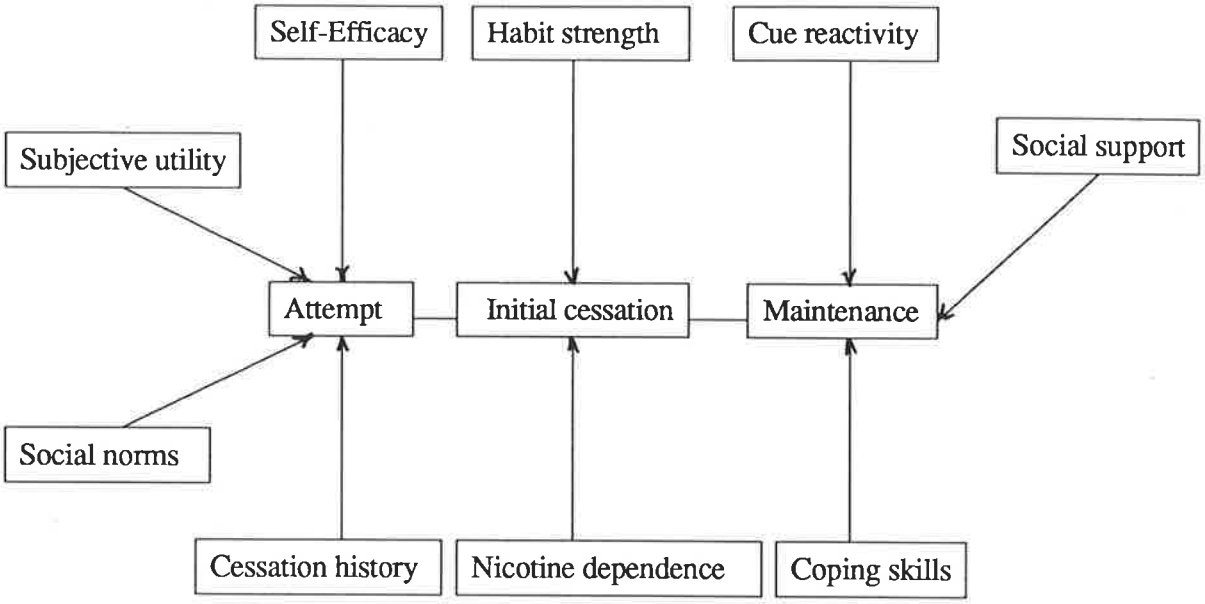
It must, however, be emphasised that many theoretical and applied studies in the area show methodological shortcomings. Often studies are characterised by small sample sizes, contributing to an increased possibility of type two errors. This is especially a problem as the outcome measure of smoking status is binary which further reduces statistical power (Glasgow & Lichtenstein, 1987). Furthermore, not all authors have used appropriate

multivariate techniques to control for the confounding influence of variables such as age and sex. Few studies are directly comparable to others as there are often differences in the definition of abstinence. The most common stipulates that a person should not have smoked for the week preceding the observation. Studies also differ in their timing of follow-up observations with periods varying from three months to three years.

The stages of behavioural change: All of the perspectives reviewed in this chapter help to describe and explain different aspects of the cessation process. Several authors point to the need for models of the behavioural change process which integrate different theoretical perspectives (e.g., Oldenburg & Pope, 1990). Section 4 of Chapter 1 presented a description of the behavioural change process (Di Clemente, et al., 1991) where the smoker progresses through a sequential series of qualitatively differing stages. The earlier stages require the acquisition of attitudes which facilitate cessation attempts whilst the later stages emphasise the acquisition of behavioural skills. This, and similar descriptions of the behaviour-change process, may be used to form the basis for an integrated model of smoking cessation, as different perspectives may be used to explain processes occurring at different stages.

Figure 2.1 summarises the major theoretical points of this review. It presents a context of behavioural change within which theoretical perspectives may be placed. It is not designed to be a summary of the current empirical data nor does it make direct causal inferences, as these would lead to undue complexity. Also here are only three stages mentioned in the model (as opposed to the five stages mentioned by Di Clemente, et al (1991)) as it is not entirely clear which of the Di Clemente, et al stages (contemplation or preparation) should be addressed by each perspective.

Figure 2.1 Overview of theoretical variables and their likely influences on behaviour.



The term cessation history refers to variables such as the number and duration of cessation attempts and the time elapsed since the last attempt. Habit strength refers to variables such as smoking rate that describe current smoking behaviour.

Perspectives such as the health belief model, the theory of reasoned action and protection-motivation theory help to explain the development of an intention (and a subsequent attempt) to perform a health related behaviour. The outcome of that attempt is more likely to be dependent upon bio-behavioural factors such as nicotine dependence and habit strength. Theories explaining the relapse to smoking stress the role of cue reactivity, coping skills and social support.

This overview is a diagrammatic summary of the theoretical perspectives reviewed in this chapter. It is presented this way for simplicity. The current empirical literature can also suggest different models. For example, self-efficacy has been associated with all stages of the cessation process but there is little evidence to suggest that these associations are causal ones. For simplicity, the overview assumes that the theoretical processes affect behaviour independently of each other. It does not incorporate indirect effects such as the role that habit strength and previous cessation attempts may play in determining self-efficacy.

One of the objectives of Study 2 presented in Chapter 6 will be to provide an empirical test of some of the elements identified in this overview. The effects of baseline measures of risk perception, habit strength, cessation history and confidence upon the future initiation and the outcome of cessation attempts will be evaluated. It is expected that a high perception of risk, high confidence and a history of recent cessation attempts will predict the initiation of another attempt, but high levels of habit strength and the past achievement of long periods of cessation will be associated with actual cessation.

2.6 Summary

A number of theoretical perspectives on the maintenance and change of smoking behaviour were examined and some public health implications were discussed. Most perspectives were seen as being potentially appropriate for inclusion into a mass-reach framework. Perspectives that are of interest, and are applicable to, mass-reach intervention include the identification of attitudinal and behavioural skills that enable smokers to cope with nicotine withdrawal and, once the withdrawal period is over, subsequent conditioned cravings. Conditioned cravings may also be averted by the alteration of the stimulus environment to eliminate conditioned smoking cues. This may be done by restrictions on advertising and smoking in public. Social learning and other social psychological perspectives may be incorporated into mass media campaigns as they emphasise attitudes and beliefs that may be transmitted using simple messages. Theories concerning the influence of stress and social support on smoking are not yet well defined. Despite this, there is potential for interventions aimed at incorporating these factors into cessation programmes (e.g., Windsor, Lowe, & Bartlett, 1988). How some of these theoretical approaches may be best applied to better understand the processes of smoking cessation in a population context will be considered in Chapter 3.

CHAPTER 3

INTEGRATING PSYCHOLOGICAL AND PUBLIC HEALTH PERSPECTIVES

The material presented in the previous chapter suggests that psychological theory offers a number of different perspectives for explaining aspects of the maintenance and cessation of smoking. Recently, there have been debates concerning the ways in which psychological theory and methods may be used as a conceptual base from which behaviourally-related public-health problems may be understood and interventions can be developed (e.g., Winett, King, & Altman, 1989). These debates have revealed differences of theory, focus and methodology between the disciplines of psychology and public health. Most psychologists specialise at an individual level of analysis whilst public health researchers are concerned with issues at a population level. The study of behaviours on a population - rather than an individual - basis means that causal factors may assume different levels of importance (Jeffery, 1989).

It may be the case that psychologists need to develop a more sophisticated conceptual and methodological grasp of public health issues (Winett, King, & Altman, 1989; Jeffery, 1989; Stokols, 1992). The argument presented in this chapter summarises some of the main differences between the approaches of the two disciplines and proposes that a behavioural epidemiologic framework may provide a suitable framework whereby some of these differences may be reconciled. In order to do this, four key areas of theory, methodology and practice are identified. The examination of these will form the basis of this thesis.

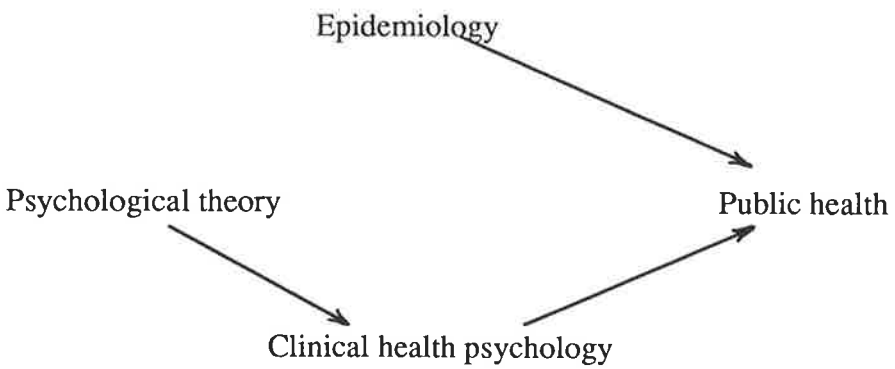
3.1 Health psychology and public health

Health psychology evolved from clinical psychology, an orientation that Stone (1990) argues is still dominant in the sub-discipline. The clinical mode of intervention employs a philosophy that emphasises the modification of characteristics of the individual in order to facilitate behavioural change (Millon, 1982). Maladaptive behaviour is assumed to result from the

learning of inappropriate behaviours and cognitions. Social and contextual variables are not ignored, but are often seen as being of secondary importance to those that operate at the level of the individual. Clinical psychology occupied a strong position in applied psychology in the 1970s and 1980s and it was, perhaps, inevitable that a clinical orientation would be brought to bear upon public health issues by the early practitioners of health psychology. They gave an emphasis to individually-oriented approaches to problems such as psychosomatic distress, coping with medical procedures and modification of risk behaviours (Lovibond & Birrell, 1986). In the case of smoking, this viewpoint is demonstrated by the large number of papers published in the clinical and behavioural journals dealing with the development of intensive, structured, cessation programmes aimed at producing large cessation rates (Glasgow & Lichtenstein, 1987; Lichtenstein & Glasgow, 1992).

Figure 3.1 shows how the traditional relationships between the disciplines of psychology, epidemiology and public health evolved, as health psychologists applied their clinical perspective to public health problems.

Figure 3.1 the current relationships between psychology, epidemiology and public health.



The early work of the Stanford Heart Disease Prevention Program team of the 1970's, was one of the first attempts by psychologists to deal with CVD risk factors, such as smoking, in a public health framework. In one intervention, they used an intensive skills training condition for high-CVD-risk individuals to teach behavioural skills relevant to the modification of smoking and other CVD related-behaviours (Meyer, et al, 1980). Whilst the intervention itself generated a high abstinence rate, only a small number of smokers in the population was

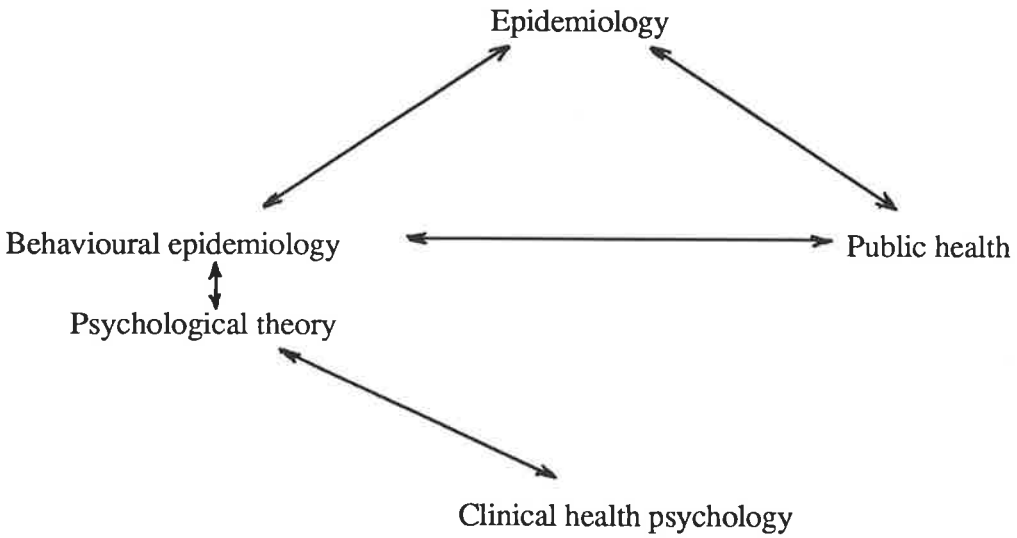
actually affected, limiting the possibility of a large public health impact. There may also be some cost-effectiveness problems with intensive interventions such as this (Altman, Flora, Fortmann, & Farquhar, 1987). Later work by this team has involved the use and evaluation of effective minimal contact procedures, which may lead to a greater overall impact (Taylor & Owen 1989; Farquhar et al., 1990).

During the late 1980s and 1990s psychologists have become more interested in public health issues concerned with smoking and other health-related behaviours (Winett, King, & Altman, 1989; Jeffery, 1989; Lichtenstein & Glasgow, 1992). This interest has created a demand for effective ways of integrating the approaches of the two disciplines (Winett, King, & Altman, 1989; Oldenburg, 1993). The study of public health issues employs a multi-theoretical, contextualist perspective, oriented toward the examination of environmental and social determinants of disease (Winett, King, & Altman, 1989). Psychological perspectives often are individually-based and stress what are, essentially, reductionist viewpoints. Given these differences, it is not surprising that the two disciplines may not easily co-exist. Jeffery (1989) argues that psychological theory may maximise its potential to explain public health outcomes only if its theories are developed and tested in a public health context.

Epidemiology is a major evaluative component of public health, and involves the study of disease patterns within defined populations, their causes and the effects of interventions. Behavioural epidemiology refers to the application of epidemiological thought and techniques to the study of behavioural correlates of physical and mental health (Heggenhougen & Shore, 1986; Raymond, 1989). The practice of behavioural epidemiology includes (i) the monitoring of behavioural factors and their influence on disease processes, (ii) the understanding of social, environmental and individual processes that influence the prevalence of behavioural risk factors, (iii) the identification of target groups for intervention and (iv) the development and evaluation of strategies designed to reduce the prevalence of risk behaviours (Raymond, 1989; Owen, 1989). There have been some applications of this framework to the way that public health problems are conceptualised. Heggenhougen and Shore (1986) propose that structural factors such as social class and economic position influence health-related behaviours. Owen (1989) argues for a cohesive use of theoretically-driven variables in behavioural epidemiologic

research, to explain processes that influence population smoking behaviour. Such variables may be derived from behavioural, social-cognitive and social psychological theories such as those presented in the last chapter. There have now been several studies that do so (Pierce, Dwyer, Chamberlain, Aldrich, & Shelley, 1987; Sutton, Marsh, & Matheson, 1990), and it seems that this field is likely to grow. The model presented in figure 3.2 may allow for a more productive integration of psychology, public health and epidemiology.

Figure 3.2: Proposed relationships between psychology, epidemiology, behavioural epidemiology and public health.



The main features of this model involves the establishment of behavioural epidemiology as a field with a specialist responsibility for integrating psychological theory into epidemiology and public health, and for the testing of psychological theory in this context. Psychological theories may be used to provide a number of different perspectives and hypotheses explaining the maintenance and cessation of smoking behaviour, many of which will have been tested to some degree. Behavioural epidemiology involves the selection of psychologically-derived hypotheses, their testing in a population context and applying the findings to the development of interventions.

Such a model allows for a link to be drawn between disciplines which have historically operated using a number of different assumptions and viewpoints, as behavioural

epidemiology can be used to view psychological models in a population context. Behavioural epidemiology is seen as being separate to, but influenced by, clinical health psychology due to the latter's contributions to theory. The purpose of this model is not to argue that psychologists with an orientation toward clinical research should not participate in population-based analyses, but to point out that the research context differs from that to which they are familiar, and that their knowledge and techniques may not be directly transferable.

3.2 Behavioural epidemiology and psychological theory

The use of behavioural epidemiology as a means of integrating the disciplines of psychology and public health has at least four major implications for methodology, theory, and practice. These are as follows:

Sampling methodology: The theoretical principles used for population intervention should, ideally, be derived from studies that are conducted using samples which are representative of the target populations (a description of sampling procedures for the collection of population-representative samples is given in Appendix 1). Most of the research reviewed in this thesis has employed clinical or other opportunistic, samples which are self-selected and, therefore, possibly biased. Chapter 5 reports a comparison of a population-representative sample with a clinical sample, in order to quantify the differences between such sampling techniques.

Outcome criteria: There is a need to develop more sensitive outcome criteria in population research for two reasons. (i) The use of minimal intervention procedures in populations means that only a minimal amount of assistance is given to each smoker. Outcome criteria for clinical studies have generally consisted of measures of smoking status or reductions in the amount of cigarettes smoked. The use of measures such as these may be insensitive to the effects of minimal intervention procedures even though subtle changes occur which may help the smoker to eventually stop. (ii) When population-representative sampling is employed, there is a great expense involved in collecting data. This expense usually militates against the collection of follow-up data, which excludes the analysis of longitudinal relationships. As

future smoking status cannot be determined in cross-sectional studies, there is a need for variables which can act as dependent variables. These variables will need to be conceptually and empirically related to future cessation. Chapter 6 deals with the effect of theoretically-derived variables such as behavioural intention, readiness to quit and confidence on future cessation, with a view to using these measures as outcome criteria in future studies. This will allow for a better evaluation of short-term intervention outcomes and a better interpretation of cross-sectional survey data.

Effects of contextual factors: There has been a heavy emphasis in health psychology, on models and theories which focus upon the individual. Processes that influence the behaviours of populations may also be explained with reference to the way broad social and environmental contexts interact with individually-mediated factors (Jeffery, 1989). Models taken from other disciplines, and combined with psychological concepts, may enhance the explanatory power of psychological theories. An example of this may be the joint influences of social status and psychological factors on smoking cessation. Study 4 in Chapter 8 investigates associations between social status and some psychological variables related to smoking cessation, as it may be the case that the effects of social status may be mediated by these variables.

Modes of intervention: The majority of theoretical perspectives explaining the maintenance and change of smoking behaviour are based upon, or directed toward, clinical models of intervention. Such interventions are normally implemented by trained therapists who are able to conduct detailed individual assessments, tailor behavioural programmes and teach, monitor and reinforce adherence to those programmes. Their objective is to teach skills and strategies which enhance the client's ability to change behaviour. Population interventions are implemented using strategies such as mass media interventions. This results in the diffusion of the message and, therefore, the need to keep it as short and as simple as possible. Intensive contact with, or supervision of, smokers making cessation attempts is impossible. Self-instructional materials may represent an effective method of teaching more complex behavioural skills and attitudes in a minimal-contact setting. The study in Chapter 9 examines

the effects of using self-instructional materials in an attempt to teach skills and attitudes, favourable to smoking cessation, within a minimal-contact setting.

3.2.1 Sampling methods

Strengthening the contribution of psychological theory to population interventions requires the development of models to explain the initiation and maintenance of health related behaviours on a population-wide basis (Jeffery, 1989; Winett, King, & Altman, 1989). This enterprise may be best served by using theoretical perspectives tested on samples that are representative of that population. Almost all studies reviewed in the previous chapter use self-selected or other opportunistic samples that are potentially biased. These samples have been shown to differ from the general population along a number of potentially important dimensions such as reasons for smoking, smoking history, readiness to stop smoking and confidence (Warnecke, et al., 1991).

Schachter (1982) suggested that smokers who take part in formal smoking-cessation programs are likely to exhibit different characteristics, when compared to smokers in the general population. Schachter collected survey data on peoples' smoking histories from a university sample and from a sample of residents of a small town in New York State. He reported that, in these samples, 63% of people who had tried to stop smoking had been successful. A 22 year follow-up of the Framingham study in the U.S.A. has shown a spontaneous cessation rate (defined as the accomplishment of continuous abstinence for period of at least 12 months) of 40% during the time of the study (Sorlie & Kannel, 1990). These figures are comparable to the 30% to 50% long-term cessation rates achieved using intensive clinical programs (Glasgow & Lichtenstein, 1987). It must, however, be conceded that the clinical studies were time limited to between 6 and 18 months whilst smokers in the population studies had 20 to 30 years to attempt cessation. Schachter argues that selection effects may account for the fact that spontaneous cessation rates can rival those observed for formal clinical interventions. People who are least able to stop smoking through their own efforts, are most likely to seek assistance, although the very seeking of that assistance

indicates that these smokers are more strongly motivated to stop. Schachter's argument suggests that understanding the maintenance and change of smoking behaviour in the general population may require different models to those derived from research with clinical or other self-selected samples of smokers. It is therefore appropriate to use procedures which ensure that a sample of smokers, representative of the population under study, is collected.

Population-representative sampling is used by many research organisations for a number of purposes. Sampling methods usually involve cluster sampling where a population is divided into a number of small equivalent units (usually geographic areas), and some of those units are randomly chosen to be included in the sampling frame. Households within the area are randomly chosen as is a person within the household. A number of attempts are made to contact that person before their replacement in the sample (see Appendix 1. for a full description of sampling methods). Other, less expensive, ways of achieving a representative sample involve random telephone dialling techniques (eg. Lee, 1989a). The resultant samples may be weighted according to population census figures.

The use of population-representative sampling techniques will achieve two objectives. Firstly, use of these samples will provide a high level of generality for research findings. A knowledge of population parameters is important when attempting to interpret the results of studies employing non-representative samples (particularly intervention studies). This is particularly so if there is an intention to use findings as a basis to disseminate an intervention to the entire population (Flay, 1986). For example, the outcomes of interventions which recruit heavy smokers may not be relevant to the entire population, as lighter smoking may be maintained by different processes. Secondly, the use of population samples allows for accurate targeting of groups within the population for further research and intervention. It is not possible to use psychological (or any other) variables to identify and target sections of the population unless the population parameters are accurately quantified. If population parameters are not known, the size of the target group, relative to the population, will not be known, nor will be the extent to which they differ to the population. For example, researchers may wish to influence smoking prevalence by targeting and assisting smokers with high levels

of nicotine dependence. The effects of doing this may only be estimated if the number of smokers in this group and the level of their nicotine dependence relative to the general population are known.

There are now several examples of studies which use population-representative data sets to examine theoretically-driven propositions. Pierce, et al. (1987) applied the Theory of Reasoned Action to a study of smokers' intentions of future cessation, whilst Sutton, Marsh, and Matheson (1990) examined aspects of SEU theory. There are now several Australian studies which use data sets which are specially designed for analysis using psychological theories (Owen & Bauman, 1992; Owen, Wakefield, Roberts, & Esterman, 1992; Wilson, Wakefield, Owen, & Roberts, 1992).

The study reported in Chapter 5 will attempt to quantify the differences between smokers who attended a formal smoking-cessation program, and the more general population of smokers. Data from a population-representative survey of smokers will be compared with data obtained from smokers volunteering to enrol in a smoking-cessation program run by a community health centre. It is expected that the health centre sample will consist of those who find smoking cessation difficult but are more motivated to stop smoking. Owen and Davies (1990) found that female smokers were more likely to show a preference for personalised assistance with cessation, so it is expected that the health centre sample will have a higher percentage of women than the population sample.

3.2.2 Outcome criteria for population research

Population interventions rely upon the use of minimal-contact procedures which are transmitted using diffuse and varied media such as television, community leaders and medical practitioners. It is generally the case that, when dealing with a behaviour which is difficult to change, the prospect of success is proportional to the intensity of the intervention (Altman, et al., 1987). Minimal contact procedures promote cessation rates of between 5% and 20% (see Brown & Owen, 1992, Appendix 4.2).

These rates may be relatively low by clinical standards, particularly when difficult groups such as heavily dependent smokers are targeted for intervention.

Currently research designs, used in smoking-cessation studies employ one dependent variable, smoking status, and have time frames that do not often exceed one year (Glasgow & Lichtenstein, 1987). These research designs are adequate for intensive clinical interventions where effect sizes are expected to be relatively large. Mass-reach interventions are designed to produce small, but ultimately important, changes in a large number of smokers in order to increase the proportion of smokers who stop. Sometimes the aims of an intervention may not even be to stimulate immediate cessation in smokers. Long term studies such as the 22-year Framingham study (Sorlie & Kannel, 1990) show that the majority of smokers are able to achieve prolonged, unassisted, cessation if given a long enough time period. There is a need for the use of outcome criteria that are sensitive to subtle psychological changes in the target population and are predictive of abstinence achieved over longer periods of observation. The exclusive use of less sensitive outcome criteria, such as smoking status, for short term follow-up observations may result in the rejection of strategies that can prove useful for population intervention.

Whilst actual smoking cessation is the most objective and, in the long term, only desirable outcome for any intervention, there is a need to develop outcome indicators that identify short-term gains that lead to eventual cessation. These can then be used to evaluate programmes. If, for example, a number of smokers state a definite intention to stop smoking after exposure to a media campaign urging them to do so, that campaign may be seen as being effective, even if it does not immediately increase cessation rates. In clinical terms these gains would hardly justify the expense of intensive programmes but, in a population context, gains achieved at a low cost that are related to future cessation may be important. This is especially the case when there is large number of smokers involved.

An interesting illustration of how research findings from a clinical context may be misleading when applied to a population context may be derived from the work of

Lichtenstein, Glasgow and Abrams (1986). The authors evaluated a number of interventions, based upon the provision of social support, to determine their utility for clinical use. The research designs used small sample sizes, twelve month follow ups and used smoking cessation as an outcome variable. No statistically significant effects were observed in favour of the intervention conditions, leading to the conclusion that such interventions were ineffective. This conclusion may be correct if applied to intensive clinical programmes, but social support strategies have been effectively utilised in several mass-reach programmes (Windsor, Lowe, & Bartlett, 1988; Ossip-Klein, Giovino, Megahed, et al., 1991; Curry, Wagner, & Grothaus, 1991). Useful strategies may be overlooked if research designs inappropriate to a population context are employed.

The previous section has suggested that research on smoking behaviour, in a population context, is best conducted using population-representative sampling techniques. Longitudinal designs are superior to cross-sectional designs in smoking cessation research (Lichtenstein, 1982). However, surveys that involve both population-representative sampling and longitudinal designs are expensive, due to the added costs of recontacting participants. Consequently, population surveys in this area generally are cross-sectional rather than longitudinal. Such designs do not permit the use of future cessation as an outcome measure, and their interpretation requires that appropriate dependent variables be identified. These variables should be predictive of future cessation and should, ideally, be theoretically well-defined. The latter point is important because the difference between prediction and causality for these variables should be specified.

The stages of change model (Di Clemente et al., 1991) discussed in Chapter 1 (Section 4), suggests that behavioural change consists of a defined number of qualitatively different stages. Progress between stages of the smoking cessation process may increase the chances of a smoker achieving future cessation. This notion has support from both cross-sectional and longitudinal research, which suggests that navigation of all stages of smoking cessation is an important condition for permanent cessation (Di Clemente, et al., 1991). Thus, a media campaign may be designed to promote the movement of a substantial number of smokers from

the pre-contemplation stage to the contemplation or preparation stage of the behavioural change process. If this occurs, the campaign will have achieved its objective despite not having contributed to actual smoking cessation in the population at which it was aimed. Beiner and Abrams (1991) showed that a readiness to quit measure developed from the model predicted participation in a voluntary smoking education programme amongst smokers in a worksite, although it did not predict actual smoking cessation as defined by a smoker being abstinent during any 24-hour period during the 10 month course of their study. Readiness to quit may be expected to predict both the initiation and outcome of cessation attempts as it addresses all stages of the cessation process.

Behavioural intention is used in some social psychological theories of behavioural change (see Chapter 2, Section 2.2) as an indicator of future behavioural change. It is similar to the concept of readiness to quit, as it is used to signify a psychological state preceding behavioural change. Behavioural intention is argued to be mediated by the perception of smoking-related health risks and social norms (Ajzen, 1985; Sutton, 1987). However, due to the limited volitional control some smokers have over their behaviour, it may be limited to predicting the initiation of cessation attempts, rather than their outcome. Bandura's (1986) social learning theory suggests that self-efficacy mediates behavioural change (see section 2.2.2). Individuals' confidence in their ability to stop smoking may also be seen as a potential outcome indicator, as self-efficacy has been shown to be a strong and consistent predictor of outcome in the current research literature (O'Leary, 1985).

Outcome measures such as readiness to quit, intention to quit and confidence will become more important as mass-reach methods are targeted toward groups of smokers who find behavioural change difficult. They may be nicotine dependent, lack confidence or be smokers whose physical or social environments do not favour sustained smoking cessation. These people can hardly be expected to stop smoking within short time periods, but may make measurable progress on dimensions conceptually related to smoking cessation within that time.

Chapter 6 presents a study that assessed potential outcome variables for their use in population research. Baseline measures were taken from a population-representative sample of their readiness to quit smoking (a measure taken from the stages of change model), self-efficacy and behavioural intention. These variables will be used to predict whether a smoker has made a cessation attempt and, if so, abstinence at a twelve month follow-up. It is expected that the readiness to quit and confidence measures will predict both the initiation and outcome of cessation attempts but the behavioural intention measure will only predict the initiation of an attempt.

3.2.3 Social status and smoking

The social ecology perspective of health promotion (Winett, King, & Altman, 1989; Stokols, 1992) emphasises that health behaviours are influenced by the interactions of multiple factors operating at a number of different levels. Jeffery (1989) suggests that health behaviours are associated with broad social, cultural and economic norms, citing large cross-cultural and intra-cultural (e.g., social status) differences in smoking behaviour. The cessation of smoking is associated with individual factors such as those reviewed in Chapter 2, but also with factors such as price (Warner, 1986), availability (Chapman, 1980), advertising (Townsend, 1992), the social status of the smoker (Hill, White, & Gray, 1991) and the smoker's educational status (Wagenknecht, Perkins, Cutter, et al., 1990).

As noted in Section 3 of Chapter 1, psychologists and other health professionals working in the design and implementation of mass-reach population-based cessation interventions acknowledge the importance of employing multifaceted strategies emphasising the modification of smokers' physical and social environments (Puska, et al., 1985; Winett, King, & Altman, 1989). To provide an adequate research base for this enterprise, it is important that psychological theories employ perspectives which address these issues (Winett, King, & Altman, 1989; Jeffery, 1989). Theories of social facilitation, social support, communication and group processes all relate to the context within which smoking is

practised, but they are only recently beginning to receive concentrated attention from research psychologists working in the public health area (Winett, King, & Altman, 1989).

Due to the individualised focus of most clinical work, the current range of psychological theories applied to smoking favours models specifying attitudinal, cognitive and behavioural processes. However, it is unlikely that attitudes, beliefs and behaviours are acquired without reference to the social, intellectual and physical environment within which the individual exists. Smoking is practised within the context of these environments and may be influenced by advertising, monetary cost, the presence of other smokers and a diverse range of social reinforcers (Owen & Halford, 1988). Matthews (1989) speculates that variance attributed to socio demographic factors such as educational attainment and job prestige may reflect psychological processes which covary with these factors. Analyses of the interactions between socio-demographic and psychological factors may lead to a greater understanding of the factors which maintain and change smoking behaviour.

Social status is an example of a contextual factor which influences smoking behaviour. Social status is associated with differences in smoking prevalence and gradients in smoking-related morbidity and mortality. Lower-status groups have a greater smoking prevalence (Hill, White, & Gray, 1991) and their members are more likely to die from smoking related diseases (McMichael, 1987). These smokers are also less likely to stop smoking. Hill, White and Gray's recent (1991) population survey of smoking prevalence shows that lower social status groups, as defined by a measure of job prestige, contain a smaller percentage of ex-smokers. Smokers in these groups either are not willing to try to stop smoking or they are less capable of doing so if they try. Borland, Owen, Hill and Schofield (1991) found that smokers with a lower educational attainment were less likely to succeed if they made a cessation attempt compared with those of a higher status. Improving the effectiveness of mass-reach intervention programmes may require that greater attention is directed toward the identification and satisfaction of these smokers' needs (Pierce, Fiore, Novotney, Hatziandreu, & Davis, 1989).

There has been little quantitative research devoted to the examination of factors that contribute to the relationship between social status and smoking behaviour. Analyses of social-status influences on health behaviours have concentrated upon the structural level rather than that of the individual (Powles & Salzburg, 1989). Whilst it may be considered beyond the purview of psychologists to specialise at the structural level of analysis, the ability to study the effects of specific physical and social environments upon individuals' behaviour should not be. Social learning theory, for example, suggests that structural and personal environments influence behaviour by affecting factors, internal to the individual, such as outcome and efficacy expectations (Bandura, 1986). Such a model will be adopted in a study of social status and smoking behaviour (Study 4), but it will also be expanded to include the direct influences of behavioural factors such as habit strength, cessation history and nicotine dependence.

At the level of the individual, behavioural and psychological factors may involve knowledge of the health effects of smoking, priority given to health as a personal concern, nicotine addiction, perceived ability to stop smoking and the number of other smokers in the individual's social network. These factors affect the probability of a smoker changing that behaviour and may be, in turn, influenced by broad environmental factors such as social status. There are a number of possible ways in which social status may influence individuals' smoking behaviour. Fagerstrom and Schneider (1989) have noted that smokers who are physically dependent upon nicotine are likely to experience greater difficulties in stopping smoking than those who are not. Hill, White and Gray's (1991) population survey has shown that smokers in lower socio-economic groups smoke, on average, more cigarettes per day than those in higher groups. High smoking rates are associated with nicotine dependence so it may be the case that the maintenance of smoking in socially disadvantaged groups is, at least in part, due to this factor.

Sutton (1987) reviews a number of studies suggesting that smokers are more likely to attempt cessation if they perceive that doing so will result in benefits to their health. The extent to which the smoker perceives that smoking leads to specific, undesirable, health

consequences will, therefore, affect their intention to stop smoking. There is evidence from a British study that the quality of health information is lowest in the print media preferred by lower social groups (Kristiansen & Harding, 1988). It may, then, be the case that the maintenance of smoking behaviour in lower social-status groups is partly due to their members' less specific knowledge of smoking's effects on long-term health. A less specific knowledge of smoking-related risk factors may be associated with the reduced perception of smoking-related risk in groups of a lower social status.

Mass-reach smoking cessation strategies rely upon stimulating self-directed behavioural change. Winkler (1986) argues that participation in self-directed smoking cessation (and other health promotion) activities is likely to be an activity of the middle classes who are more likely to identify with programmes which emphasise self-reliance. If the smoker does not possess a belief that they can stop smoking it is unlikely that they will try to do so, or if they do, that they will succeed (Di Clemente, Prochaska, & Gilbertini, 1985). Pill and Stott (1985) suggest that, in general, the ability of people in lower socio-economic groups to assume responsibility and a sense of personal efficacy for behavioural change is less than that of other groups. This, they argue, is because people in socially disadvantaged groups are required to make fewer volitional changes of behaviour in their career, social or family lives. A perceived lack of personal efficacy by members of lower socio-economic groups may enhance the maintenance of smoking behaviour as they are less responsive to prompts to change their own behaviour. Smokers in socially disadvantaged groups would, therefore, be less likely to report high levels of confidence and be more likely to perceive difficulty in stopping smoking.

Smokers of a low social status may, due to some relative economic and social disadvantages, experience more stress in their lives than other smokers, yet have fewer resources to cope with this. This has often been cited as a reason for the greater prevalence of psychiatric disorders (Kessler, 1982) and unhealthy behaviours (Powles & Salzburg, 1989) in people of a lower social status. Smokers who are subject to stress may be less likely to either wish to, or to be able to stop smoking (Baer & Lichtenstein, 1988). Smokers who are under

stress may be less likely to assign a high priority to smoking cessation, preferring to deal with what they may perceive as more immediate issues. If this is so, smokers in groups of a low social status would be more likely to attribute their smoking to high levels of stress and to report that smoking cessation has a low priority for them.

The number of other smokers in an individual smoker's social environment has been shown to militate against either attempts at cessation being made or the chances of success if they are made (Mermelstein, Cohen, Lichtenstein, Baer, & Kamarck, 1986). There are a number of possible reasons for this: exposure to smoking related stimuli (such as cigarette smoke) may elicit cravings and subsequent relapse (Shiffman, 1982, 1984), smoking may be an important social norm in socially disadvantaged groups or there may be a lack of social support for any smoker who tries to stop (Mermelstein et al., 1986). Given that there is a higher proportion of smokers in disadvantaged social groups it is possible that there are more smokers in their social networks, contributing to the maintenance of their smoking. If this is the case, smokers in socially disadvantaged groups would report a greater number of other smokers in their immediate social, family and employment networks.

The empirical work reported in Chapter 6 will describe relationships between measures of social status (education and occupational prestige) and nicotine dependence, participants' knowledge of the health effects of smoking, risk perception, confidence in being able to stop smoking, the number of smokers in their social networks and intentions to try to stop smoking in the future. Two objectives may be achieved by these analyses. Firstly, they may help to elucidate the nature of relationships between social status and health related behaviour. Secondly, this research may provide an example of how psychological theories can be adapted to explain the influence of non-psychological variables on behaviour. Such a model can then be applied to other variables of interest to public health researchers such as physical and economic factors which influence smoking.

3.3 Objectives of this thesis

A behavioural epidemiologic framework emphasises the use of particular sampling techniques, outcome variables and the importance of contextual factors in smoking cessation. Sampling frames are wider to encompass population-representative samples, the outcome variables more sensitive to subtle changes in attitudes and behaviours and contextual variables are more heavily emphasised than in the analysis of individual behaviour. This may mean that the impact of psychological variables differs in a public health compared to a clinical context and that the transfer of knowledge from one context to the other may be a complex task. The objectives of the empirical work in this thesis are twofold: Firstly, to examine the applicability of behavioural epidemiology to a mass-reach smoking cessation strategies, by testing the hypotheses presented in this Chapter, and, secondly, to provide some indication of variables which are best associated with population smoking behaviour. Chapter 10 is devoted to an assessment of these variables and Chapter 11 is devoted to the discussion of the wider issue of implications for the use of a behavioural epidemiologic framework to integrate the disciplines of psychology and public health.

3.4 Summary

Psychological theory presents a number of insights into smoking behaviour. The issues which confront psychologists working in the area of population intervention are based around the difficulties in selecting appropriate theories and adapting them to suit a population context. The aims and methodologies of population intervention differ from those of clinical intervention in terms of the dependent variables used and the sampling techniques which need to be employed. Current psychological theory may give insufficient emphasis to contextual factors influencing the cessation process. There are also challenges in finding the best methods of teaching of knowledge and skills which help smokers to stop smoking which are addressed in the next chapter.

CHAPTER 4

THE USE OF SELF-INSTRUCTIONAL MATERIALS IN MASS-REACH SMOKING-CESSATION INTERVENTIONS

This chapter will consist of two main parts. The first will present a review of approaches to smoking cessation using printed self-instructional materials and the second will review strategies which have been used to augment the effects of these materials[1] . These will form the theoretical and conceptual basis of the two studies in Chapter 9.

Recent studies on self-instructional smoking cessation materials, dealing with the issues of outcome evaluation and the effectiveness of individual programme components, will be reviewed. The extent to which participants in self-instructional programmes actually comply with the content of the programmes will be examined, and shown to be low. Studies which attempt to augment cessation rates by providing smokers with individually tailored, interactive materials, social support and minimal levels of therapist instruction will also be reviewed. It will be concluded that the provision of personal contact and social support may be of benefit to smokers using self-instructional materials, but it is not certain that this is due to the actions of these variables in increasing the level of compliance to the materials. The rationale for the two empirical studies in Chapter 9 will be introduced.

Self-instructional behaviour-change programmes are used to intervene with a number of health related behaviours including cigarette smoking, weight loss and the maintenance of regular exercising. Such programmes are usually produced in a printed form such as books, manuals, pamphlets or kits but they can also be produced as audio and video tapes. They are designed to teach specific skills and techniques in order to facilitate the process of behavioural change. In a public health context, the materials may be used to complement mass media campaigns (Flay, 1987), worksite interventions (Fielding, 1991) or interventions administered by general practitioners (Richmond & Heather, 1990). Given that content of proven efficacy

[1] This review has been published as: Brown, S.L. and Owen, N. (1992). Self-help smoking cessation materials. *Australian Journal of Public Health, 16*, 188-191.

is expressed in easily understood language, the potential for using self-instructional programmes, in a mass-reach context, may be great. Cummings, Sciandra and Markello (1987) published a series of smoking cessation articles in a New York newspaper. Their evaluation findings suggested that 4% or 9,600 smokers in Eire County, New York, stopped smoking for at least one week.

4.1 Controlled evaluations of self-instructional smoking cessation materials.

Despite the potential of self-instructional materials for promoting behavioural change, there have been relatively few studies which evaluate their effects using control conditions such as waiting lists or the provision of lesser materials such as pamphlets or other handouts. This is a problem because self-instructional programmes often incorporate material which is derived from face-to-face clinical work which has not been subjected to controlled evaluation in a self-instructional context.

In order to demonstrate the value of self-instructional materials, outcome studies need to show that they promote greater abstinence rates than either non-intervention conditions or controls using less sophisticated materials such as short courses and pamphlets. Four published studies have evaluated the effects of printed self-instructional programmes compared to either non-intervention or pamphlet-only control groups. Pederson, Baldwin and Lefcoe (1981) used a sample of 37 smokers recruited from a local community to compare two smoking cessation books with a waiting list control. They found that both books elicited a greater abstinence rate than the control condition. However, the number of smokers in the study was small (the control group only consisted of nine participants) and participants' non smoking status were not biochemically verified.

Harackiewitz et al. (1987) gave a self-instructional manual to 47 smokers and a set of smoking-cessation pamphlets to 38 smokers. After twelve months the smokers with manuals achieved a 15% abstinence rate whilst those with pamphlets achieved 8%. Self-reports of abstinence were supported by biochemical measures. Janz, Marshall, Kirscht, Eraker, Billi and

Wooliscroft (1987) used a self-instructional manual to complement smoking cessation advice to outpatients from a physician and nurse. They do not specify an exact cessation rate but they report that, at a six month follow up, the manual and advice condition had a significantly higher abstinence rate than the advice only. They did not use biochemical measures.

Davis, Faust and Ordentlich (1984) used a community sample of smokers. As part of their study, they compared a self-instructional manual with a series of smoking cessation leaflets. Smokers in the manual condition achieved a cessation rate of 18% after 12 months compared to 12% in the control. Due to the large sample size, biochemical measures were not used. This may mean that the 18% figure is overstated, but the comparison is not affected as the same methodology applies to all conditions.

These studies provide some evidence for the increased efficacy of printed self-instructional behavioural change programmes over control conditions. The programmes promote abstinence rates of between 10-20% which are generally greater than control conditions. There have been few studies which biochemically validated participants' claims of abstinence, so it may be conceded that actual cessation rates may be even less than those reported in the literature. Whilst this is so, these studies provide strong evidence for the effectiveness of these materials and their use in mass-reach contexts.

4.2 Identifying the effective content of self-instructional materials

Self-instructional materials are designed to teach specific behavioural skills and techniques to smokers. It is, however, not clear whether the beneficial effects of using self-instructional materials are due to use of the specific content of the manuals or to other factors such as moral support, increased perception of a threat to health or merely the pride of owning a well packaged and presented set of materials. Cummings, Emont, Jaen and Sciandra (1988) compared four different self-instructional behavioural change programmes with a manual which only provided information on the health effects of smoking. They report taking care that all programmes were equally well packaged and presented. After six months, none of the

behavioural programmes were observed to be any more effective than the health information condition, although all conditions proved superior to a control. Furthermore, varying the nature of the behavioural content presented in the programmes produced no difference in abstinence rates.

Cummings et al. also asked their subjects to specify whether they had actually used the behavioural techniques presented in the manuals. Generally, smokers used less than a half of the techniques presented. Use of some techniques was associated with a successful outcome such as stimulus control, reinforcement of non smoking and 'cold turkey' cessation. However, these correlations may be spurious as the behavioural content of the manuals is likely to be used by participants who are more motivated and, therefore, more likely to succeed.

Results of the Cummings et al. study challenges the notion that the beneficial effects of self-instructional materials are due to participants' use of their specific content. Controlled studies are needed to elaborate upon this point. Varying the behavioural content of materials and observing participants' compliance rates will identify active components of behaviour-change programmes delivered in a self-instructional context.

4.3 Enhancing the effectiveness of self-instructional materials

The efficacy of self-instructional programmes may be enhanced if greater levels of adherence to their content can be achieved. There seem to be two aspects to the adherence problem: substantial portions of self-instructional programmes are rarely used, and those that are used may not always be implemented correctly. However, it is hardly surprising that low levels of compliance are observed in self-instructional programmes. There are very few intrinsic rewards for practising the techniques, programme participants do not have the opportunity to see the techniques modelled, there is no feedback from therapists and no checking on the participant's progress. The literature on medical compliance suggests that unless these factors are present to some degree, compliance will be poor (Peck & King, 1986).

Tailoring of materials to individual's needs and requirements may make the programmes seem to be more personally relevant and increase programme effectiveness by stimulating greater compliance. Heavily dependent smokers, negative affect smokers, habitual smokers, less confident smokers and other groups of smokers with special needs may benefit from programmes tailored to their specific requirements (Best, 1978). The use of interactive programmes may also help to increase compliance. Behavioural change programmes may be more effective if a participant's progress is monitored and constructive feedback given (Perri, Shapiro, Ludwig, Twentyman, & McAdoo, 1984).

Schneider, Benya and Singer (1984) used a microcomputer to produce a personalised correspondence smoking cessation course. The course was tailored to aspects of smokers' self-reported smoking habits and histories, and was administered as a series of lessons, each based on feedback from participants about their use of and reaction to the previous lesson. At the six-month follow-up, there was no significant difference in the abstinence rates between smokers using this programme and smokers using a standard course. Smokers in the personalised condition achieved an abstinence rate of 9.6% whilst those in the standard course achieved a rate of 9.8%. The authors did, however, find a higher abstinence rate for the smokers who completed the entire course compared to those who did not.

In a similar study, Owen, Ewins and Lee (1989) compared a personalised correspondence course with a standardised manual. They tailored their course on the basis of participant motivation, current smoking habits, subjective belief in addiction, confidence and concern over weight gain. After a nine-month follow-up period, using biochemical measures of smoking status, they found no difference in abstinence rates between the two conditions. Participants assigned to the personalised course condition achieved an abstinence rate of 10% whilst those in the standard course achieved a rate of 18%. However, they did find that completion of the course was related to smoking cessation.

At present there is no evidence to suggest that abstinence from smoking may be facilitated by personalised, interactive materials. Owen, Ewins and Lee (1989) suggest that the personalisation of the courses may not have been noticeable as the computer technology at the time only allowed for this to be done with a few variables. Furthermore, they suggest that personalising the course may create, in the participant, a greater perception of difficulty in achieving smoking cessation. In both studies, a minority of smokers actually completed the personalised courses suggesting that, either significant compliance problems still exist or that smokers do not use self-instructional materials in a time frame specific enough to accommodate the regular mailing of materials.

Curry, Wagner and Grothaus (1990) evaluated two methods of augmenting the cessation rates promoted by self-instructional materials. They attempted to increase the levels of intrinsic motivation of 304 smokers by providing them with personalised mailed feedback on their progress and reminding them of their reasons for stopping smoking. In another condition they attempted to increase the levels of extrinsic motivation of another 304 smokers by rewarding them with lottery tickets for programme adherence. These conditions were contrasted with a combined intrinsic/extrinsic condition of 304 smokers and a manual only condition of 305 smokers. After a twelve month follow up, biochemical testing showed that participants in the intrinsic motivation condition exhibited a significantly higher abstinence rate (17%) than the extrinsic (13%), combined (12%) or manual only (15%) conditions. All three treatment groups showed increased adherence to the manual compared to the control group but not compared to each other. The authors also concluded that the intrinsic motivation intervention increased the abstinence rates independently of any increase in adherence levels.

The provision of social support may help smokers to achieve permanent abstention (Janis, 1983). Windsor, Lowe and Bartlett (1988) implemented a social support condition where smokers nominated an ex- or non-smoking "buddy" who, along with the smoker's spouse, would agree to provide support for the cessation attempt. The "buddy" and spouse were then mailed a set of instructions concerning appropriate support strategies for a quitting smoker. The social support plus manual condition promoted a cessation rate of 19% in 94

smokers after 12 months compared to the manual alone condition which promoted a five percent success rate amongst 95 smokers. These results were validated by biochemical analyses.

The use of minimal-contact support and guidance services may assist smokers using self-instructional materials. Glasgow, Schafer and O'Neil (1981) offered group therapy to 30 smokers, where a therapist explained and elaborated upon techniques contained in the manuals. This condition was compared to a group of 26 smokers which met only as a discussion group. Biochemical testing showed that, at a six month follow up, the group therapy condition had a higher abstinence rate (26.7%) than the discussion group (3.9%). This they attributed to the therapist's assistance to participants in their implementation of the manuals. It seems that a low level of therapist instruction serves to augment the effects of self-instructional materials, although higher levels of contact may have little additional effect (Glasgow , 1979).

Ossip-Klein, Giovino, Megahed et al. (1991) used a telephone hotline to complement the use of self-instructional materials. They evaluated the effect of providing the option for 849 smokers to call either a 24-hour recorded telephone message service or a telephone counselling service to complement self-instructional materials. They compared this with a manual only condition containing 919 smokers. They used a quasi-experimental design where they allocated separate geographical regions to each condition to prevent cross-over between the conditions. Because participants were not randomly assigned to the two conditions direct comparison of cessation rate in the two conditions is difficult. Analyses using logistic regression techniques showed that smokers in the hotline condition were more likely to be abstinent at 12 and 18 month follow ups. Biochemical measures were used in this study.

There is some evidence that the effects of self-instructional materials may be enhanced by minimal levels of either social support or personal contact, although it is yet to be demonstrated that individually tailored, interactive programmes have any effect. There are a number of ways through which social support and personal contact may work to increase

abstinence rates compared to manual only conditions. Personal contact may serve to increase compliance with the behavioural content of self-instructional materials through constant prompts, reminders, reinforcements and instruction in the techniques themselves. Unfortunately, neither Glasgow et al. (1981) nor Windsor et al. (1988) sought to measure the levels of compliance in their intervention or control conditions so it is not possible to show that their interventions were successful through increasing compliance.

Swan and Denk (1987) have shown that smokers can cycle through a number of failed cessation attempts until they finally succeed. Personal contact may encourage smokers to make more cessation attempts or simply encourage them to try harder when they do. The interest of others may also encourage smokers to monitor their own progress. It is well known that self-monitoring may effect the exhibition of a target behaviour. In the case of a habitual behaviour such as smoking, self-monitoring may well serve to decrease its frequency (Hunt, Matarazzo, Weiss, & Gentry, 1979). Finally, the relationships between social and therapist support and smoking cessation may be mediated by affective factors. Put more simply, people who have higher levels of social support may be happier or more emotionally stable and, therefore, more able to cope with the difficulties involved in stopping smoking (Janis, 1983).

4.4 Implications of findings

Controlled trials suggest that self-instructional smoking cessation materials assist some people to stop smoking. However, it is not certain whether these effects are due to use of the specific content of the materials or to other, unknown, factors. There is a dearth of published research devoted to compliance with self-instructional materials and the processes smokers go through in order to stop. There is also a need for studies which vary the content of materials in order to examine, in a controlled way, the particular techniques which are effective in a self-instructional context.

There is some, limited, evidence that the effectiveness of these materials may be increased by combining them with social support or minimal therapist contact. This may occur through increasing the level of compliance to the specific content of the materials although compliance may not be the only contribution of social support interventions. Prompting, self-monitoring, confidence or affective factors may also mediate the relationship between personal support and smoking cessation. Elaboration of causal links is important for the development of self-help materials. Large numbers of smokers may be helped at a relatively small cost and smokers who would not accept other forms of intervention may be helped in this way (Schwartz & Dubitzky, 1967; Owen & Davies, 1990). Particular importance should be placed upon outcome studies which demonstrate the range of different interventions which do augment smoking cessation and the level of personal contact required to be effective.

Glasgow, Schafer and O'Neil (1981) augmented cessation rates by actually assisting smokers to implement the content of the manuals. This was independent of social or therapist support which was also provided to participants of the discussion group. It is thought that similar results may be obtained for less cost if this style of intervention could be implemented using telephone contact. Study 6 presented in Chapter 8 will be designed to test the proposition that minimal levels of therapist support administered by telephone can augment the effect of providing a self-instructional cessation manual. It is thought that brief telephone contact from therapists will encourage participants to increase compliance with the manual and to implement the techniques more effectively. The study will also be designed to examine levels of adherence to the specific content of the materials.

4.5 Summary

The provision of self-instructional materials to smokers making cessation attempts will help some of them to stop. There is some doubt as to the reason for this, as smokers do not seem to actually use a great deal of the specific behavioural content. The provision of personalised support has been shown to augment the effect of these materials; perhaps by making the

content of the materials easier to implement and by providing some social support. In Study 6 (Chapter 8), an intervention will be tested where the use of self-instructional materials is augmented by minimal telephone contact by therapists.

CHAPTER 5

STUDY 1: POPULATION RESEARCH AND THE LIMITATIONS OF NON-REPRESENTATIVE SAMPLING TECHNIQUES

Section 3.1 of Chapter 3 examined some conceptual problems encountered when generalising information derived from studies which use clinical and other self-selected samples to the wider population. The study reported in this chapter will attempt to quantify the problem by comparing characteristics of a population sample with those of volunteers for a structured smoking cessation programme at a community health centre[2]. In South Australia, community health centres have been established in metropolitan areas to serve the needs of between 50,000 to 100,000 people. They are composed of teams of multi-disciplinary health professionals who are trained in aspects of primary and secondary health care.

Schachter's (1982) argument suggests that the community health centre sample (smokers attending an organised cessation program) will consist of smokers who are willing to change their smoking behaviour, but also be those who find self-directed cessation difficult (see Section 3.1, Chapter 3). It is expected that smokers enrolling in the programme will be older, as older smokers are known to find cessation more difficult (Borland, et al., 1991) and more likely to be female, as it has been shown that females are more likely to prefer organised cessation programmes than males (Owen & Davies, 1990).

It is also expected that smoking rates will be higher in the health centre sample, as smoking rates are seen as being an indicator of habit strength and nicotine dependence (Heatherton, Koslowski, Frecker, & Fagerstrom, 1991). Due to their greater habit strength and motivation to quit, it is predicted that smokers in the health centre sample would have made more attempts to stop smoking. The health centre sample may suffer from a greater

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[2] This study has been published as: Brown, S.L., and Owen, N. (1990). Population versus clinical perspectives on smoking behaviour. *Behaviour Change, 7*, 120-125.

level of nicotine dependence and, therefore, will be more likely to attribute previous relapses to withdrawal symptoms such as strong cravings and irritability (Fagerstrom & Schneider, 1989).

5.1 Method

Findings from a survey of a population-representative sample of the South Australian population, carried out in July 1987 by the Australian Bureau of Statistics (ABS), were compared to findings from a survey of participants enrolled in a smoking-cessation program at the Tea Tree Gully community health centre (reported in Study 6, Chapter 9). The Australian Bureau of Statistics assisted with the population survey as part of its Monthly Labour-Force Survey in July 1987 (ABS, 1988). Due to the ABS's policy governing the use of their data sets (outlined in Appendix 1), the data were taken from response frequencies published in the Bureau's publication Smoking and Asthma in South Australia (ABS, 1988).

The population sample was a self-weighting, multistage, clustered area sample of 0.43% of South Australian dwellings. This resulted in a final sample of 4644 persons aged 15 years and over, weighted according to independently revised 1986 Census parameters for age, sex, area of usual residence and employment status. There was no replacement of the sample required, as there were up to five call-back visits for the urban residents, and up to three call-back visits for rural residents. Details of the sampling method are discussed in full in a document entitled Smoking and Asthma in South Australia (ABS, 1988).

The survey was conducted by personal interview in the home of the respondents by trained ABS interviewers. It was expected that reactivity of the participants toward the interviewers would be very low, as the ABS is not a health organisation with a particular interest in smoking. Of the 4644 participants interviewed, 1398 were smokers. This corresponds to a population estimate of 326 283 (30% overall smoking prevalence; 34.7% for males and 25.5% for females) persons aged 15 years and over being current smokers,

comparable to the prevalence rates found in a national smoking survey conducted at the time (Hill, 1988).

Participants for the community health centre sample were recruited using local media and community outlets in the health centre's catchment area. The smoking-cessation course was advertised in the centre's regular column in the local newspaper two weeks in advance, with a follow-up feature article appearing a week later in a community news column. Advertising was also presented at a community information booth situated in the major local shopping centre and at a public hospital. All advertisements requested that persons interested in smoking cessation attend an information evening. At the end of that evening, interested persons were given the option of enrolling in the course contingent upon the completion of a brief self-administered questionnaire. No person refused to complete the questionnaire. Seventy-one per-cent (n=32) of enrolled participants claimed to have responded to the feature article in the community news column. The data presented here are from 45 participants who initially enrolled in the course.

Five identical questions were asked of smokers in both surveys: gender, age, current smoking rate and the total number of previous cessation attempts; in addition, participants who had previously stopped smoking were asked to identify the main reason for their last relapse from a list of nine possible responses (these included - enjoy smoking too much, stress or tension, lack of willpower, cravings too strong, encouraged by others, too irritable without cigarettes, boredom, or putting on weight).

5.2 Results

Five categorical variables, common to both surveys, were used in the analysis. These are presented in tables 5.1, 5.2 and 5.3. Differences between the two samples on the variables were examined using the Kolmogorov-Smirnov chi-square statistic (Siegal, 1956). All tables show the data as percentages.

Table 5.1 shows the sex and age differences between the two samples.

Table 5.1: Comparison between the samples on age and sex (the numbers are percentages).

	Population sample	Health centre sample
Sex		
Male	58	38
Female	42	62
Age		
15-29	39.3	17.8
30-44	33.1	35.6
35-59	16.9	24.4
over 59	13.7	22.2

As predicted, the health centre sample was significantly older ($X^2_{(2)}= 8.1$, $p< .05$) and biased toward females ($X^2_{(2)}= 34.5$, $p< .001$) compared to the population sample. Table 5.2 Shows the number of cigarettes smoked per day and the number of prior cessation attempts made by smokers in both samples.

Table 5.2 Comparison between the samples on smoking rate and the number of previous cessation attempts (the numbers are percentages).

	Population sample	Health-centre sample
Daily smoking rate		
Less than 20	57.9	22.2
20-39	38.5	73.4
40 or greater	3.6	4.4
Number of cessation attempts		
None	27.1	14.3
One	21.3	23.8
2-4	34.2	52.4
5-9	8.7	9.5
10 or greater	8.7	0.0

The smokers in the health centre sample had higher smoking rates ($X^2_{(2)}=21.88$, $p<.001$) and a greater number of cessation attempts ($X^2_{(2)}=31.7$, $p<.001$). This supports Schachter's proposition that smokers enrolling in formal programmes are those who experience more difficulty stopping but are more motivated to do so.

Table 5.3 Comparison between samples for the reason for the smokers' previous relapse (numbers are percentages).

	Population sample	Health-centre sample
Enjoy smoking	13.7	9.4
Stress/tension	19.9	6.3
Lack willpower	15.4	15.6
Craving	11.0	6.3
Encouraged by others	10.8	15.6
Irritable	5.6	34.4
Boredom	7.2	3.1
Weight gain	3.8	3.1
Other	12.5	6.3

Table 5.3 examines the reasons attributed by smokers for their last relapse. The two-tailed Kolmogorov-Smirnov test was used to test the significance of sample differences for each response (Siegal, 1956). At the .05 probability level, all differences of 20.5% and above are significant. The only statistically-significant difference was the greater tendency for the health centre sample to attribute relapse to irritability (28.6% difference) compared with the population sample, who were less likely to endorse any single response.

5.3 Discussion

Data obtained from a population-representative sample of smokers was compared with that from a sample who chose to enrol in a formal smoking cessation program offered by a community health centre. Women, heavier smokers and older people were over-represented in the self-selected health centre sample. Older people and heavier smokers may have a

history of difficulty with cessation, influencing them to join an organised programme, whilst an earlier study found that women were more likely to express preferences for assistance from a formal programme (Owen & Davies, 1990). Smokers in the health-centre sample had made more previous cessation attempts and were also more likely to attribute the main reason for their last relapse to irritability. This irritability may perhaps be due to more severe withdrawal reactions in this group, although it may also reflect a lower capacity to tolerate emotional distress.

There are some limitations on the inferences which may be drawn from this study. The health-centre sample was drawn from the population of Tea Tree Gully, an urban, predominantly middle-class area which is not wholly representative of the general population of South Australia. Therefore the sampling frame, which was confined to Tea Tree Gully, is somewhat different to that of all of South Australia as it is biased toward urban middle class people. Cigarette smoking is more prevalent among those who are less well-educated, and in lower-status occupations (Wagenknecht, Perkins, Cutter, Sidney, Bourke, et al., 1990; Winkleby, Fortmann & Barnett, 1990; Hill, White, & Gray, 1991), so it is possible that this sample obtained from a middle class population is biased compared to the rest of the state. Another limitation is that the population-sample data were collected by interview, while the health-centre data were collected using self-administered questionnaires. Lastly, a potential problem may arise because all reported associations are bivariate. Multivariate statistical techniques would have been useful to evaluate levels of unique and shared variance explained by what are potentially inter-correlated variables such as age, smoking rate and the number of previous cessation attempts. Unfortunately, due to the inability to gain access to the ABS data set itself (see Chapter 3, Section 2.1), multivariate analyses could not be conducted. Such limitations mean that inferences must be drawn with some caution, but there are some interesting implications.

These data are consistent with Schachter's (1982) argument that smokers who seek formal assistance are likely to be those who find cessation to be more difficult. The members of the health-centre group were older and, presumably, had been smoking for a longer period

of time, they were heavier smokers, had made more unsuccessful cessation attempts, and showed more evidence of discomfort associated with withdrawal. Smokers enrolling in the health-centre program may have been more likely to be either contemplating or attempting cessation (Di Clemente, et al., 1991) as they had made more attempts to stop smoking. Smokers who enrol in structured smoking-cessation programs may be attempting to change a pattern of behaviour which is difficult to change, but they may have a strong commitment to do so. This point is important in a practical sense because it shows that smokers choosing to enrol in structured programmes may have similar characteristics to those who have difficulty in stopping smoking by their own efforts (Borland, et al, 1991; Hellman, et al., 1991).

Theoretical accounts of the behavioural processes which influence smoking in self-selected samples may not be appropriate to understanding the maintenance and change of smoking behaviour in the more general population, which is the focus of this thesis. This may result in less effective interventions or even interventions which are potentially damaging, in a context where programme costs may run to millions of dollars. For example, Pierce, Dwyer, Chamberlain, Aldrich and Shelley (1987) used probability sampling techniques to obtain samples of the smoking populations of Sydney and Melbourne. They tested elements of Ajzen and Fishbein's (1980) theory of reasoned action to assess the most appropriate mass-reach strategies and techniques for population intervention. Their findings using a population sample were somewhat different to findings previously reported with other samples (Sutton, 1987). Pierce et al found that the perception of an anti-smoking social norms were positively associated with the intention to quit in smokers who saw cessation as being beneficial to health. However, this same perceived social influence was inversely associated with the intention to quit in smokers who did not see cessation as being beneficial to health. The obvious implication of this is that the manipulation of social influence may be counterproductive when applied to this group of smokers as they may react adversely to that influence. Such a finding has important ramifications for population intervention. These may have been overlooked if the study had not been conducted with a population representative sample. Pierce, et al's (1987) findings certainly show the need to use appropriate population

sampling techniques when the results of research are used to design population intervention strategies.

Population sampling techniques have been applied to the study of the prevalence of behaviours such as smoking, vigorous exercise, ultra-violet sunlight exposure, alcohol consumption and stress (Risk Factor Prevalence Study Management Committee, 1990) and are now quite common (Palinkas & Hoiberg, 1982). These surveys may also be used for the theoretically-based study of psychological factors affecting population smoking prevalence (Owen, 1989). Variables dealing with smoking history, previous cessation attempts, attitudes, confidence, intentions and readiness to stop smoking may be used to test a number of hypotheses relating to the process of smoking cessation. These items may also be used to elaborate upon factors influencing the behaviour of key segments of the smoking population.

Apart from the Pierce, et al. (1987) study cited earlier, few studies have been conducted using probability sampling techniques. Owen and Davies (1989) used a population sample to assess smokers' preferences for assistance with cessation, and found that most smokers who wished to receive assistance preferred working with a health professional. Owen, Wakefield, Roberts and Esterman (1992) conducted a prevalence analysis of South Australian smokers in each of Di Clemente et al's. (1991) stages of change. Sutton, Marsh and Matheson (1991) used a British sample to test theoretical propositions derived from subjective expected utility theories. Their results were consistent with previous analyses using SEU theory with smokers showing that smokers' intentions to stop are predicted by multiplying the desirability of the consequences of cessation by the perceived likelihood of those consequences actually occurring.

In addition to theory-testing, the use of population samples enables researchers to determine the utility of that theory as a basis for intervention. For example, theories of nicotine dependence are undoubtably valid, but the prevalence of nicotine dependence in the general smoking population is not known. Researchers are also unaware of the role that nicotine dependence plays in the maintenance of smoking behaviour in the general population,

as compared to clinical populations. If health workers are to concentrate upon interventions which address the problem of nicotine dependence, they may wish to know its population prevalence and the existence of possible confounding factors such as motivation and confidence. The use of population data sets not only enhances the generalisability of study findings, but also allows for a more effective targeting of groups of smokers (Pierce et al., 1987).

The use of population surveys does, however, have some limitations. Due to the expense of conducting follow-up observations, surveys are generally cross sectional. Few are designed to study longitudinal relationships. Cross-sectional designs do not enable the prediction of future behaviour (e.g., cessation or cessation attempts) based upon current attitudes, beliefs and behaviours (see Section 2.2, Chapter 3). In order to overcome this difficulty it will be necessary to follow either the full sample or a randomly-selected portion of it in order to re-survey them at a later stage to identify variables which are predictive of future cessation. Study 2 in Chapter 6 will present data from a longitudinal study using population probability sampling methods to examine the role of variables such as behavioural intention, readiness to quit and confidence as predictors of self-initiated cessation attempts and their outcomes.

5.4 Summary

This chapter compared characteristics of a group of smokers volunteering for a cessation programme at a community health centre, with those of a population-representative sample of smokers. The smokers in the health centre sample were older, more likely to be female, more likely to be heavy smokers and more likely to be dependent upon nicotine. However, they had made more cessation attempts than the population sample which suggests that they were more motivated to quit. These findings support Schachter's (1982) suggestion that smokers in clinical and other self-selected samples may differ systematically from other smokers in the community. Psychological theories which have been tested upon self-selected samples may not be appropriate to other smokers in the community, so their usefulness for the design of

population-based interventions may not be appropriate. The next three chapters will feature the use of population-representative surveys in the testing of psychological perspectives appropriate to community smoking behaviour.

CHAPTER 6

STUDY 2: CORRELATES OF SMOKING CESSATION ATTEMPTS, AND THEIR OUTCOMES, IN A POPULATION-REPRESENTATIVE SAMPLE

Study 1 examined the problem of sampling bias in smoking research, and it was recommended that future surveys employ techniques ensuring that population-representative samples are obtained. Due to the expense involved in their collection, such surveys do not often employ follow-up observations, examining longitudinal effects. This is certainly the case with the data sets to be used in subsequent chapters. Section 3.3 of Chapter 3 described a need for the identification of variables which are theoretically and empirically linked to future cessation which may then serve as dependent variables in cross-sectional population surveys. This chapter reports findings from a study, using a longitudinal design and a population-representative sample, which was designed to identify such variables.

It is expected that Beiner and Abrams' (1991) readiness to quit measure, derived from the stages of change model, will be associated with both the initiation and outcome of cessation attempts, as it encompasses all stages of the cessation process (Di Clemente, et al., 1991). A measure of behavioural intention should predict the initiation of cessation attempts but, is not expected to be associated with their outcome when applied to behaviours such as smoking which may be characterised by a lack of volitional control (Ajzen, 1985; Sutton, 1987; see Section 3 of Chapter 2).

This study also provides an opportunity to evaluate aspects of the behaviour-change model presented in section 2.2.1. According to Slovic (1987) high perceptions of smoking-related health risk would predict the initiation of cessation attempts. A history of many prior cessation attempts may predict the initiation of a cessation attempt, but may also militate against a successful outcome as these smokers may have particular difficulties in achieving cessation (Owen & Brown, 1991). Smokers who have not made a cessation attempt in the last twelve months are expected to be less likely to attempt cessation. Once initiated, low

levels of nicotine dependence (Fagerstrom & Schneider, 1989) and low levels of habit strength (Matarazzo, Weiss, & Gentry, 1979) would be expected to predict the likelihood of successful outcomes. According to Bandura's (1986) social learning theory, high levels of confidence would predict both the initiation of cessation attempts, and there is some empirical evidence to suggest that confidence may be associated with the outcome of cessation attempts (Condiotte & Lichtenstein, 1981; O'Leary, 1985; Di Clemente, Prochaska & Gilbertini, 1985; Baer, Holt, & Lichtenstein, 1986).

There has been some recent interest in the effect social status may have on behavioural change (see Section 2.3 of Chapter 3). A variable measuring educational attainment has been included in the study as this is a strong social-demographic correlate of smoking behaviour (Wagenknecht, Perkins, Cutter et al. 1990). There are no theoretical grounds to differentially associate educational attainment with the initiation or the outcome of cessation attempts, although Borland, Owen, Hill and Schofield (1991) found that it was associated with the outcome of attempts, and it is expected to be so in this study.

6.1 Method

The data for this study were obtained by negotiation with the Centre for Behavioural Research in Cancer (CBRC) in Melbourne, Australia. The centre had commissioned the Roy Morgan Market Research Company to administer a telephone survey to a population-representative sample of smokers, and to complete a twelve month follow up on a randomly selected sub-set of the original sample. At the twelve-month follow-up participants were asked if they had made a cessation attempt and, if so, whether they were currently smoking.

Participants in the survey were 333 smokers over the age of 16 years. Interviewing was conducted on weekends and the sample selection was based upon Commonwealth of Australia (Federal) subdivisions. Names and addresses were taken from the electoral roles and households adjoining the identified elector were approached until eight interviews were completed. Selection of one interviewee within each household was dependent on pre-

determined sequence based upon age and gender. At least two separate attempts were made to contact interviewees. Interviews were conducted with 60% of people approached, the remaining 40% were sample replacements.

Procedure: During 1989 the baseline questionnaire was administered by interview to 333 participants. After twelve months, a follow-up telephone survey was administered to a randomly selected sub-sample of 172 of the original survey participants. Participants were asked if they were smoking at the time of the follow-up and, if so, whether they had attempted to stop in the twelve months since the baseline questionnaire.

Information on the following items was collected in the baseline survey:

Readiness to quit and behavioural intention: Participants were shown a prompt card with a ladder drawn on it (see Beiner & Abrams, 1991). An example of the cards used in this and subsequent studies is presented in Appendix 3.6. Five of the rungs were marked with statements used to define stages within the readiness to quit measure: "I have no thought of quitting" (precontemplation), "I think I need to consider quitting someday" (contemplation 1), "I think I should quit, but I'm not quite ready" (contemplation 2), "I'm thinking about how to change my smoking patterns" (preparation 1) and "I'm taking action to quit (e.g. cutting down, enrolling in a program)" (preparation 2). Respondents were asked to indicate the rung which best described them with regard to quitting. This variable best predicted the outcome of cessation attempts when all contemplation and precontemplation stages were combined and compared to the preparation stages (see Appendix 2.2). This was used for all analyses. Participants were also asked if they intended to stop smoking within the next 3 months.

Risk perception: Participants were shown a card with percentages from 0-100% marked at intervals of ten and asked to estimate both the percentage probability of them developing a fatal health condition due to smoking, and to estimate the percentage probability of them developing a non-fatal illness.

Cessation history: Respondents were asked to estimate the number of times that they had tried to stop smoking. This was coded into four values: none, one, two or three and four or greater. Participants were then shown a card specifying time periods ranging from one week to 10 years or more and asked to choose the period representing the time elapsed between the time of the interview and their last serious attempt. To create a normally distributed variable, smokers were then grouped into those who had tried to stop in the previous twelve months, and compared to those who had not.

Habit strength: Smokers were asked to estimate the number of packets of cigarettes they smoked per week. The survey estimates were compared by the CBRC with community cigarette consumption figures and shown to be accurate. A smoking rate per day was calculated by multiplying the number of packets by the smoker's reported packet size and dividing the result by seven. Participants were also asked to estimate the elapsed time, in minutes, between waking and smoking the first cigarette of the day. The time periods were: "within 15 minutes", "15 minutes to half an hour", half an hour to an hour" and "greater than an hour". To create a normally distributed variable, smokers were grouped into periods of less than or equal to half an hour and greater than half an hour.

Confidence: Participants were asked how confident they were that they could stop smoking, permanently, if they tried to do so. They were shown a card with the following statements and asked to nominate the one which they felt best applied to them: definitely will not, very unlikely, quite unlikely, half and half, quite likely, very likely and certain. To create a normally-distributed variable, confidence was coded into three values: unlikely (which included definitely not, very unlikely and quite unlikely), half and half and likely (which included definitely, very likely and quite likely).

Educational attainment: Participants were asked to specify their highest educational attainment. This was categorised thus: primary and some secondary education (equivalent to approx. 8 to 11 years schooling), completed secondary (equivalent to approx. 12 to 13 years schooling) and completed tertiary qualification.

6.2 Results

To ensure that the sub-sample who were recontacted for follow-up were representative of the original, a stepwise discriminant function analysis was performed to identify any systematic baseline differences between those who were, and those who were not, recontacted. There were no differences on these measures (eigenvalue=0.03, canonical correlation=0.17, n.s.), suggesting that the follow-up sample was representative of the original.

At the twelve month follow up 52.5% (n=90) of smokers had not made a cessation attempt, 30.8% (n=53) had made a cessation attempt but were smoking at the follow up and 16.9% (n=29) reported that they were non-smokers at the follow-up. The analyses are based upon two twelve month follow-up outcomes. Smokers who had made an attempt, regardless of outcome, were compared with those who had not made an attempt. The second analysis involved a comparison of the non-smokers at follow-up with those who had attempted to stop but were smoking at the time of the follow-up. These analyses were conducted using bivariate statistical tests (either chi-square, Fisher's exact or t-tests). Due to correlations between several of the independent variables (see Appendix 2.1), two stepwise discriminant function analyses were performed to estimate the variance unique to each independent variable.

Bivariate predictors the initiation and outcome of cessation attempts: Table 6.1 shows the bivariate relationships between all independent variables and the initiation of cessation attempts. The initiation of a cessation attempt was associated with younger age, higher perceived chance of a fatal illness and a non-fatal illness, a higher number of prior cessation attempts, less time elapsed since the last cessation attempt, higher confidence, and the statement of an intention to quit. Variables which did not predict the initiation of a cessation attempt were smoking rate, time taken between waking and smoking, educational attainment and sex. Of the readiness to quit categories, non-membership of the contemplation 1 stage and membership of the preparation 1 stage were associated with the initiation of a cessation attempt.

Table 6.1 Means and proportions of the independent variables for smokers who did, and did not, initiate cessation attempts (S.D.s are in parentheses).

Variable	No attempt	Attempt	Significance
Age	39.20 (13.71)	35.00 (14.03)	t(170)=3.20*
Sex - Male	47.0%	37.8%	X2=1.7
- Female	53.0%	62.2%	
Intention - intending	16.7%	59.7%	X2=39.2***
- not intending	83.3%	40.3%	
Readiness - precont + cont	72.0%	59.7%	X2=8.43**
	18.0%	40.2%	
Chance of fatal illness	53.7 (29.1)	66.7 (27.7)	t(166)=2.88**
Chance of non-fatal illness	57.4 (27.3)	66.1 (27.7)	t(166)=2.29*
Smoking rate@	20.4 (11.96)	17.3 (13.85)	t(170)=1.64
Time after waking	2.62 (1.23)	2.62 (1.21)	t(170)=0.00
No. of cessation attempts	1.57 (1.11)	2.07 (0.91)	t(170)=3.25***
Time since last attempt			
- Less than 12 mths	21.1%	42.7%	X2=10.7**
- Greater than 12	78.9%	57.3%	
Confidence	1.89 (0.84)	2.30 (0.80)	t(167)=3.33***
Education - some secondary	42.2	37.8	X2=3.9
- completed sec.	37.8	47.6	
- tertiary	20.0	14.6	

*p<.05, **p<.01, ***p<.001

@ The mean and standard deviations of the raw smoking rates are presented here, the t-value is calculated on the basis of a square root transformation of the variable.

Table 6.2 shows the bivariate relationships between all independent variables and the outcome of cessation attempts. Once initiated, the successful outcome of cessation attempts was associated with less time taken between waking and smoking, and high confidence.

Table 6.2 Means and proportions of the independent variables for smokers who attempted to stop, by the outcome of the attempt.

Variable	Unsuccessful	Successful	Significance
Age	35.75 (13.71)	33.60 (14.69)	t(80)=0.66
Sex - Male	37.7%	37.9%	X2=0.0
- Female	62.3%	62.1%	
Intention - intending	56.6%	65.5%	X2=1.7
- not intending	43.4%	34.5%	
Readiness - precon + cont	69.8%	41.4%	X2=6.30*
- preparation 1 + 2	30.2%	58.6%	
Chance of fatal illness	64.4 (27.9)	70.7 (28.5)	t(79)=0.92
Chance of non-fatal illness	64.4 (27.8)	69.3 (27.7)	t(78)=0.75
Smoking rate@	18.7 (13.67)	14.8 (14.16)	t(80)=1.34
Time after waking	2.41 (1.17)	3.00 (1.22)	t(80)=2.13*
No. of cessation attempts	2.07 (0.94)	2.07 (0.88)	t(80)=0.00
Time since last attempt			
- Less than 12 mths	43.4%	41.4%	X2=0.82
- Greater than 12	56.6%	58.6%	
Confidence	2.13 (0.83)	2.62 (0.62)	t(80)=2.76**
Education - some secondary	47.2	20.7	X2=5.7
- completed secdry	39.6	62.1	
- tertiary	13.2	17.2	

*p<.05, **p<.01, ***p<.001

@ The mean and standard deviations of the raw smoking rates are presented here, the t-value is calculated on the basis of a square root transformation of the variable.

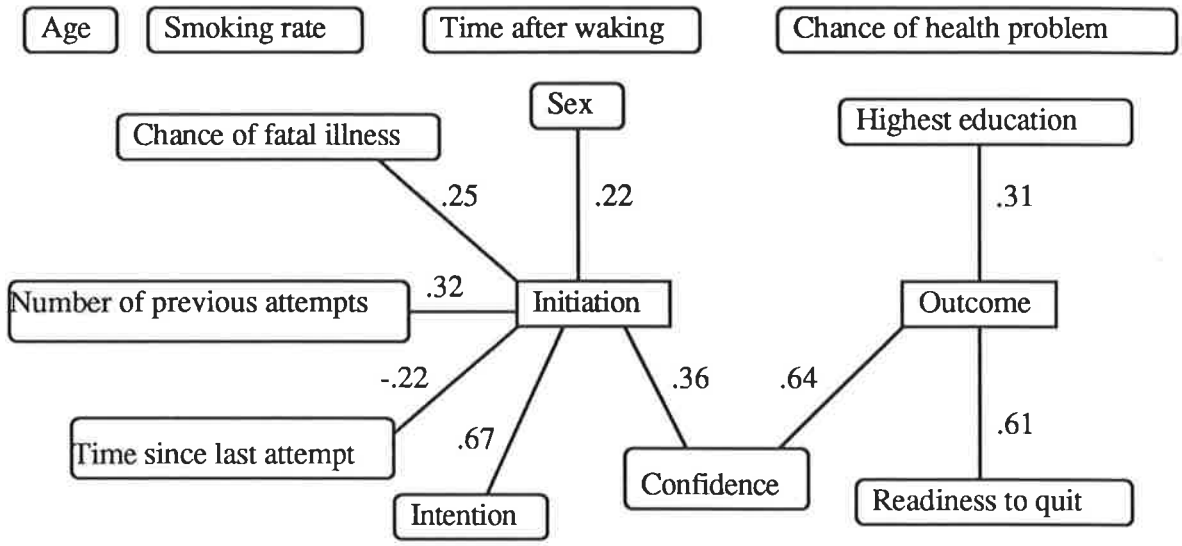
Variables which were not associated with the outcome of a cessation attempt were age, sex, smoking rate, number of prior cessation attempts, time elapsed since the last cessation attempt, the perceived chance of a fatal illness, the perceived chance of a non-fatal illness, educational attainment and intention. Of the readiness to quit measure, only membership of the preparation 1 stage was associated with the successful outcome of cessation attempts

Multivariate analyses: As there were associations between some dependent variables, multivariate analyses were used to determine the extent to which each predictor variable was uniquely associated with the dependent variables. All independent variables were entered into stepwise discriminant function analyses using both the initiation and outcome of cessation attempts as dependent variables. Preliminary bivariate analyses suggested that the readiness to quit measure best predicted the outcome of cessation attempts if the precontemplation stage was combined with both contemplation stages and compared with a combination of the two preparation stages (see Appendix 2.2). The resulting binomial variable was used in the multivariate analyses Figure 6.1 shows all significant standardised discriminant function coefficients. Both functions, predicting initiation (eigenvalue=0.39, canonical correlation=0.53, $p<.001$) and outcome (eigenvalue=0.19, canonical correlation=0.40, $p<.05$), were significant.

Female smokers, smokers with multiple previous cessation attempts, smokers with less time elapsed since their last attempt, less well educated smokers and those perceiving a greater risk to their own health were more likely to attempt smoking cessation. Better educated smokers were more likely to successfully stop. High levels of confidence predicted both the initiation and outcome of cessation attempts. Membership of the preparation stage was associated with a successful outcome, but not the initiation, of cessation attempts.

The chance of smoking causing a non-fatal health problem was not a multivariate predictor of the initiation of a cessation attempt, despite being a strong bivariate predictor. This may be attributed to the fact that this variable shared much variance with the perceived chance of a fatal illness item. In the multivariate analysis, this variance was attributed to the fatal illness item (the F to enter statistic of the non-fatal illness item decreased from 1.2 to 0.0 when fatal illness entered the discriminant function analysis). The bivariate association between the time taken to smoke after waking and outcome was not apparent in the multivariate analysis. Age, smoking rate, perceived chance of a non-fatal illness and the time to smoke after waking variables were not significantly associated with the initiation or the outcome of cessation attempts.

Figure 6.1 Significant multi-variate relationships between the independent variables and both the initiation and outcome of cessation attempts (the figures are standardised discriminant function coefficients).



The relationship between intention and readiness to quit: The performance of both the intention and readiness to quit variables has potentially important implications for models of behavioural change. Intention is the better predictor of the initiation of attempts, although the two variables share much variance (the F to enter statistic of the readiness to quit measure decreased from 7.9 to 0.5 when intention entered the discriminant function analysis), but only readiness to quit predicts outcome. It may be the case that the formation of a behavioural intention represents either a unique stage of the behavioural change process or a better definition of an existing stage. In order to help determine this, associations between intention and the readiness to quit categories were analysed. Behavioural intention was moderately associated with the full readiness to quit measure ($r=0.37$, $p<.001$). In order to identify the role of behavioural intention in the quitting process, the readiness to quit measure was divided into its component stages, and correlation coefficients between stage membership and intention were computed. These are displayed in Table 6.3.

Table 6.3 Pearson correlation coefficients showing relationships between intention to quit and the readiness to quit categories.

Stage	Correlation
Precontemplation	-.23**
Contemplation 1	-.11
Contemplation 2	-.12
Preparation 1	.28**
Preparation 2	.23**

** p<.01

The data presented in Table 6.3 suggests that the relationship between behavioural intention and readiness to quit is based, largely, upon the former's discrimination between the contemplation and preparation stages. The statement of a behavioural intention may be associated with progress between these two stages and, due to it's prediction of the initiation of a cessation attempt, may be potentially useful in helping to define the preparation stage.

6.3 Discussion

The major objective of this study was to establish variables which are associated with future cessation and may then be used as dependent variables in cross-sectional population surveys. A baseline measure of intention to quit within the next three months was related to the initiation of cessation attempts whilst the readiness to quit measure predicted both the initiation and outcome of cessation attempts (although the association of readiness to quit and the initiation of cessation attempts was non-significant when the effect of intention to quit was controlled). A single item measure of confidence in being able to stop smoking was associated with both the initiation and outcome of cessation attempts. Readiness to quit and confidence may be potentially useful as outcome variables in cross-sectional surveys and when evaluating minimal-contact intervention programmes.

The results of future studies which use these variables as outcome measures should, however, be interpreted with some caution. Bandura's (1986) theory proposes that self-efficacy acts as a mediator of behavioural change - which would make it an ideal outcome variable as causal processes are directly measured. However, there has been some criticism of

this proposal and suggestions that self-efficacy may play a merely diagnostic role in the behavioural change process (see section 2.1.2). Furthermore, the single item measure of confidence employed here is quite different to the multi-dimensional construct which has been described in previous theoretical and empirical literature (Baer, Holt, & Lichtenstein, 1986). The original construct involves the measurement of expectancies relating to specific aspects of smoking cessation. The use of a single item confidence measure may be contaminated by situational factors such as other behavioural agendas or by dispositional factors.

These results differ from those of Beiner and Abrams (1991), who found that a similar readiness to quit scale did not predict the achievement of a 24 hour period of biochemically verified abstinence at any time during a ten-month intervention period. However, due to a number of methodological differences, their study and the present one are not directly comparable. This study did not use biochemical testing, was not an intervention study (although the initial interview may be considered to be a form of intervention), a different criterion for abstinence was used and this sample was representative of the general population whilst that of Beiner and Abrams was derived from a worksite. Beiner and Abrams also used the ladder as an interval measure. This study tried a number of permutations of the ladder before using the dichotomous variable (pre-contemplation and contemplation versus preparation) as it was the better predictor of cessation (see Appendix 2.2).

The preparation stage of the readiness to quit measure seems to be a key factor in predicting future behavioural change, as the smokers who were in that stage were more likely to both attempt and succeed at cessation. Intention to stop smoking was strongly related to the initiation of cessation attempts and was very much associated with membership of the preparation stage. As the intention variable was far more strongly related to the initiation of cessation attempts than the readiness to quit variable, it may be usefully incorporated into the stages of change model. The formation of a definite intention to act may signify the resolution of cognitive processes characteristic of the contemplation stage (Di Clemente, et al, 1991). Agreement with the statement "I intend to try to stop smoking within the next three months" (intention) is a better predictor of a cessation attempt whilst agreement with

the statement "I'm thinking about how to change my smoking pattern" (preparation) predicts a successful outcome. It may, therefore, be the case that smokers who commit themselves to the planning of a cessation attempt are more likely to succeed at smoking cessation than those who simply express an intention to stop. It is unlikely that the preparation stage merely signifies a higher motivation to quit, as it was not as strong a predictor of cessation attempts as intention to quit.

The number of prior cessation attempts and whether the smoker had attempted cessation in the last year were both predictors of a cessation attempt independently of measures of intention or readiness to quit. This supports Di Clemente et al's. (1991) proposition that the recency and number of prior cessation attempts can assist in discriminating between smokers, in each stage, who are and are not likely to make cessation attempts. The association between the outcomes of previous cessation attempts and the likelihood of subsequent attempts being made is an important issue for the conduct of mass-reach cessation programmes and is further addressed in Study 3 (Chapter 7).

The initiation and outcome of cessation attempts were predicted by different patterns of variables. Risk perception items and items dealing with the smokers' histories of previous cessation attempts predicted the initiation, but not outcome, of cessation attempts. The outcome of cessation attempts was predicted by confidence, education and readiness to quit. This suggests that they may be qualitatively different processes. These findings favour multi-stage models of behavioural change (Di Clemente, et al., 1991). Consideration needs to be given to helping smokers to form an intention to stop, helping them to prepare to stop and assisting theme to cope with the problems involved in immediate cessation and long-term maintenance (Brownell, Marlatt, Lichtenstein & Wilson, 1986). There is a related problem of assisting smokers who make multiple unsuccessful cessation attempts (Owen & Brown, 1991). There is some research literature concerning the initiation of cessation attempts in mass-reach settings (Flay, 1987; Farquhar, et al., 1990), but there is less on how to influence outcomes once a cessation attempt has been made (Glynn, Boyd, & Gruman, 1990). The use of self-instructional materials (Davis, Faust, & Ordentlich, 1984, Brown & Owen, 1992) and

social support programmes (Windsor, Lowe, & Bartlett, 1988) have been successfully used to help smokers stop. A major challenge for health psychologists is the theoretically guided development of population-wide behavioural interventions to assist people who make smoking cessation attempts.

The findings did not support the predictions that smoking rate and time elapsed between waking and smoking the day's first cigarette would be associated with the outcome of cessation attempts. This is inconsistent with the results obtained by Hellman, et al. (1991) and Borland, et al. (1991) who did not use population-representative samples. The role played by nicotine dependence, whilst important in clinical or other opportunistic samples, may not be as significant in the general population. The differences between the clinical and population samples, observed in Study 1, suggest that the population sample would manifest a lower level of nicotine dependence. This does not mean that habit strength and nicotine dependence are not useful concepts, they may merely be less applicable to the general population of smokers than they are to clinical or other opportunistic samples.

There is a growing body of literature which suggests that a lower educational attainment is associated with the maintenance of smoking and other unhealthy behaviours (Winkleby, Fortmann, & Barnett, 1990; Wagenknecht, Perkins, Cutter, et al., 1990; Winkleby, Jatulis, Frank, & Fortmann, 1992). Findings from this, and a previous study (Borland et al, 1991), suggest that educational attainment is related to the outcome of cessation attempts but not their initiation. This finding is interesting, but difficult to interpret as the influence of education may be due to several different factors. The effect may be explained by factors which are intrinsic to the variable itself. Smokers with higher levels of education may be better able to deal with conceptual problems such as planning and the use of cognitive strategies, which may be important parts of smoking cessation attempts (Marlatt & Gordon, 1985). Educational attainment may also be a marker for other causal processes. Educational status is an indicator of social status which may affect behavioural change processes. This idea is further examined in Study 4 (Chapter 8). Education may also be associated with dispositional characteristics such as persistence, personality and intelligence which may also

influence smoking cessation. Further research is required to determine why education is associated with the outcome of cessation attempts, and Study 4 in Chapter 8 will attempt to do this.

Over 30% (n=53) of smokers in the study made unsuccessful cessation attempts. These smokers were less likely to be in the preparation stage, had a lower average educational attainment and were less confident in being able to stop. There is evidence that large segments of the population are willing to, or considering making cessation attempts but seem unable to do so. Owen, Wakefield, Roberts, and Esterman, (1992) interviewed a population representative sample of smokers and found that 75.9% were in either the contemplation or preparation stages, but the majority of them had made previous cessation attempts and they were not highly confident of success. Some 73% of the population has made a cessation attempt sometime in the past (ABS, 1988). These findings are promising for the potential impact of mass-reach intervention, if strategies can be developed to help these smokers. This numerically large group of smokers represent a natural target group for researchers interested in smoking cessation as their smoking is practised at higher rates (Hellman, et al., 1991) which creates a greater health problem, but they are, to some extent, willing to try to stop. The challenge for researchers working in mass-reach contexts is to determine why these smokers experience difficulty stopping and to determine ways of assisting them.

The next two chapters will address these problems. Chapter 7 examines the effects of past cessation attempts upon the likelihood of future cessation. Chapter 8 examines social gradients in smoking prevalence and the likelihood of a given smoker achieving cessation. Finally, Chapter 9 examines the use of self-instructional materials and telephone support in assisting smokers to stop.

6.4 Summary

Measures of readiness to quit, confidence, behavioural intention and other variables predicted the initiation and outcome of smoking cessation attempts in a population-representative

sample. The readiness to quit and confidence measures predicted both initiation and outcome whilst the behavioural intention variable only predicted the initiation of cessation attempts. The other variables showed different predictor patterns for initiation and outcome consistent with the model presented in section 2.2.1, suggesting that these two processes may be qualitatively different. Readiness to quit and confidence will be used as dependent variables in the cross-sectional surveys reported in Chapters 7 and 8.

CHAPTER 7

STUDY 3: ASSOCIATIONS OF THE NUMBER AND DURATION OF PREVIOUS CESSATION ATTEMPTS WITH THE LIKELIHOOD OF FUTURE SMOKING CESSATION

Findings from the previous chapter suggested that there is a substantial segment of the population who make cessation attempts, but are not able to succeed. These smokers represent a significant challenge to the designers of mass-reach intervention programmes as successful intervention with members of this group may lead to a large impact upon disease incidence because as their smoking is practised at high rates. A factor which may affect the maintenance of smoking behaviour in this group is the adverse effects of previous unsuccessful cessation attempts upon their confidence in being able to stop, and the difficulty they perceive in doing so (see Section 3 of Chapter 2). This study will examine associations between the number of previous cessation attempts, the duration of the longest period of abstinence, and smokers' confidence and perceived difficulty of future cessation[3] .

Self-efficacy theory and the relapse prevention model, reviewed in Section 1.2 (Chapter 2) suggest that people who have had some success with cessation attempts, in terms of being able to stop smoking for long periods of time and not having suffered a great number of failed attempts, would exhibit increased confidence in being able to stop in the future. Conversely, those who have had many previous cessation attempts and have not been able to stop smoking for long periods of time, would exhibit less confidence than those who had made only one previous attempt.

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[3] This study has been published as: Owen, N. and Brown, S.L. (1991). Smokers unlikely to quit. *Journal of Behavioral Medicine, 20,* 627-636. The order of authorship shows that N. Owen, who supervised this thesis, is first author. This occurs for two reasons 1) He contributed $1,000 for the payment of a fee charged by the ABS (see Appendix 1) for the analysis of data and 2) because he played a major part in the conceptualisation and writing up of the published version. The version appearing in this chapter differs from the published version and represents the work of the author of this thesis.

Brownell et al. (1986) propose an incremental-learning model, which suggests that each cessation attempt increases the smoker's knowledge of the processes required to stop smoking. It may be the case that the longer a smoker remains abstinent, the more likely it is that she or he will learn about the difficulties of remaining abstinent beyond the initial cessation attempt (Prochaska, Velicer, Di Clemente, & Fava, 1988). Smokers who have abstained for longer periods of time would, therefore, be expected to have a fuller appreciation of the difficulties involved, and may rate cessation as being a more difficult task, yet be more confident of success. The incremental-learning model would therefore, predict that, for smokers who have abstained for periods of longer than a month, there would be a greater level of confidence in being able to stop smoking but a greater appreciation of the difficulty involved compared to those who have not been able to stop for a week. Both the self-efficacy model and the incremental learning perspective would predict that confidence would be lower and perceived difficulty higher for a greater number of prior cessation attempts.

Nicotine dependence theory suggests that smokers, who have many unsuccessful cessation attempts and who are not able to stop for long periods of time, would manifest signs of nicotine dependence such as strong cravings, withdrawal symptoms and high smoking rates (Fagerstrom & Schneider, 1989; see also Section 1 of Chapter 2). It is expected that these smokers will attribute both relapse and current smoking to strong cravings, irritability and that they will be heavier smokers than others.

A possible consequence of smokers losing confidence in their ability to stop is that they may be more likely to feel that they require help from an outside agency such as their doctor or another professional, rather than trying to stop by their own efforts, or by using self-help materials (Owen & Davies, 1990). Those who have made many unsuccessful cessation attempts, or have been able to abstain for only short periods of time, would be more likely to express preferences for personalised assistance with stopping smoking.

7.1 Method

The data set used in this study is the population data set used in Study 1 (Chapter 4). The sampling methodology and the conduct of the survey is the same as reported in that section.

Smokers were asked to estimate the number of times they had attempted to stop smoking and the longest period of time they had managed to remain abstinent. For the purposes of the analyses, smokers who reported a single cessation attempt were compared to those who had made five or more attempts. The effects of five or more attempts were examined, because the incremental-learning (Brownell, et al., 1986) suggests that multiple attempts may increase the probability of future success. Smokers whose longest reported period of continuous abstinence was less than one week were compared to those who had managed to abstain for more than a month - on the assumption that, after one month, the pharmacological effects of smoking withdrawal are likely to have largely abated (Henningfield, Goldberg, & Jasinski, 1987). participants were also asked to rate perceived difficulty of stopping and confidence as one of three categories ('very', 'fairly', or 'not at all'), and to nominate the most relevant of a set of prescribed categories of reasons for previous relapses and for current smoking. Reasons for relapse were: enjoyment of smoking; stress/tension; lack of willpower; cravings; encouragement from other smokers; irritability; not serious about quitting; boredom; stopped only for pregnancy; weight gain; don't know; or, other. Reasons for current smoking were: addiction; enjoyment; relaxation; friends smoke; stress/tension; sociability; boredom; don't know; or, other.

Participants were allowed to choose a preferred method of assistance from a prescribed list which included a stop smoking group, a lecture, a telephone counselling service, a book, pamphlet or quit kit, a TV programme or video, a programme conducted through the mail, a programme through your doctor, a programme through another health professional or none. For the purposes of the analysis, preferences for methods of assistance were divided into four major categories: personalised assistance (including individual and group programs), self-help (including printed and audiovisual self-instructional materials),

programs through the doctor or other health professional, and a preference for no assistance at all.

7.2 Results

There were 234 smokers (17% of all smokers in the survey) who reported having made only one previous cessation attempt, and 184 smokers (13% of all smokers) who reported having made five or more previous cessation attempts. There were 76 smokers (5.4% of all smokers) who reported having previously abstained for less than one week, and 342 smokers (24% of all smokers) who had previously abstained for more than one month. Although the use of these categories has resulted in the exclusion of a relatively large portion of the overall sample of smokers, the numbers remaining (because of the large initial sample size) still provide adequate statistical power, with the categories used being well-separated.

Preliminary analyses tested for differences between the independent variables (number, and duration, of previous cessation attempts) on age, gender, and current smoking rate. There were no differences between any of the groups on current smoking rate (number of attempts, t = 0.26; duration, t = -1.36) or gender (number of attempts, $X^2_{(1)}$= 0.2; duration, $X^2_{(1)}$= 3.7). Age was not related to the number of cessation attempts ($X^2_{(3)}$= 6.05) but was positively related to the duration of the longest where those who had not been able to abstain for longer than a week were younger than those who had abstained for more than a month ($X^2_{(3)}$= 18.45, p<.01). Appendix 2.3 shows these associations.

Confidence: Bivariate analyses showed that there was a negative association between confidence and the number of cessation attempts ($X^2_{(2)}$=25.6, p<.001) and a positive association for the duration of the longest cessation attempt ($X^2_{(2)}$=32.4, p<.001). Table 7.1 shows the percentage of smokers in each of these categories.

Table 7.1: Associations of the number and duration of previous cessation attempts with confidence. Numbers are percentages.

	Very Confident	Fairly confident	Not confident
Number of attempts			
One	38.3	31.3	30.5
Five or more	29.6	15.0	55.4
Duration of longest attempt			
Less than week	9.2	20.3	70.5
Greater than month	39.7	24.5	35.8

Preliminary analyses showed some associations between the number and duration of cessation attempts and age, gender and smoking rate. To control for the effects of these variables, they were entered into stepwise logistic regressions. Regressions were performed separately for the number and duration variables, as the purpose was to control only for age, gender and smoking rate. Using the logistic regression, the number of previous cessation attempts ($X^2_{(2)}=7.85$, $p < .01$) was a unique predictor of confidence as was the duration of the longest previous attempt ($X^2_{(2)}= 11.70$, $p<.001$).

Table 7.2: Logistic regression showing unique relationships between confidence and other variables.

Variable	d.f.	chi-square	significance
Age	4	0.72	n.s.
Gender	2	2.74	n.s.
Smoking rate	2	0.86	n.s.
Duration of longest attempt	2	11.70	<.001
Number of previous attempts	2	7.85	<.01

Perceived difficulty: Bivariate analyses showed that there was a positive association between perceived difficulty and the number of cessation attempts ($X^2_{(2)}$=15.3, p<.001) and a negative association for the duration of the longest cessation attempts ($X^2_{(2)}$=50.3, p<.001). Table 7.3 shows the percentage of smokers in each of these categories.

Table 7.3: Associations of the number and duration of previous cessation attempts with perceived difficulty. Numbers are percentages.

	Very Difficult	Fairly Difficult	Not Difficult
Number of attempts			
One	33.9	27.1	40.0
Five or more	53.3	20.0	26.7
Duration of longest att.			
Less than week	76.3	17.3	6.3
Greater than month	34.9	25.5	39.7

As with the confidence variable, logistic regression techniques were used to identify variance unique to each independent variable (Table 7.4). The logistic regression showed that duration of the longest previous period of abstinence was a unique predictor of perceived difficulty ($X^2_{(2)}$= 18.93 p < .001) as was the number of previous cessation attempts ($X^2_{(2)}$= 6.49, p<.05).

Attributions for Relapse and Current Smoking: Bivariate analyses showed that smokers who had made only one cessation attempt were significantly more likely to report strong cravings and encouragement from others as reasons for relapse ($X^2_{(2)}$= 15, p < .05). Smokers who had been abstinent for less than a week were more likely to attribute relapse to lack of willpower and strong cravings whilst those who had been abstinent for a month or more were more likely to attribute relapse to stress and tension ($X^2_{(2)}$= 38.5, p < .001).

Table 7.4: Logistic regression showing unique relationships between perceived difficulty and other variables.

Variable	d.f.	Chi-square	Significance
Sex	2	2.73	n.s.
Age	2	2.20	n.s.
Smoking rate	2	0.37	n.s.
Number of previous attempts	2	6.49	<.05
Duration of longest attempt	2	18.93	<.001

Smokers who had been abstinent for less than a week were more likely to attribute current smoking to addiction whilst those who had abstained for a month or more were more likely to attribute current smoking to stress and tension ($X^2_{(2)}= 16.7$, $p < .05$). There were no significant relationships between the number of previous cessation attempts and reported reasons for current smoking ($X^2_{(2)}= 13.4$, $p<.001$). Table 7.5 shows these associations. Smokers who had previously abstained for a month or more were significantly more likely to express a preference for no forms of assistance with cessation, compared to those who had previously abstained for less than a week ($X^2_{(2)}= 4.1$, $p < .05$). or between number of attempts and preferences for any forms of assistance with cessation.

7.3 Discussion

This study investigated relationships between the number of smokers' previous cessation attempts, the duration of the longest attempt, the perceived difficulty of, and their confidence in, achieving cessation. The prediction, derived from Brownell et al.'s. (1986) incremental-learning model of change in the addictive behaviours - that a greater number of cessation attempts would be associated with higher levels of perceived difficulty of cessation, but also with higher levels of confidence about future cessation - was not supported by the present

Table 7.5: Associations of the number and duration of cessation attempts with: reasons for current smoking and preferences for assistance with cessation. Numbers are percentages

	Number of attempts		Duration of attempts	
	One	Five or more	< 1 week	> 1 month
Reason for relapse				
Enjoy smoking	16	10	12	13
Stress/tension	19	22	9	23
Lack willpower	11	14	26	9
Strong craving	8	16	22	9
Encouraged by others	16	8	7	14
Irritable	5	3	9	3
Other	26	27	15	29
Reason for current smoking				
Addicted	37	47	57	38
Enjoyment	26	20	16	25
Relaxation	11	8	5	11
Stress/tension	10	7	7	9
Other	14	18	14	18
Preferences for services				
Personalised	7	9	9	7
Self-help	9	14	10	12
Doctor	24	31	32	25
None	47	48	37	49

findings. Smokers who had not been able to stop for longer than a week and those who had made five or more unsuccessful cessation attempts, had both a greater perception of difficulty in stopping smoking and a lower level of confidence in being able to do so.

The hypotheses derived from the self-efficacy and relapse prevention models were supported. These models would suggest that negative experiences with cessation are causally related to high levels of perceived difficulty and low confidence. These are, however, not the only explanations for the findings - it may have been the case that high perception of difficulty and lack of confidence may have caused failure in cessation attempts.

The interpretation of these results may be clouded by statistical issues. The categorisation of the independent variables was done according to theoretical grounds explained in the method section. However, these categorisations (one versus five or more cessation attempts; a period of less than a week's duration for the longest period of cessation versus more than a month) are comparisons of extreme scores. Such a method of analysis is not sensitive to curvilinear relationships between variables. An example may be the relationship between number of previous cessation attempts and confidence. Confidence may be increased after one or two failed cessation attempts (through a process of gaining familiarity with the task of smoking cessation) and then decrease after subsequent attempts. The effect shown by the method of analysis employed in this study would be an overall decrease. It may, therefore, be the case that the incremental learning model does apply under some conditions, but the nature of the analysis was such that the effect would not easily be detected.

As predicted by nicotine dependence theory, smokers who had made five or more cessation attempts, and smokers who had not been able to stop smoking for a period of more than a week, were more likely to attribute relapse to strong cravings and irritability and current smoking to addiction. It may be the case that these smokers were more dependent upon nicotine. However, there were no associations between the number or duration of cessation attempts and smoking rate, an important (but not exclusive) index of nicotine dependence, which may weaken this interpretation.

It is possible that attributions for both relapse and current smoking may be directly affected by the smoker's history of cessation attempts. Eiser's (1982) application of the dissonance construct reviewed in section 2 of Chapter 2 suggests that attributions to uncontrollable factors such as addiction, lack of willpower or overpowering cravings may be a way of resolving the dilemma between continuing to smoke and knowing that there are health risks involved in doing so. Thus, smokers who have made few cessation attempts would be more likely to attribute their previous relapses to factors outside of their control than would those who had made many previous cessation attempts. For the same reason, smokers who

have experienced only short periods of abstinence in the past would be more likely to attribute previous relapses to factors outside of their control than would those who have experienced longer periods of abstinence. Another explanation might be that the attributions to strong cravings and addiction made by those who had abstained for only a short duration may have been somewhat arbitrary and specific attributions which fitted with a general sense of not being able to gain control of smoking behaviour. Such an attribution may function to alleviate the dissonance caused by not being able to achieve a personally important goal, rather than reflecting smokers' experience of craving and subjective discomfort.

Interventions designed to stimulate immediate attempts at permanent cessation may not be appropriate for smokers who have unsuccessful histories of cessation attempts. Given the likelihood of failure, further dissipation of confidence may occur. Self efficacy theory suggests that confidence may be enhanced by the pursuit and accomplishment of short-term goals (Bandura, 1986). A more flexible range of individual goals could be considered as appropriate for these smokers. Reductions of smoking rate may be promoted as goals, provided that they are seen as steps toward cessation, and they should be followed by other actions such as cessation attempts. This may assist nicotine dependent and high rate smokers (Foxx & Brown, 1979). Smoke free days may, also, be promoted as achievable goals on the path to permanent cessation.

Smoking bans in the workplace may force smokers to stop smoking for long periods of time, a feat which they may previously have seen as difficult to accomplish. These periods of abstinence may be promoted as representing a behavioural accomplishment rather than painful withdrawal periods. Marlatt and Gordon (1985) suggest that smoking cessation may be viewed as an ultimate objective, but the success or failure of any one attempt is irrelevant. All of these methods define steps toward permanent cessation which are achievable and can contribute toward the development of an enhanced personal efficacy and lower perception of difficulty.

It may be appropriate to provide smokers with some form of assistance in terms of helping them to choose an occasion for stopping which will maximise their chances of success. For example, they should be free of stress (Baer & Lichtenstein, 1988), have ample social support (Mermelstein, et al., 1986) and be in a position to avoid smoking-related stimuli (Shiffman, 1982,1984). The use of self-instructional materials and social support strategies may be useful for helping these smokers to stop (Brown & Owen, 1992). Finally, nicotine replacement therapy may be appropriate to members of this group, if it is combined with a relapse prevention intervention (Lam, et al., 1987). Future research will help to better define characteristics of smokers who are having trouble with cessation and assist in the development of interventions which assist them to stop smoking.

Smokers who had abstained for a month or more were more likely to express a preference for none of the forms of assistance specified, than were those who abstained for less than one week. This may be because they perceive themselves as being better able to stop under their own direction. Apart from this particular association, there were no significant associations between the two smoking-history variables and preferences for assistance with cessation. There was no support for the prediction that multiple attempts and short-duration abstinences would be associated with preferences for more intensive and personalised forms of assistance with cessation.

7.4 Summary

This chapter reported the findings of a study which showed the negative effects of both multiple and short duration cessation attempts on confidence and the perceived difficulty of cessation. There was also evidence to support the contention that these smokers are likely to resort to explanations of behavioural uncontrollability to reduce cognitive dissonance associated with continuing to smoke. Smokers' prior experience with cessation had no effects upon their preferences for services assisting them with cessation. These results were seen as supporting a model whereby smokers become increasingly demoralised after unsuccessful

cessation attempts and may benefit from assistance in structuring future attempts in ways which will help them to overcome this problem.

CHAPTER 8

STUDY 4: SOCIAL STATUS AND SMOKING BEHAVIOUR

Studies reviewed in Section 2 of Chapter 1 suggested that social status gradients in morbidity and mortality for cardiovascular disease and cancer are a cause for public health concern. These gradients have been related to similar gradients in smoking behaviour (McMichael, 1985). Smoking is more prevalent in lower social status groups, smoking rates are higher and there is a lower incidence of cessation. A finding of study 2, presented in Chapter 6, was that a higher level of education is associated with the ability to stop smoking once an attempt is made. The control of smoking in groups of a lower social status is now a public health priority (Pierce, et al., 1989).

The aim of the study reported in this chapter is to identify and describe associations of social status with smoking behaviour and variables which are known to influence smoking behaviour. These associations may suggest possible mediating relationships between social status and smoking behaviour. A related aim is to determine if social status differences are associated with any particular stage or aspect of the cessation process, and to suggest some appropriate modes of intervention. Section 2.3 of Chapter 3 reviewed a number of theoretical perspectives suggesting some ways in which social status may affect an individual's smoking behaviour. These perspectives are restated below.

There is evidence that smokers in groups of a lower social status have higher smoking rates (Hill, White & Gray, 1991) and it is possible that these smokers are also more dependent upon nicotine (Fagerstrom & Schneider, 1989). High levels of habit strength and nicotine dependence may, therefore, be partly responsible for higher smoking prevalence in these groups.

Mass-reach smoking cessation strategies rely upon stimulating self-directed behavioural changes. Pill and Stott (1985) suggest that the ability of people in lower social

status groups to assume a sense of personal efficacy and, therefore, responsibility for behavioural change may be lower than that of other groups. This, they argue, is because people in socially disadvantaged groups are required to make fewer volitional changes of behaviour in their career, social or family lives. If smokers do not possess a belief that they can stop smoking it is unlikely that they will try to do so, or if they do, that they will succeed (Di Clemente, Prochaska & Gilbertini, 1985). A perceived lack of personal efficacy in members of lower social status may enhance the maintenance of their smoking behaviour, as they feel that they are less able to respond to prompts to stop. Smokers in groups of a lower social status are expected to be more likely to perceive greater difficulty in stopping smoking.

There is evidence that the quality of health information is lowest in the print media preferred by lower social status groups (Kristiansen and Harding, 1988). Sutton (1987) reviewed a number of studies, concluding that smokers are more likely to attempt cessation if they perceive that doing so will result in benefits to their health. It may, then, be the case that the maintenance of smoking behaviour in lower social-status groups is partly due to their less specific knowledge of smoking's effects on long term health and the benefits which may be gained from cessation.

Smokers in lower social status groups may, given their relative economic disadvantage, experience more stress in their lives. They may also allocate a greater priority to activities concerned with satisfying immediate needs such as shopping, child care and working. If this is the case they would be more likely to cite stress and other priorities as causes for their continued smoking.

The number of other smokers in an individual smoker's social environment has been shown to militate against either attempts at cessation being made or the chances of success if they are made (Mermelstein, Cohen, Lichtenstein, Baer & Kamarck, 1986). There are a number of possible reasons for this: exposure to smoking related stimuli (such as cigarette smoke) may elicit cravings and subsequent relapse (Shiffman, 1982, 1984), smoking may be an important social convention, or there may be a lack of social support for any smoker who

tries to stop (Mermelstein et al., 1986). Given that there is a larger prevalence of smokers in disadvantaged social groups, it is possible that there are more smokers in their members' social networks, contributing to a higher smoking prevalence.

A survey will be used to compare smokers of high medium and low social status over a number of dimensions related to these perspectives. It is expected that groups of a lower educational attainment and occupational prestige will manifest higher smoking rates, score more highly on a measure of nicotine dependence and rate cessation as being more difficult to achieve. It is also expected that these smokers will show a lesser appreciation of smoking-related personal risk and a lesser appreciation that cessation will reduce this risk. Smokers in socially disadvantaged groups are expected to report a greater number of other smokers amongst their close friends and in their household. Smokers in lower social status groups are expected to be more likely to attribute their continued smoking to stress and to assign a low priority for cessation. A readiness to quit scale was also included, as it would be expected that, for the above reasons, smokers in groups of a lower social status would be likely to have made less progress toward cessation.

8.1 Method

A survey was administered, in 1991, as part of a larger survey on attitudes and behaviours with regard to a number of health issues. Using cluster sampling techniques based upon the Australian Bureau of Statistics' collector's district (see Appendix 1), 0.43% of South Australians from urban, and 0.29% from rural areas were chosen. This resulted in a sample of 3,379 people who were interviewed in their homes. Up to five approaches were made to each respondent, resulting in a response rate of 73%. The sample was weighted for sex and age according to 1986 South Australian population Census parameters. The survey methods are discussed by Wilson, Wakefield and Taylor (1992).

Participants: The surveyors interviewed 839 smokers (24.83% of the sample). Of these, 473 (56.3%) were males and 367 (43.7%) were females. The mean age of participants was 37.7 years (S.D.=11.8).

Measures of social status: There are a number of procedures which may be used to measure social status (Daniel, 1984). In this study social status was assessed using a variant of Congalton's 4-category occupational prestige scale which assigns occupations prestige ratings obtained from 'man in the street' surveys (Daniel, 1983). Respondents were asked the question "What kind of work have you done for most of your life?" Educational attainment is also a measure of social status, which has been associated with smoking prevalence and the smokers' ability to stop (Wagenknecht, Perkins, Cutter et al. 1990; Borland, et al., 1991). In this study, participants were asked to specify their highest level of education (bachelor degree, trade qualification/diploma/certificate or secondary school). Participants were not asked if they had completed these qualifications.

Response frequencies are included here to facilitate ease of cross referencing. Occupational prestige data were obtained from 482 (57.5%) participants. Memberships of each group from lowest to highest were 181 (37.5%), 161 (33.3%) and 141 (29.3%). Education level data were provided by 807 participants, of whom 345 (42.8%) had only a secondary school education, 260 (32.2%) had a post secondary but non-university education and 202 (25.1) had participated in a degree course.

Habit strength and nicotine dependence: Smoking rate and the time taken between waking and smoking best predict reports of withdrawal symptoms, exhaled carbon monoxide and serum cotinine levels in smokers (Heatherton, Koslowski, Frecker, & Fagerstrom, 1991). Smokers were asked to estimate how many cigarettes they smoked per day. In the case of smokers who smoked different amounts at work as compared to leisure days, an average number was computed. The amount smoked on work days was multiplied by five and the amount smoked on leisure days multiplied by two. The two figures were summed and then divided by seven. Respondents who reported smoking less than 20 cigarettes per day (46.2%)

were compared with those who reported smoking more than 20 cigarettes per day (53.8%). Participants in the survey were also asked to estimate how soon after waking they smoked the first cigarette of the day (0-14 minutes, 15-29 minutes, 30-59 minutes, 1-2 hours, more than two hours). For the analysis this was coded into less than 30 minutes (43.3% of smokers) and greater than 30 minutes (56.7% of smokers).

Perceived difficulty and readiness to quit: Participants were asked to estimate how difficult they thought it would be to stop smoking (not at all difficult, fairly difficult, very difficult). Analyses compared those who reported that they expected cessation to be very or fairly difficult (74.4%) with those reporting that they did not expect cessation to be difficult (25.6%). Readiness to stop smoking was assessed by showing participants a prompt card with an illustration of a ladder, each rung representing a step toward achieving permanent cessation. The labelling of the rungs was based upon the stages of change through which smokers are thought to progress toward cessation "no thought of quitting" (pre contemplation); "think I need to consider quitting someday" (contemplation 1); "think I should quit but not quite ready" (contemplation 2); "starting to think about how to change my smoking patterns" (preparation 1) and "taking action to quit e.g. cutting down or enrolling in a programme" (preparation 2) (Beiner & Abrams, 1991, Owen, et al, 1992). Participants were asked to indicate where they thought they stood on the ladder. As described in Study 2, a binomial variable, based upon membership of the preparation stages (36.6%) versus the precontemplation and contemplation stages (63.4%), was used.

Risk perception and outcome expectancy: To assess their perception of smoking-related risk, participants were asked to estimate the future possibility of illness if they continued to smoke at their current level (certain, very likely, moderately likely, slightly likely or not at all likely). For the purposes of the analysis this was coded into a binomial variable; moderately likely or greater (47.6%) versus slightly or not at all likely (52.4%). To assess their level of outcome expectancy regarding the health benefits of cessation, participants were also asked to estimate the time it would take to 'get rid' of health risks if they gave up smoking (less than a year, 1 to

3 years, 3 to 5 years, 5 to ten years, more than 10 years or never). For the analysis this was coded into categories of 3 years or less (29.4%) versus more than 3 years (70.6%).

Reasons for not quitting: Smokers were asked to choose, from a prompt card, the main factor stopping them from quitting at the present moment (addicted, smoke to cope with stress, enjoy it too much, weight gain, no willpower, friends smoke, other priorities). Responses to the stress (22.3%) and other priorities (4.8%) were coded as either yes or no. As the major reason for not quitting was requested, smokers were only given one choice and were unable to choose other responses which they considered suitable. Statistical analyses based upon these measures will tend to be conservative as second preferences were not recorded.

Smoking in participants' social networks: Smokers were asked if at least one other member of their household smoked (52.8% answered yes) and to estimate the percentage of their close friends who smoke (almost none or none, a minority, about half, a majority, nearly all or all). The responses were coded into two categories: Half or greater (65%) and less than a half (35%).

8.2 Results

Age and gender are factors which could potentially influence relationships between social status, smoking behaviour and possible mediating variables, as the relative effect of the variables may differ in each age and gender category. For example, females have been shown to be more sensitive to social influences and to have a greater perception of smoking-related health risk (Grunberg, Winders, & Wewers, 1991). Similarly, nicotine dependence and smoking rate may be more important in older samples (Fagerstrom & Schneider, 1989). To correct for these potential problems, the effects of social status on smoking prevalence and cessation rates were examined separately for different age and gender groups and the effects of these variables were controlled in all subsequent analyses.

Social status and smoking prevalence: Table 8.1 shows the per cent prevalence of smokers and ex-smokers in each social status group for the full sample and for sub samples of males and females of greater and less than or equal to forty years. In order to gain some estimate of cessation rates, the proportion of ex- to current smokers is included for each analysis. This was calculated by dividing the number of ex-smokers by the number of current smokers (the percentage prevalences of ex-smokers may be found in Appendix 2.4). Likelihood ratio chi-square values are presented for social status trends in the prevalence of smoking and the ratio of ex- to current smokers.

Table 8.1: Per cent prevalence of current smokers and the ratio of current- to ex-smokers by social status, age and gender.

	Current smokers				Ex-smokers			
	High	Medium	Low	X2 (df=2)	High	Medium	Low	X2 (df=2)
Full sample								
Education	21.6	28.5	26.8	13.2**	1.15	0.87	0.92	3.4
Occ. prestige	19.4	35.0	32.0	47.8***	1.37	0.64	0.57	31.9***
Males under 40								
Education	23.5	34.8	53.9	41.5***	0.96	0.40	0.24	23.8***
Occ. prestige	17.8	42.2	39.0	30.8***	1.42	0.37	0.35	27.5***
Males over 40								
Education	18.3	25.9	21.5	4.3	2.05	1.60	2.49	4.3
Occ. prestige	16.7	28.5	24.2	7.4	2.38	1.20	1.60	5.7
Females under 40								
Education	25.7	25.7	37.3	7.6*	0.70	0.73	0.56	1.1
Occ. prestige	25.4	32.3	33.0	2.8	0.67	0.69	0.58	0.3
Females over 40								
Education	16.8	19.0	14.7	1.4	1.38	1.25	1.20	0.2
Occ. prestige	17.5	21.2	23.6	1.4	1.12	0.89	0.68	1.2

* p< .05, ** p< .01, *** p< .001

Social gradients in smoking prevalence were apparent for the full sample and particularly for males of less than forty years of age. There were no clear relationships between social status and smoking prevalence in the other groups. Similar trends were observed for the proportions of smokers to non-smokers, cessation rates were lower in the low status groups for males beneath the age of forty.

Associations between social status and smoking-related beliefs and behaviours: A number of preliminary bivariate analyses were conducted to determine the final nature of the analysis presented here. These are appended (Appendices 2.5 to 2.10). Different patterns of associations were observed for males and females. Due to this, and the gender differences in the associations between social status and smoking prevalence, separate analyses were performed for each gender.

Interpretation of the results may be confounded by age and smoking rates. All subsequent analyses (presented in Tables 8.2 to 8.5) were conducted using logistic regression techniques to control for age and smoking rate. The high categories for occupational prestige and educational attainment were used as reference categories, and the figures presented in Tables 8.2 to 8.5 show relative odds of the low and medium groups compared to the high status group.

There were few significant associations between educational attainment and smoking-related variables. Male smokers with a low educational attainment were more likely to have smoked over 20 cigarettes per day and male smokers with a medium educational attainment were less likely to attribute their smoking to stress. Male smokers of a medium and a low educational attainment were more likely to experience more than 50% of their friends as being smokers.

Table 8.2: Associations between educational attainment and smoking-related variables in males. Confidence limits of 95% are in parentheses.

	High	Medium	Low
Smoking behaviour			
Smoking rate (% >20)	1.00	1.05 (0.12,1.98)	2.44 (1.40,3.48)*
How long a smoker (% >10yrs)	1.00	1.42 (0.00,4.05)	3.03 (0.05,6.01)
Time after waking (% <30 mins)	1.00	1.52 (0.47,2.57)	1.82 (0.69,2.95)
Perceived difficulty (% difficult)	1.00	0.72 (0.18,1.27)	2.08 (0.44,3.72)
Readiness to quit (% prep)	1.00	0.54 (0.17,1.01)	0.66 (0.31,1.01)
Risk-related items			
Likely to suffer health problems	1.00	1.02 (0.09,1.95)	0.72 (0.26,1.18)
Time before risk stops (>3 yrs)	1.00	1.15 (0.00,2.52)	1.82 (0.22,3.42)
Reason for current smoking			
Stress	1.00	0.38 (0.00,0.94)*	0.70 (0.14,1.26)
Other priorities	1.00	0.86 (0.10,1.62)	0.17 (0.00,1.09)
Social environment			
Proportion of friends smoking (50% or greater)	1.00	2.33 (1.43,3.22)*	2.15 (1.17,3.13)*
Any smokers in the household	1.00	1.09 (0.16,2.02)	1.54 (0.51,2.57)

* p< .05, ** p< .01, *** p< .001

Table 8.3: Associations between educational attainment and smoking-related variables in females. Confidence limits of 95% are in parentheses.

	High	Medium	Low
Smoking behaviour			
Smoking rate (% >20)	1.00	1.32 (0.00,2.68)	1.50 (0.39,2.51)
How long a smoker (% >10yrs)	1.00	0.76 (0.06,1.46)	0.56 (0.00,1.19)
Time after waking (% <30 mins)	1.00	1.28 (0.00,2.70)	1.70 (0.57,2.93)
Perceived difficulty (% difficult)	1.00	1.71 (0.16,3.26)	1.88 (0.53,3.23)
Readiness to quit (% prep)	1.00	0.67 (0.08,1.45)	0.85 (0.32,1.38)
Risk-related items			
Likely to suffer health problems	1.00	0.95 (0.43,1.47)	1.38 (0.40,2.36)
Time before risk stops (>3 yrs)	1.00	1.52 (0.00,3.10)	1.15 (0.00,2.52)
Reason for current smoking			
Stress	1.00	1.06 (0.00,2.59)	1.87 (0.72,3.02)
Other priorities	1.00	1.00 (0.00,23.3)	1.56 (0.00,12.46)
Social environment			
Proportion of friends smoking (50% or greater)	1.00	1.91 (0.71,3.13)	1.86 (0.83,2.89)
Any smokers in the household	1.00	1.27 (0.17,2.33)	0.81 (0.22,1.30)

* p< .05, ** p< .01, *** p< .001

Table 8.4: Associations between occupational prestige and smoking-related variables in males. Confidence limits of 95% are in parentheses.

	High	Medium	Low
Smoking behaviour			
Smoking rate (% >20)	1.00	1.11 (0.17,3.05)	1.56 (0.68,2.44)
How long a smoker (% >10yrs)	1.00	4.35 (0.98,7.72)	4.22 (1.39,7.05)*
Time after waking (% <30 mins)	1.00	1.59 (0.53,2.65)	1.92 (0.96,2.88)
Perceived difficulty (% difficult)	1.00	1.08 (0.00,2.37)	1.33 (0.50,2.26)
Readiness to quit (% prep)	1.00	0.75 (0.25,1.25)	0.53 (0.05,1.01)
Risk-related items			
Likely to suffer health problems	1.00	1.29 (0.48,2.10)	1.13 (0.43,1.83)
Time before risk stops (>3 yrs)	1.00	2.02 (0.67,3.46)	2.99 (1.63,4.36)*
Reason for current smoking			
Stress	1.00	0.90 (0.35,1.45)	0.49 (0.00,1.05)
Other priorities	1.00	1.72 (0.00,6.05)	1.62 (0.00,5.82)
Social environment			
Proportion of friends smoking (50% or greater)	1.00	0.75 (0.29,1.21)	1.64 (0.61,2.67)
Any smokers in the household	1.00	0.79 (0.34,1.24)	0.71 (0.30,1.12)

* p< .05, ** p< .01, *** p< .001

Table 8.5: Associations between occupational prestige and smoking-related variables for females. Confidence limits of 95% are in parentheses.

	High	Medium	Low
Smoking behaviour			
Smoking rate (% >20)	1.00	1.26 (0.21,2.31)	1.33 (0.00,2.98)
How long a smoker (% >10yrs)	1.00	1.14 (0.00,2.70)	1.42 (0.00,4.11)
Time after waking (% <30 mins)	1.00	0.64 (0.15,1.13)	1.07 (0.00,2.89)
Perceived difficulty (% difficult)	1.00	0.95 (0.41,1.48)	1.00 (0.00,2.98)
Readiness to quit (% prep)	1.00	0.71 (0.21,1.21)	1.17 (0.00,2.99)
Risk-related items			
Likely to suffer health problems	1.00	0.95 (0.51,1.49)	0.40 (0.00,1.01)
Time before risk stops (>3 yrs)	1.00	2.45 (1.14,3.76)*	1.50 (0.00,3.49)
Reason for current smoking			
Stress	1.00	0.90 (0.40, 1.40)	0.99 (0.35,1.63)
Other priorities	1.00	0.67 (0.00,1.50)	1.00 (0.00,8.01)
Social environment			
Proportion of friends smoking (50% or greater)	1.00	1.13 (0.00,2.69)	1.41 (0.00,4.29)
Any smokers in the household	1.00	1.05 (0.58,1.52)	3.03 (1.33,4.73)*

* p< .05, ** p< .01, *** p< .001

There were few significant associations between occupational prestige and smoking-related variables. Male smokers with low prestige occupations were more likely to have been smoking for a period of ten years. Given that these figures have been adjusted for age differences they probably represent an earlier onset of regular smoking. Male smokers of low occupational prestige and female smokers of medium occupational prestige were more likely to report a belief that the health risk of smoking could not be alleviated within three years.

Female smokers in low occupational prestige groups were less likely to report the presence of other smokers in the household.

The prevalence analyses presented in Table 8.1 showed that associations between social status and the smoking-related variables were strongest in male smokers younger than forty. This group also had the highest overall smoking prevalence. It was thought that social status differences would be maximised in this group. Tables 8.6 and 8.7 show the odds ratios, adjusted for smoking rate, for male smokers aged 40 years or less.

Table 8.6: Associations between educational attainment and smoking-related variables for males under 40 years of age. Confidence limits of 95% are in parentheses.

	High	Medium	Low
Smoking behaviour			
Smoking rate (% >20)	1.00	1.58 (1.21,2.95)	4.70 (3.22,6.18)**
How long a smoker (% >10yrs)	1.00	2.68 (1.26,4.10)*	1.45 (0.00,2.90)
Time after waking (% <30 mins)	1.00	0.74 (0.15,1.33)	0.74 (0.13,1.35)
Perceived difficulty (% difficult)	1.00	1.49 (0.00,3.27)	0.74 (0.05,1.43)
Readiness to quit (% prep)	1.00	0.60 (0.01,1.19)	0.83 (0.21,1.45)
Risk-related items			
Likely to suffer health problems	1.00	1.25 (0.00,3.01)	1.37 (0.00,2.81)
Time before risk stops (>3 yrs)	1.00	0.80 (0.16,1.44)	1.15 (0.00,3.13)
Reason for current smoking			
Stress	1.00	0.42 (0.00,1.06)	0.80 (0.16,1.44)
Other priorities	1.00	0.59 (0.00,1.38)	0.16 (0.00,1.08)
Social environment			
Proportion of friends smoking (50% or greater)	1.00	3.64 (2.29,4.99)*	2.42 (0.97,3.87)
Any smokers in the household	1.00	1.45 (0.15,2.75)	2.56 (1.12,4.00)*

* p< .05, ** p< .01, *** p< .001

Table 8.7: Associations between occupational prestige and smoking-related variables for males under 40 years of age. Confidence limits of 95% are in parentheses.

	High	Medium	Low
Smoking behaviour			
Smoking rate (% >20)	1.00	1.90 (0.59,3.21)	2.76 (1.50,4.02)*
How long a smoker (% >10yrs)	1.00	0.49 (0.00,1.09)	0.48 (0.00,1.06)
Time after waking (% <30 mins)	1.00	3.12 (1.55,4.69)*	2.44 (0.81,4.07)
Perceived difficulty (% difficult)	1.00	1.90 (0.36,3.54)	1.90 (0.34,3.46)
Readiness to quit (% prep)	1.00	0.91 (0.33,1.49)	0.72 (0.15,1.29)
Risk-related items			
Likely to suffer health problems	1.00	1.34 (0.11,2.57)	1.05 (0.00,2.22)
Time before risk stops (>3 yrs)	1.00	1.32 (0.00,3.22)	2.12 (0.23,4.01)
Reason for current smoking			
Stress	1.00	1.30 (0.00,3.22)	0.97 (0.31,1.63)
Other priorities	1.00	1.22 (0.00,7.81)	1.14 (0.00,7.98)
Social environment			
Proportion of friends smoking (50% or greater)	1.00	1.49 (0.20,2.78)	3.09 (1.73,4.45)**
Any smokers in the household	1.00	1.37 (0.17,2.57)	1.03 (0.00,2.26)

* p< .05, ** p< .01, *** p< .001

In male smokers aged 40 years or less, the likelihood of smoking 20 or more cigarettes per day and having 50% or more close friends who smoke is higher for those of lower educational attainment and occupational prestige. Smokers of a lower educational attainment were more likely to have been smoking for greater than 10 years and to have other smokers in their household. Smokers of a lower occupational prestige were more likely to smoke within 30 minutes of waking.

8.3 Discussion

The identification of smoking-related variables, associated with social status, may suggest possible explanations for relationships between social status and smoking behaviour, although it must be emphasised that these associations may not signify causal relationships. The findings showed some associations, although most were confined to sub-groups such as young males, rather than being consistent through the whole sample. Measures of smoking behaviour, smoking rate, time spent smoking and time elapsed between waking and smoking were associated with social status in some (usually male) sub-groups. There was a positive relationship between occupational prestige and the perception that cessation could alleviate the health risk of smoking within three years for both males and females. Occupational prestige in females was inversely related to the likelihood of other smokers being members of their household. For males of forty years or under, educational attainment was inversely related to the likelihood of both having other smokers in the household, and more than 50% of their close friends being smokers. For males of forty years or under, occupational prestige was inversely related to the likelihood of more than 50% of their close friends being smokers.

These associations may have been somewhat stronger for the educational attainment variable if it had been used to measure the actual achievement of educational goals, rather than the respondent's participation at the level stated. Furthermore, the medium educational attainment category encompassed post-secondary (high school level) training, which is more available to males (through trade qualifications) than females in Australia. There were stronger social gradients observed for smokers of less than 40 years of age, this may be due to the fact that higher education has only recently become common, and that a levelling effect exists for older smokers. The occupational prestige variable only included 58% of the sample, and this has led to smaller cell sizes (see Appendices 2.6, 2.8 and 2.10) The survey which was employed in this study was designed by multiple users, and generic questions such as educational attainment were not under the complete control of the author of this thesis.

Associations between smoking rate, time spent smoking and social status have been often found (Hill, White, & Gray, 1991), and suggest differences in habit strength and nicotine dependence. High levels of habit strength and nicotine dependence may contribute to the maintenance of smoking in low social status groups. Male and female smokers of a lower occupational prestige were less likely to report believing that the excess health risk of smoking would dissipate after three years' abstinence. This finding is difficult to interpret because the true time taken for excess health risks to abate depends upon the disease concerned; heart disease risk may decline markedly after three years, but this is not necessarily the same for cancer (Ockene, Kuller, Svendsen, & Meilahn, 1990). It is possible that this finding means that smoking-related risk is not perceived as being particularly modifiable. Health promotion campaigns directed at encouraging cessation may be advised to focus upon informing smokers of the health benefits of cessation, in addition to the risks of continued smoking.

More smokers of a lower social status reported that there were other smokers in their immediate social and household environments. This finding may be an artefact of the higher smoking prevalence in these groups, but may also be an indicator of group processes which help to develop and maintain smoking behaviour (Mermelstein, et al., 1986). For example, smoking may be seen as an important aspect of group identity, especially in young males of a low social status (Owen & Halford, 1988). Smoking may be profitably studied and influenced as a group, as well as an individual, phenomenon. Interventions which influence smokers' social support networks may be helpful (Windsor, Lowe, & Bartlett, 1988) as may be those which seek to provide smoke-free social environments in the workplace and in recreational settings (Borland, Chapman, Owen, & Hill, 1990).

A clear social gradient in smoking prevalence was observed for males of less than forty years of age, but much less so for other age/gender categories. The findings are similar to those of Hill, White and Gray (1991) who also used a population-representative sample. The reasons for this are probably complex. Social status may be regarded as a concept which applies more to males because, historically, the working male has been placed into socio-economic categories. It may also be the case that cigarette advertising has specifically

targeted blue-collar males. Female targeting may have used a less status-oriented approach; preferring more universal themes, such as physical and sexual attractiveness, to sell cigarettes (Jacobson, 1981). Older males of a low social status were more likely to have stopped smoking than younger males. This may be simply because they had been smoking for longer and, subsequently, had more time to stop. They may also be more likely to respond to threats to their health, as such threats have more immediate consequences.

Other variables, not used in this study, may help to mediate the relationships between social status and smoking behaviour. One characteristic of groups of a lower social status may be that they may react against or mistrust health messages from government agencies. This would especially be the case if the message was not consistent with their pre-existing beliefs. Processes of denial and rationalisation may also be more prevalent in less highly educated smokers, and inhibit the cessation of smoking. There have been some recent studies which suggest that the problem of smoking prevalence in groups of a low social status can be addressed using the electronic mass-media (Ramirez & McAlister, 1988; Warnecke et al., 1989; Warnecke et al., 1991; Macaskill, Pierce, Simpson, & Lyle, 1992). This is consistent with Kristiansen and Harding's (1988) suggestion that people of a lower social status are less likely to prefer 'quality' press and more likely to choose popular media such as television. Interventions delivered at the worksite have also been effective at helping these smokers to stop. It may be the case that social gradients in smoking prevalence and the incidence of cessation are influenced, not so much by differences in psychological factors relating to smoking behaviour itself, but by their responsiveness to different channels of communication. Future research may be profitably directed toward the identification of media preferred by different social groups and the amount of faith that they show in various health-promotion organisations.

This study aimed to identify possible psychological mediators of the effects of social status on smoking behaviour by showing associations between smoking-related variables and social status. This information would be useful for the design of intervention strategies which target groups of a lower social status. On a larger scale, the study was designed to

demonstrate the research possibilities afforded by combining a psychological perspective with perspectives from other disciplines such as epidemiology and sociology which emphasise the contribution of contextual factors.

Psychological constructs are important for understanding the cessation of smoking behaviour in a population context. However, the sole use of these constructs in explaining smoking behaviour may be somewhat limited. For example, the psychological and demographic variables used in Study 2 only explained 28% of the variance for smokers initiating cessation attempts and 16% of the variance for the outcome of those attempts. The material presented in Section 2.3 of Chapter 3 agued that the employment of a population perspective entails the examination of models which emphasise the contribution of contextual variables to the behavioural change process. Such variables include analyses of smokers' social (Mermelstein, Cohen, Lichtenstein, Baer, & Kamarck, 1986) and physical environments (Borland, Owen, Chapman, & Hill, 1990), the effects of different styles of communication (Solomon & Maccoby, 1984) and, as addressed by this study, smokers' positions within the social structure.

There has been a recent trend for psychologists to look toward more environmentally- and contextually-oriented models explaining smoking behaviour (Stokols, 1992). These models, whilst originating from many disciplines, contain high levels of (implicit) psychological material, and psychologists may gain much by combining their knowledge with that of other disciplines (Matthews, 1989). The study presented in this chapter provided some support for the premise that social status, a contextual variable, is related to some psychological factors which affect smoking behaviour although the effects were statistically weak. It is expected that this research will become more common in the near future. This issue is discussed more fully in Chapters 10 and 11.

8.4 Summary

Several hypotheses examining the nature of the relationship between social status and smoking behaviour were evaluated. The highest education level achieved by the participants and the prestige of their occupations were both associated with smoking-related variables. However, these relationships, whilst statistically significant, were small and usually confined to subgroups. Measures of smoking behaviour, smoking rate, time spent smoking and time elapsed between waking and smoking were associated with social status in some (usually male) sub-groups. The perception that cessation could alleviate the health risk of smoking within three years for both males and females was greater in high status groups. Smokers of a lower social status were also more likely to report the presence of other smokers in their social environments. These relationships were strongest for males under the age of forty, the group who showed the greatest smoking prevalence. The importance of using contextualist perspectives in the study of population smoking behaviour was emphasised.

CHAPTER 9

STUDIES 5 AND 6: THE USE OF SELF-INSTRUCTIONAL MATERIALS FOR SMOKING CESSATION

The review of studies evaluating the use of self-instructional materials, presented in Chapter 4, showed that, in controlled trials, smokers who were provided with these materials were more likely to stop than those who were not. This was especially the case if their use was augmented by the provision of personal contact or social support. There was some suggestion that the beneficial effects of these materials are not necessarily contingent upon users' strict adherence to their content (Cummings, et al., 1988), and that aspects of interventions which increase levels of adherence may augment their efficacy (Brown & Owen, 1992). This chapter presents two empirical studies which examine and attempt to influence levels of adherence to the content of self-instructional materials. The first (Study 5) attempts to identify the extent to which smokers use the content of the materials and to determine the relationship between levels of use and smoking cessation. The second (Study 6) evaluates an intervention, based upon minimal therapist support, designed to enhance levels of adherence to the content of the materials.

9.1 Study 5, Introduction

Analyses conducted in the previous chapters have identified a group of smokers who are motivated to stop, yet experience difficulties in doing so. These smokers show evidence of a greater level of habit strength, higher level of addiction and less confidence. The psychological literature suggests that these smokers may be helped by teaching them specific skills and techniques which have been shown to improve smokers' prospects of cessation (Lichtenstein & Mermelstein, 1984; Glasgow & Lichtenstein, 1987). Self-instructional materials represent a method of teaching such skills. However, Cummings et al. (1988) suggest that self-instructional materials may not be most effectively utilised, as smokers do not report high levels of adherence to the skills and techniques. Furthermore, they did not observe

a strong relationship between the level of participants' use of the content and the outcome of cessation attempts (see Chapter 3, Section 2). This study intends to replicate this aspect of the Cummings et al. (1988) study, to establish an estimate of participants' impromptu adherence to the content of the materials, and to determine the extent to which adherence is associated with cessation.

A cohort of smokers using a self-instructional smoking cessation programme were asked to estimate the number of smoking cessation techniques they had actually used, and to rate their perceptions concerning the helpfulness of each. If Cummings, et al's proposition is correct, rates of use for techniques in the manual will be low. It is also expected that there will be little association between the level of participants' adherence to techniques contained in the materials and the outcome of their cessation attempt.

9.2 Study 5, Method

Data were obtained from an intervention study conducted in 1982 and published by Owen, Ewins, and Lee (1989) described in Section 3 of Chapter 4. Full details of the intervention may be obtained from their paper. The programme was conducted in Adelaide, South Australia, and participants recruited by advertising in 'The Advertiser' newspaper (the major South Australian daily newspaper). A total of 208 smokers entered the programme and they were randomly allocated to one of three conditions. Smokers in condition one received a correspondence course which was tailored, by microcomputer, to some characteristics of their personal and smoking history. Smokers in condition two received a standard correspondence course whilst smokers in condition three served as a control. The tailoring of the course did not alter the content in a way which greatly differed from the standard course. The analyses presented in this study use 168 participants from the first two groups, as they were recipients of the full course.

The first section was mailed to participants within two weeks of enrolment, the following three sections were mailed at one week intervals. After three months participants

were contacted over the telephone and asked whether they were still smoking and, if so, how much they were smoking. A total of 156 (54.5% (n=85) male, 45.5% (n=71) female) participants of the original 168 were contacted. The interviewer was supplied with a list of techniques presented in the manuals and asked participants if they had actually used each one (possible responses were; completed, used a little or not at all). For the purpose of the analysis the 'completed' and 'used a little' categories were combined and those participants compared with those who did not use the technique at all. The participant was also asked to rate the helpfulness of each technique on a three point scale (very helpful, moderately helpful or not at all helpful).

The manual: The manual, composed of three parts, was developed specifically for the course. The 'preparing to stop' chapter included a decision making model based upon smokers' motivation to quit, a self monitoring exercise for current smoking behaviour and instruction in deep muscular relaxation, instant relaxation and deep breathing. Participants were asked to practise these until they became proficient. The 'stopping' chapter included instructions on quitting. Participants were asked to write a contract with themselves to stop smoking. A number of strategies designed to help users cope with withdrawal distress were included. These were distraction, challenging inappropriate cognitions, concentration on the benefits of cessation and training users to recognise high-risk situations. The last chapter dealt with the maintenance of non-smoking, including strategies to cope with lapses, relaxation and cognitive coping, using behavioural contracts not to smoke, dietary advice and identifying and coping with high-risk situations

9.3 Study 5, Results and discussion

Table 9.1 shows the number and percentage of smokers who used techniques presented in the manual. Only the techniques presented in the first part are included as the use of subsequent sections is contingent upon the smoker having achieved some period of abstinence. The majority of smokers (62.7%) did not report using any of the techniques in the materials whilst 14.2 per cent of smokers reported using all seven.

Table 9.1 The number and percentage of smokers using techniques in the manual.

Number of techniques	Number of smokers	Percentage
None	94	62.7
1-5	22	14.2
6	18	11.5
7	22	14.2

The number of participants using each technique are reported in table 9.2. All smokers were included in the analysis of techniques in part one of the manual, but only smokers who had managed to stop smoking for more than a day were included in the analyses of the other two parts. Usage rates for each technique ranged from a quarter to a third of participants in the study.

These data support the suggestion of Cummings et al, that the specific content of smoking cessation materials is not highly utilised by smokers. Most did not use any of the techniques, whilst some made use of a large number. The mean percentages of participants using each technique were; 33.6 for part one, 50.7 for part two and 42.4 for part three. It did not seem that there were preferences for any particular techniques as there was only a narrow range between the most and least used techniques in each part (7.1 for part 1, 6.0 for part 2 and 15.2 for part 3). All techniques used were found to be moderately helpful (mean=2.03, S.D.=0.20). To assess the relationship between the use of techniques and cessation, levels of their use in part 1 of the manual (using the same categories as Table 9.1) were computed for those who were abstinent at the three month follow-up and compared with those of participants who were not. Only the techniques presented in the first part are included as the

Table 9.2 Number and percentage of smokers using each skill or technique and their ratings of each technique's helpfulness (maximum=3).

Technique	Usage		Helpfulness	
	Percent used	Number	Mean	S.D.
Part 1				
Making a committment	35.9	56	2.4	.72
Deep muscular relaxation	29.5	46	1.8	.76
Instant relaxation	33.3	52	2.3	.72
Deep breathing	35.3	55	2.4	.62
Tally booklet	37.3	58	2.3	.77
Self monitoring	34.6	54	2.0	.86
Stop think card	28.8	45	1.8	.73
Part 2				
Personal contract	54.5	18	2.3	.77
Alternative behaviours	51.5	17	2.3	.61
High risk situations	48.5	16	2.2	.75
Thinking strategies	48.5	16	2.2	.66
Part 3				
Self-statements	39.4	13	2.0	.91
Covert sensitisation	45.5	15	2.2	.81
Coping with slips	39.4	13	2.0	.87
Coping with neg. affect	48.5	16	2.3	.75
Coping with withdrawl	48.5	16	2.1	.76
Dietary advice	33.3	11	2.2	.86

use of subsequent sections is contingent upon the smoker having achieved some period of abstinence. There was a significant relationship between the number of techniques used in part 1 and the achievement of smoking cessation ($X^2_{(3)}=10.3$, $p<.05$). However, this association may be spurious, as more motivated participants may be both more likely to use the techniques, and more likely to achieve cessation.

The results of this study should be interpreted in a somewhat critical fashion. The use of techniques was extremely polarised, smokers either did not use the materials at all or reported reasonably high rates of usage. There were few who reported using 1 to 5 techniques. This bi-polar pattern seems strange and may be symptomatic of memory

distortion, as participants may have been unaware of which techniques they did actually use when they were asked at the three-month follow-up. It may also be the case that some smokers failed to use the materials at all, as they may have decided not to attempt cessation. Study 6 was designed to alleviate the problems of memory distortion and non-participation. Taking advantage of a personal-contact intervention condition, participants using self-instructional cessation materials were monitored at scheduled intervals to determine the extent to which they adhered to the content of the manual. Participants were also asked if they had made cessation attempts or not.

9.4 Study 6, Introduction

The review presented in section 4 of Chapter 2 suggested that high levels of social and therapist support are associated with the likelihood of a smoking cessation programme succeeding. The review presented in section 3 of Chapter 4 demonstrated that various strategies, based upon the provision of personal support, can augment the effect of self-instructional smoking cessation materials.

In this study smokers who receive a cessation manual will be provided with telephone-administered support and advice from the author and a psychologist[4] . This is designed to encourage the use of specific smoking cessation techniques and thought to be a cost-effective way of increasing cessation rates achieved using self-help materials. It is predicted that a greater cessation rate will be achieved in this condition than with the self-instructional manual alone. The telephone calls will also be used to monitor the use of techniques. During the calls, participants will be asked if they have implemented the techniques and strategies presented in the manual. Low rates of usage would support the Cummings et al. (1988) suggestion that the success of self-instructional intervention owe more to placebo effects than to participants' use of the materials' specific content. It must be stressed that there is no

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[4] This study has been published as: Brown, S.L., Hunt, G., and Owen, N. (1992) The effect of adding telephone contact to the use of self-instructional smoking cessation materials. *Behaviour Change, 9,* 216-222.

monitoring of the control group, so high rates of usage may not be interpreted in terms of the support condition, nor should they be seen as indicative of usage rates in smokers who use the materials without other assistance.

The study also presents an opportunity to observe the effect of baseline characteristics on future behavioural change in an intervention setting. Three confidence items are included; ratings of the participants' expectations of being able to stop for a week, three months and to recover from a relapse. It is expected that these items will each predict cessation at the three month follow-up. An item requesting participants to estimate their motivation to quit is also included. It is expected that smokers who report being more motivated to stop would have more success in doing so. Marlatt and Gordon (1985) suggest that internal (characterological) attributions for relapse are associated with an unwillingness to try to stop smoking in the future, and an inability to stop if they do try (see Section 3, Chapter 2). Internal attributions by smokers for their last relapse are therefore expected to be associated with a decreased likelihood of cessation.

9.5 Study 6, Method.

The study was conducted at the Tea Tree Gully community health centre, in the outer north eastern suburbs of Adelaide. The community health centre was chosen as a venue for the programme as it was thought that the setting would maximise participation by taking advantage of the centre's existing local client base and goodwill. Participants were recruited in two phases; one in August 1988, the other in February 1989. The service was advertised in the health centre's regular column in a local newspaper, two weeks in advance of the course, with a follow-up article a week later in a community news column. The course was also advertised at a community information booth located in the major local shopping centre, and at the local public hospital. All advertisements requested that persons interested in smoking cessation contact the health centre and reserve places at an information evening. The evenings were designed by the author to provide information about the health consequences of smoking and the process of cessation. The manual was described as a tool for learning specific

cessation techniques and it was recommended that time and effort be put into learning and practising these techniques. Attendees were then offered the opportunity to enrol in the course. People who joined the course paid a three dollar cover charge for the manual. Enrolment was made contingent upon their completing a pre-test questionnaire, which was done on the night to ensure completion of all forms. Two participants received manuals but did not consent to follow up, so their data were excluded from the study.

Participants: There were 45 participants in the study (28 females and 17 males). Their mean age was 40 years (S.D. = 12.5 years), they were smoking an average of 22.7 cigarettes a day (S.D. = 7.0), and had been smoking for an average period of 22.9 years (S.D. = 11.6). Only 20% of participants reported having previously been able to stop smoking for a period of greater than one month.

The Questionnaire: The questionnaire, administered at baseline, was designed to assess the current attitudes and behavioural history of the participants. It is presented in Appendix 3.2. Habit strength was measured by smoking rate and an estimate of the number of years the participant had been regularly smoking. This was obtained by subtracting the age they claimed they were when they started regular smoking from their current age. The history of previous cessation attempts was assessed by asking how many serious attempts they had made to stop, the time elapsed since their last cessation attempt and the duration of their last period of abstinence.

Participants were also asked to nominate the reason for their last relapse, given the choice of; enjoy smoking too much, boredom, stress/tension, too irritable without cigarettes, not enough willpower, putting on weight, craving too strong and was encouragement from others to smoke. These responses were coded into two groups; the first of which included the items irritability, lack of willpower and strong cravings and represented internal attributions for relapse (Curry, Marlatt, & Gordon, 1987). The other group consisted the remainder of responses and represented external attributions.

Self-efficacy was measured by asking participants whether they believed that they could stop smoking for at least one week, whether they believed that they could stop smoking for at least three months and whether, if, when abstaining, they smoked one or two cigarettes, they could resist a full relapse. Smokers were also asked to specify how motivated they felt to give up smoking.

Each participant was then randomly assigned to one of two conditions: one being the use of a manual and regular telephone contact, the other condition being the use of a manual only. After three and six months, all participants were telephoned to ascertain whether they had stopped smoking, how many times they had attempted to stop smoking, how many cigarettes they smoked and if they were contemplating making further cessation attempts. Participants were considered to be smokers if they had smoked more than one cigarette in the last seven days. During the course of the follow-ups five participants were unable to be contacted (two in the telephone contact/manual condition, and three in the manual-only condition). For the purposes of data analysis, they were considered to be smokers. This was consistent with the methodology suggested by Lichtenstein (1982). After twelve months all participants were again telephoned. Participants claiming abstinence were asked if they would provide a saliva sample for the purpose of biochemical validation.

The Manual: The manual had been used in two previous studies (Owen, Ewins, & Lee, 1989; Lee, 1990) and was associated with 10%-20% long-term abstinence rate. It was designed to be implemented in three stages: preparing to quit, quitting and maintenance. Participants were strongly advised (both in the text of the manual and at the information night) to proceed through each stage in the recommended sequence.

The 'preparing to stop' chapter included an exercise designed to make reasons for quitting more salient, a self monitoring exercise for current smoking and instruction in deep muscular relaxation, instant relaxation and deep breathing. Participants were asked to practise these until they became proficient. The 'stopping' chapter included instructions on quitting, such as setting a target date and halving their daily smoking rate for three days prior to

quitting. A number of strategies designed to aid coping with withdrawal distress were included. These were distraction, challenging, concentration on the benefits of cessation and training users to recognise high-risk situations. The last chapter dealt with the maintenance of non-smoking, including strategies to cope with lapses, relaxation and cognitive coping, using behavioural contracts not to smoke, dietary advice and identifying and coping with high-risk situations.

Telephone Contact Group: After the information night, efforts were made to telephone each member of the telephone-contact group during the first, second, fourth, sixth, eighth and tenth week of the course.

The first telephone interview was carried out a week after the information night. This assessed smoking status, intention to quit, whether the participant had read the manual and the extent to which she or he had used the skills included in the first two chapters. All subsequent interviews repeated the questions and asked about the use of the final two chapters.

Data concerning the participants' smoking habits were collected using a structured interview asking questions demanding closed responses (for example, "Have you smoked any cigarettes today?"). The interviewers used a score sheet which divided the manual into its component parts such as specific skills and techniques. Participants were asked if they had attempted to implement each, and if they had experienced any difficulty in doing so. When a participant reported difficulty in using a particular skill or technique they were instructed in how the technique worked, when to use it, the benefits of its use and criteria for how it's effectiveness may be checked.

Participants in both conditions were subjected to a telephone follow-up survey after periods of three, six and twelve months. At the twelve month follow-up, those participants claiming abstinence were asked to provide a sample of saliva for biochemical testing. One participant claimed to have achieved abstinence but refused to provide a saliva sample at the twelve month follow-up. This person was considered to be a smoker. Abstinence rates at

three and six months reflect only self-reported abstinence, whilst the twelve-month follow up consists of those who claimed abstinence and agreed to the biochemical test.

9.6 Study 6, Results

The adequacy of the randomisation procedure was assessed by comparing the two conditions on a number of baseline measures. Table 8.3 shows that there were no significant univariate differences between the two conditions.

Table 9.3 Means, standard deviations (in parentheses) and t values of baseline characteristics of the telephone contact and manual-only groups.

	Telephone contact	Manual only	t-value
Age	42.8 (11.7)	38.5 (13.5)	1.06 n.s.
Smoking rate	23.7 (8.0)	21.7 (5.7)	1.00 n.s.
Time smoking	24.1 (11.3)	21.4 (12.1)	0.71 n.s.
Confidence in:			
Stopping for a week	3.3 (1.2)	3.2 (0.9)	0.53 n.s.
Stopping for three months	2.9 (1.3)	2.8 (1.0)	0.15 n.s.
Recovery from lapse	2.2 (1.4)	2.2 (1.1)	0.00 n.s.
Motivation	3.9 (1.0)	3.5 (1.0)	1.50 n.s.

There was no evidence of gender bias in either group ($X^2_{(1)}$=0.4, n.s.). Age, sex, smoking rate, the number of years a person has been a smoker, the three efficacy questions and motivation to quit were entered into a stepwise discriminant function analysis, with condition as a dependent variable. This was done to examine the possibility of bias caused by the combined effect of all baseline variables. There was none observed (eigenvalue=0.07, canonical correlation=0.25, n.s.).

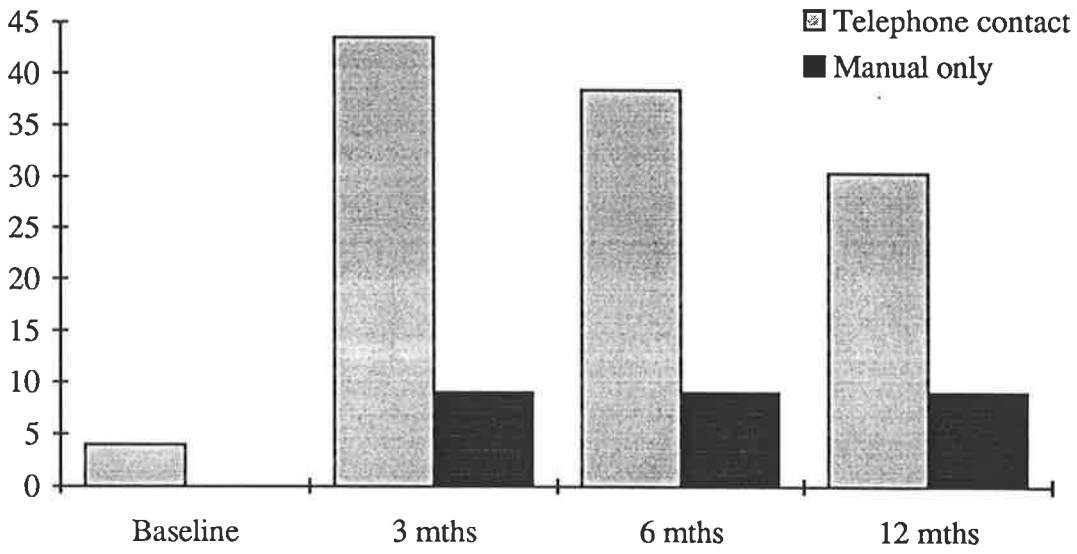
Table 9.4 shows the percentage and number of participants abstinent at each follow up. The two conditions were significantly different at the $p<.05$ level for the three month follow-up (Fishers exact test, p=0.001), and for the six month follow-up (Fishers exact test,

p=0.041), but not for the twelve month follow-up (Fishers exact test, p=0.076). Table 9.5 and figure 9.1 show trends in the number of smokers abstinent in each condition over the twelve month period.

Table 9.4 Per cent of smokers abstinent at baseline and each follow-up for the manual plus telephone and telephone only conditions.

	Baseline	3 month	6 month	12 month
Manual plus telephone	4 (1)	43.5 (10)	38.4 (8)	30.4 (7)
Manual only	0	9 (2)	9 (2)	9 (2)

Figure 9.1 Trends for abstinence over the twelve month study period.



Participants who were smoking at each follow up were asked to provide an estimate of their current smoking rates. Changes (from baseline) in the reported smoking rate were calculated using the following formula:

$$\frac{\text{(Pretreatment rate - Follow up rate) x 100}}{\text{Pretreatment rate}}$$

This formula was used in order to avoid basal effects, as the more cigarettes a smoker smokes at baseline the more they may reduce absolute consumption at follow-up. Table 9.5 shows the means and standard deviations of the percent reduction scores in each condition for those smokers.

Table 9.5: Mean, standard deviations and t values in each condition for smoking reduction in persons currently smoking at each follow-up.

	3 Month	6 Months	12 Months
Manual plus telephone	38.6% (21.9)	24.6% (24.9)	25.3% (22.4)
Manual only	24.8% (22.7)	11.6% (22.3)	11.3% (23.1)
t value	1.73* (df=31)	1.57 (df=29)	1.72* (df=26)

The smoking reduction of those who continued to smoke was significantly higher in the manual plus telephone condition than the manual only condition after three and twelve, but not six months.

Abstinence at the three month follow-up was associated with the number of attempts made to stop ($t_{(43)}$=2.84, p<.05). The mean number of attempts for those who were abstinent was 1.33 with a standard deviation of 0.49. The mean number of attempts for those who were not abstinent was 0.79 with a standard deviation of 0.74. At the three month follow up participants in the telephone contact condition also reported making more cessation attempts than participants in the manual only condition (t = 3.19, p<.01, means: telephone 1.30, manual only 0.73). This suggests that the intervention had succeeded at the level of stimulating cessation attempts which may, in future, lead to cessation.

Adherence rates: In order to determine the extent to which participants adhered to the content of the manual, they were asked whether they had used each individual technique. Techniques were coded as having been attempted if the participant reported using the

technique at any one or more interviews during the first three months. Table 9.6 reports the number of smokers using techniques from the manual. The first six techniques were used for this analysis because all smokers had equal recourse to them whereas subsequent techniques could only be used by smokers who had succeeded in achieving cessation.

Table 9.6 The number and percentage of smokers using techniques in the manual.

Number of techniques	Number of smokers	Percentage
None	6	26.1
1-2	2	8.7
3-4	9	39.1
5-6	5	21.7

Table 9.7 presents the number and percentage of smokers using each particular technique. All participants were included in the analysis for section 1. (n=23), those who attempted to stop were included in section 2. (n=19) and those who ceased smoking for a week were included in section 3. Fisher's exact tests were used to test for associations between use of each of the first six techniques and the achievement of cessation at the three month follow-up observation.

Table 9.6 suggests that a majority of smokers used some techniques presented in the first part of the manual. Table 9.7 shows that the use of techniques was initially high, but declined after that. None of the first six techniques was shown to be associated with abstinence at the three month follow-up. Of the first six, the total number of techniques used predicted neither abstinence after three months ($t_{(21)}$=0.98, n.s.; mean for smokers 3.3, S.D. 2.2; mean for abstainers 2.4, S.D. 2.1) nor the level of smoking reduction (Pearson $r_{(21)}$=0.12, n.s.). An aim of this intervention was to provide instruction for the use of the techniques in the manual.

Table 9.7 Percentage of smokers using each technique in the manual and the relationship between use of each and outcome.

Skill or technique	Percentage use	Significance
Listing the advantages of cessation	52.17	.48
Self-monitoring exercises	43.48	.48
Relaxation exercises	52.17	.30
Signing a personal contract to stop smoking	42.10	.11
Halving smoking rate before cessation attempt	47.37	.08
Using substitute activities	36.84	.45
Challenging negative cognitions	15.79	--
QUIT (problem solving) technique	5.26	--
Covert sensitisation	0.00	--
Monitoring urges	0.00	--
Dietary advice	9.09	--
Reminds self of smoking's health effects	72.72	--
Identifies high-risk situations	9.09	--
Reminds self of benefits of non-smoking	9.09	--
Signs non-smoking contract	0.00	--

Only one participant asked for a technique to be explained to them so there was little instruction given. This suggests that participants were either, comfortable with the material, or not particularly interested in its correct implementation.

Predictors of Cessation: It was thought that habit strength, the history of prior cessation attempts, self-efficacy, motivation to stop smoking and the nature of the smoker's attribution for the last relapse would influence the outcome of the programme. T-tests were used to evaluate the relationship of baseline measures with abstinence at the three month follow-up for all variables except gender where a likelihood-ratio chi-square test was used. The level of smoking reduction for each individual was coded into two groups of those who were able to reduce their smoking by greater than 30% (including the abstainers) and those who were not. This was done to correct for a skewed distribution. T-tests and chi-square statistics were used to evaluate the relationship between this variable and baseline measures. Table 9.8 shows the effects of baseline variables upon smoking cessation and smoking reductions.

Table 9.8. Associations of baseline variables with smoking cessation and reduction (all variables are t values except for gender which reports a chi-square value).

Variable	Smoking status	Reduction
Age	0.11	0.70
Gender	0.29	0.75
Smoking rate	1.32	0.40
Time smoking	0.86	0.80
No. previous attempts	0.82	3.64***
Time since last attempt	0.13	0.02
Confidence in:		
Stopping for a week	1.14	0.30
Stopping for three months	0.74	1.30
Recovery from lapse	1.83	1.75
Motivation	0.23	2.34*

* p<.05; ***p<.001

As may be seen from the table none of the baseline variables were associated with the follow-up smoking status. The number of cessation attempts the smoker had previously made was inversely associated with reductions in the number of cigarettes smoked at the three month follow-up, whilst motivation was positively associated with reductions. The effect of internal as opposed to external attributions for the last relapse was also assessed, but this dimension did not have any effect upon either smoking cessation (Fishers exact test=0.59, d.f.=1) or smoking reduction ($X^2_{(1)}$=0.34, n.s.).

9.7 Discussion

Regular, scheduled telephone contact, designed to enhance the effects of a self-instructional cessation manual, was provided to smokers enrolled in a smoking cessation programme. The abstinence rate of these smokers was compared to that of smokers who received a manual only. Significantly more of these smokers reported being abstinent at three and six months compared to the manual-only group. However, the twelve month follow-up of participants who agreed to provide a saliva sample to validate their claims of abstinence was non-

significant. This may cast the three and six month figures into some doubt. There was a significant reported reduction in cigarette consumption amongst smokers after three months, but this effect did not persist at the six and twelve month follow-up observations.

The inability to find differences between the two conditions may be partly attributable to the small sample size. As there were some trends favouring the telephone contact condition, there may be grounds to conclude that a study using a greater sample size would yield a significant effect.

It was thought that telephone contact would facilitate greater levels of compliance to the specific content of the manual. This proposition was not examined in a controlled way by comparing the two conditions, as observations could not be made of participants in the manual-only group. However, compliance with the techniques in the telephone-contact plus manual condition seemed to be low; suggesting that smokers using these materials implement their content in a somewhat selective fashion. Furthermore, there were no associations between participants' levels of adherence to the manual and the outcome of their cessation attempts. No attempt was made to determine the amount of effort that participants devoted to applying the techniques that they did attempt, but the lack of requests for help in implementing techniques suggests that this was not great. The failure of the telephone contact intervention to enhance the cessation rate of the smoking-cessation manual may have been due to it's inability to promote increased levels of adherence to the behavioural content of the manual.

The scheduling of the telephone calls may also have contributed to the failure of the intervention condition to stimulate a greater cessation rate than the control. The telephone contact (apart from the three, six and twelve month follow-up calls) ceased after a period of three months. The eventual outcome was affected by several relapses after the three month follow-up in the telephone contact condition. It is possible that either, the relapses were influenced by the cessation of contact or, that telephone contact enhanced the process of

recovery after relapse. The second possibility is supported by the greater number of cessation attempts observed in the telephone contact condition.

Ossip-Klein et al. (1991) used a telephone 'hotline' described in section 4.4.3 to successfully augment the effect of a self-instructional manual. Smokers in the Ossip-Klein et al. study were able to use the hotline at their own discretion, presumably when they were experiencing specific problems in stopping smoking or remaining abstinent. This study used a series of telephone calls, following a schedule designed by the interviewers, with the objective of promoting greater levels of adherence to the manuals. The two studies, despite being superficially similar, are not directly comparable because the telephone contact was used for different purposes. Recently, Orleans et al. (1991) were successful in increasing the abstinence rate promoted by a self-instructional manual by providing smokers with both advice on how to solicit social supports and scheduled telephone counselling. Again, the rationale for their intervention is different to this study. This intervention was designed to influence compliance with the specific content of the manual whilst Orleans et al. provided a traditional counselling service. Given a greater number of participants, this study may achieve similar results to the Ossip-Klein et al. and Orleans et al. studies. If this is the case, there would be a substantial body of evidence attesting to the efficacy of adding personal\telephone support conditions to enhance the cessation rates associated with the use of self-instructional smoking cessation materials.

Ossip-Klein, et al., Orleans et al., and Windsor, Lowe, and Bartlett (1988) conducted major intervention trials which were published after the design of this intervention. They employed controlled, randomised designs, a large number of participants (see section 3.3) and biochemical testing. The results of their studies suggest that the addition of various personalised support conditions augmented the effects of self-instructional materials. Further research is required to determine why personalised support enables smokers to stop smoking and whether this effect is attributable to the support alone or whether it is due to an interaction with the materials.

Participants in the telephone contact group made a greater number of attempts to stop smoking. Studies of the cessation process suggest that smokers may make a number of unsuccessful cessation attempts before they eventually stop permanently (Schachter, 1982; Swan & Denk, 1987; Prochaska, Velicer, Di Clemente, & Fava, 1988). It is, therefore, important to develop ways of stimulating people to persist in making cessation attempts, so that they may increase their chances of achieving eventual cessation. A greater number of cessation attempts was observed in the telephone contact condition. This style of intervention may hold promise if it can be demonstrated, using a larger sample, that smokers do actually make a greater number of cessation attempts and that this leads to a greater rate of smoking cessation. Social support may play a major role in sustaining behavioural persistence (Janis, 1983) whilst Nation and Woods (1980) suggest that persistence may be trained using intermittent reinforcement schedules. The telephone calls may represent such a reinforcement schedule. If this suggestion is implemented, note should be taken of the Study 3 (Chapter 6) findings, that the making of a cessation attempt may not be appropriate if the smoker has little chance of succeeding, because failure may result in further demoralisation.

It was thought that baseline characteristics such as age, habit strength, cessation history, confidence, motivation and the attribution made for the last relapse would be associated with the outcome of participants' cessation attempts. This was not shown to be the case except for a negative relationship between smoking reduction and the number of previous cessation attempts, and a positive relationship between reduction and motivation. It is unlikely that the failure to predict programme outcome can be attributed to the small sample size as the effects were small, even with the combined data of the two conditions. The baseline questionnaire was administered during the information evening when participants were experiencing a high level of motivation. This may have led to the over-estimation by the participants of their ability and motivation to stop.

The recruitment of smokers into smoking cessation activities is an important aspect of mass-reach campaigns. Interventions such as this one are designed to help smokers to stop smoking and should aim to recruit smokers who are interested in stopping but require

practical assistance as cessation may be particularly difficult to them (Glynn, Boyd, & Gruman, 1990). The personal and smoking history data presented in Study 1 (Chapter 4) suggest that the participants of this study have broadly similar characteristics to smokers who do require assistance with cessation. This suggests that the programme has succeeded in recruiting smokers from this specific target group, and that a case may be made for the generalisation of these findings to other smokers of that group.

It is of concern that whilst the programme was advertised in an area where 80,000 people live - approximately 20,000 of whom are smokers - it was only able to recruit 45 participants. This contrasts poorly with programmes which are integrated into large scale mass media campaigns and achieve high levels of participation (Egger, et al, 1983; Sutton & Eiser, 1984; Sallis, Flora, Fortmann, Taylor, & Maccoby, 1985; Cummings, Sciandra, & Markello, 1987). Recruitment to projects such as this may be enhanced by integrating them into mass-reach smoking cessation campaigns aimed at promoting awareness and positive attitudes towards smoking issues. One of the reasons that high levels of participation were not achieved may be peoples' perceptions about the nature of the programme. Owen and Davies (1990) found that few smokers would be prepared to attend a group or other socially oriented programme and may have perceived this programme as being of a similar nature. Recruitment to the programme may have been enhanced if participants had not been required to attend an information evening held at the centre. The privacy and convenience of a programme administered through the post may attract more participants.

Self-instructional materials have been shown to be more cost effective than other methods of behavioural skills training (Altman, Flora, Fortmann, & Farquhar, 1987). The provision of therapist support does, however, increase costs. Unless a clear facilitation effect can be shown it is obviously not economical to use such supports. There are several studies which show that the effectiveness of self-instructional smoking cessation materials may be augmented by providing smokers with varying levels of personal support and feedback (Glasgow et al., 1981; Windsor, Lowe, & Bartlett, 1988; Ossip-Klein, et al., 1991; Orleans, et al., 1991). An attempt was made to augment the effect of self-instructional materials by using

regular telephone contact. This was unsuccessful, possibly because of the inability to promote rigorous implementation of the strategies and techniques contained in the manuals. A broader approach may be more effective. Social support and the ability of smokers to elicit it are important aspects of the smoking cessation process (Lichtenstein, Glasgow, & Abrams, 1986). Windsor, Lowe, and Bartlett (1988) augmented cessation rates by helping smokers elicit support from their non-smoking and ex-smoking friends and relatives. Such an approach may be more appropriate to mass-reach smoking campaigns because it requires less of an investment in therapist resources and greater cost-effectiveness.

Mass-reach smoking-cessation strategies have the potential to reduce the prevalence of smoking in the population. This is especially true if methods can be developed to support behavioural as well as attitudinal change (Glynn et al., 1990). Self-instructional materials have been shown to facilitate behavioural change, especially if effective compliance with their content can be increased. The provision of social support may be a powerful way of enabling people to modify their behaviour (Windsor et al., 1988). The challenge for psychologists is to design, implement and evaluate interventions which use these processes to reduce the prevalence of smoking in populations.

9.8. Summary

Self-instructional smoking cessation materials are effective in helping 10-20% of participants in smoking cessation programmes to stop smoking. There is some evidence from the studies reported in this chapter and other studies (Cummings et al, 1988) that use of the content of the materials is not maximised. An attempt was made to use regular, scheduled telephone contact to promote and assist participants' use of self-instructional materials in a cessation programme. Low rates of use and a non-significant trend toward a higher cessation rate were observed in the telephone contact/manual than the manual only group. Several papers, published after this study was completed, suggest that telephone contact may perform a social support function which enhances the effects of self-instructional materials. However, there is

still no evidence that this effect is mediated by increasing the level of compliance to the content of the materials.

CHAPTER 10

THE USE OF PSYCHOLOGICAL THEORIES IN A POPULATION CONTEXT

Behavioural epidemiology involves the analysis, within a defined population, of relationships between behaviour and disease, the prevalence and incidence of these behaviours and factors contributing to their maintenance and change (see Chapter 3). This allows for the expansion of psychological perspectives into a population setting, whilst retaining the discipline's methodological rigour. The use of this framework relies upon the assumption that psychological variables, and the theories from which they are derived, can predict and explain the prevalence of behaviours within populations (see Section 3.3). An important aspect of behavioural epidemiology is the recognition that the study of behaviours on a population - rather than an individual - basis means that causal factors may assume different levels of importance. This chapter is devoted to an evaluation of the variables used in this thesis, and it will be concluded that many of these variables have utility in the prediction of population smoking behaviour. These will be reviewed, as will some methodological and theoretical problems with a behavioural epidemiologic approach. A section (Section 3) will be devoted to an examination of psychological perspectives which are not explicitly addressed in this thesis, but are seen as being important in population research.

10.1 Methodological considerations

The work in this thesis has been directed toward the development of methodologies suitable for population research. However these methodologies may have some limitations which require some discussion. A major component of behavioural epidemiology is the employment of surveys which use population-representative sampling techniques. Study 1 (Chapter 5) compared a population-representative sample of smokers with a sample who had volunteered for a cessation programme at a community health centre. It was thought that the community health centre sample would exhibit similar characteristics to people choosing to seek assistance with smoking cessation and, therefore, be typical of participants in the clinical

programmes which provide much of the current psychological literature. The health centre programme participants were older, more likely to be female, had higher smoking rates, had made more cessation attempts and were more likely to attribute their last relapse to irritability. Such participants may be more motivated to stop smoking, but may also have greater difficulty in doing so. These findings emphasise the problems involved in generalising information gained from research on clinical and other opportunistic samples to behaviours in the general population.

The use of population-representative surveys was advocated as a way of overcoming potential sampling biases. An obstacle to doing this is that the time and expense of conducting prospective studies with population-representative samples often means that only cross-sectional surveys are used. The longitudinal study presented in Study 2 (Chapter 6) identified measures of readiness to stop smoking and confidence as being predictive of future cessation. This finding enables researchers working with cross-sectional data sets to use these variables as dependent variables, as they have been shown to predict future behavioural change. Studies two, three and four used these methods.

Any interpretation of these findings should, however, be made after consideration of several methodological factors. These are listed below:

Validity of the measures: This thesis has used questionnaires and surveys, administered during personal interviews. In order to enable the convenient administration of these surveys, many of the concepts have been operationalised as brief one item questions. Single item indexes have been used to measure risk perception, confidence, nicotine dependence and some aspects of smokers' social environments. This may be contrasted with the complex, but more theoretically-pure, measures employed in the literature. These changes may somewhat undermine the validity of these measures. The items used in Study 2 (Chapter 6) to measure risk perception are a good example of this. Participants were asked to nominate the percentage probability of them contracting a fatal or serous illness. There were no prompts to specific illnesses and participants were free to estimate their personal susceptibility in any way

they chose. There is no way of discriminating between specific aspects of risk perception such as an accurate awareness of risk and generalised aspects such as such as denial and rationalisation. Similar problems of using single item measures to assess confidence are addressed in the next paragraph.

Theoretical weaknesses in outcome variables: Self-efficacy theory suggests that confidence (or at least a multi-item measure of self-efficacy as described by Bandura (1986)) mediates the initiation and outcome of attempts at behavioural change. Associations were found between confidence and the initiation and outcome of cessation attempts in Study 2. However, there has been little empirical support for the mediating proposition as opposed to a the view that self-efficacy has a merely diagnostic role (Lee, 1989c). The issue is discussed more fully in section 2.2 of Chapter 2. The stages of change model, from which the readiness to quit measure is derived, is designed to provide a conceptual overview of behavioural change and to organise diverse theoretical perspectives on the smoking cessation process (Davidson, 1992). The model is not intended to be an explanatory theory and will not, by itself, explain processes which lead to smoking cessation. There is also no evidence suggesting that the readiness to quit item reflects a uni-dimensional construct and the very nature of the variable suggests that this may not be so. Its use as a dependent variable may be problematical, due to the threat of spurious correlation. Dimensions within the readiness to quit measure, which have little relationship to actual cessation, may be associated with independent variables, giving the false impression that these other variables predict future cessation. For example, the findings of Study 2 suggest that behavioural intention and risk perception are strongly associated with readiness to quit, but those variables do not, themselves, predict cessation. Care must be taken when interpreting the meanings of some of the correlates of these confidence and readiness to quit. It is expected that future research will clarify the issues raised in this section, and provide better support for the use of confidence and readiness to quit as outcome indicators in population studies of smoking behaviour.

Validation of smoking status: Another problem with the collection of large data sets involves the measurement of the dependent variable, smoking status. It is strongly advisable to use

biochemical tests to validate participants' claims of abstinence from smoking, as the proportion of claims which are false can be up to 10% (Lichtenstein, 1982). This is often neglected in the collection of large data sets as the validation procedure is expensive. For example, the follow-up observations in Study 2, (Chapter 6), did not use these tests and the findings may be considered somewhat unreliable. However, smoking behaviour and smoking status are relatively simple to quantify compared to some other health behaviours. Issues of outcome may be more difficult to accurately quantify, as with dietary behaviours, sunlight exposure, defensive driving and sexual behaviours. The issue of validating smoking and other health-related behavioural change is a complex one and probably requires a balance of self-report and biological/physiological measures.

10.2 The usefulness of psychological variables in population research.

In this thesis, behavioural epidemiology is viewed as a framework by which psychological constructs may be applied to a population context, whilst preserving the discipline's methodological rigour. This thesis has employed several theoretically-driven variables to help explain and predict changes in smoking behaviour. The potential usefulness of each is explored in this section and suggestions made for future research.

The stages of change model: In Study 2, the readiness to quit variable, derived from the stages of change theory, predicted both the initiation and outcome of cessation attempts. This prediction was most accurate when the precontemplation and contemplation stages were combined, and compared to the two preparation stages. Behavioural intention was correlated with the readiness to quit measure, especially discriminating between smokers in the contemplation and preparation stages. Behavioural intention also predicted the initiation of cessation attempts, but not their outcome. These findings suggest that behavioural change (both the initiation and outcome of cessation attempts) is most likely to occur when the smoker is in the preparation stage. These findings support the stages of change model as proposed by Di Clemente, et al., (1991). The findings also suggest that modifications may be made to add the concept of behavioural intention to the model, as this measure was more

strongly associated with the initiation of cessation attempts than readiness to quit. The measure of behavioural intention may be effective in discrimination between smokers in the contemplation and preparation stages (see Section 3 of Chapter 6).

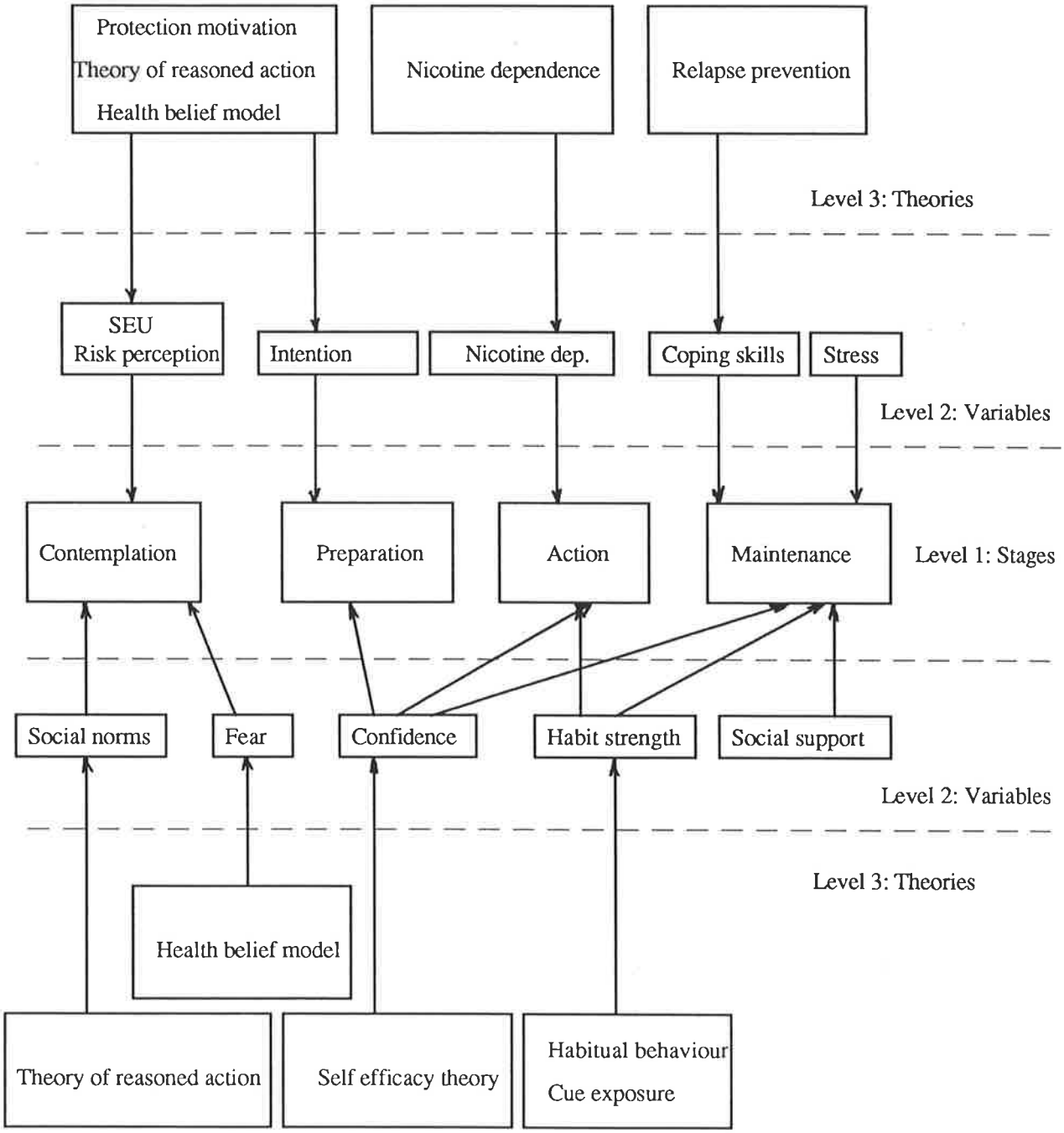
The stages of change model is designed for use as a tool, providing a conceptual framework for organising and describing the behavioural change process (Davidson, 1992). The model, itself, does not specify or explain the factors which drive the behavioural change process. However, the findings from Study 2 suggest that the ultimate success or failure of self-directed cessation attempts may be influenced by events and processes occurring at the preparation stage (see Section 6.3, Chapter 6). Future study could be profitably directed toward the identification of strategies which may be employed, during the preparation stage, to maximise the chances of successful long term cessation (Glynn, Boyd, & Gruman, 1990). Such strategies may involve the learning of behavioural skills such as relaxation, avoidance of high-risk situations and the learning of cognitive skills such as coping with withdrawal distress and coping with lapses.

The initiation of cessation attempts was predicted by a different constellation of variables to the outcome of those attempts. Initiation was associated with confidence, the intention to quit, female gender, the subjectively estimated chance of a fatal or serious illness, the history of prior cessation attempts and a low educational status. The outcome of already initiated attempts was predicted by a high educational status, confidence and greater readiness to quit. These results, consistent with those of Hellman et al., (1991) and Borland, et al,. (1991), support the propositions of Pechacek and Danaher (1979), Bettinghaus (1986) and Di Clemente, et al., (1991) that the initiation and outcome of smoking cessation attempts represent qualitatively differing processes. Other authors have argued that the process of relapse also has unique predictor variables (Brownell, et al., 1986; Glasgow & Lichtenstein, 1987; Swan and Denk, 1987) and there is even evidence that early and late relapse have different predictors (Mermelstein, et al., 1986; Swan & Denk, 1987). The implication of these findings is that models which emphasise the complex and multi-faceted nature of

behavioural change may be preferable to unitary models, and that researchers and practitioners should direct their work to specific stages of the cessation process.

The use of a sequential model of behavioural change such as that of Di Clemente, et al. (1991) allows for a greater degree of sophistication and precision when choosing psychological theories to explain the behavioural change process. Using these models, smokers may be categorised into conceptually different groups with different needs. The theories which are used to design interventions will be those which are relevant to the particular stage. For example, the theory of reasoned action, dealing with belief and attitude changes, is more likely to operate at the contemplation stage as smokers decide whether they wish to try to stop. When a cessation attempt is made, it's success may be affected by the smoker's level of nicotine dependence and learning history. Long term abstinence may be affected by environmental cues, social support, stress and the smoker's coping skills. If, for example, many smokers are in the pre-contemplation stage, theories dealing with risk perception and attitude change will be appropriate. Table 10.1 presents an overview of theories directed toward smoking cessation and variables derived from them. These are all described in Chapter 2. The model is split into three levels. Level one refers to the stages of behavioural change, level two refers to variables which operate at these stages and level three refers to the theories from which the variables are derived. For example, when the action stage is targeted, nicotine dependence may be identified as a potential problem, and interventions may be designed using principles derived from nicotine dependence theory. The effects of this intervention may be evaluated with reference to changes in nicotine dependence variable.

Figure 10.1 Factors influencing each stage of smoking cessation.



Using this model, the selection of research agendas and interventions will involve targeting a particular stage of the cessation process, identifying the most appropriate model and measuring the variable to evaluate the intervention's impact. A negative example of how this model may be applied to select interventions comes from Gritz, Berman, Bastani and Wu (1992) who mailed a number of self-instructional manuals to smokers in the community. The

materials were not effective in assisting this non-volunteer sample of smokers to stop, a finding that the authors attributed to the fact that many of the smokers were probably in the early stages of the cessation process and that the materials would be most useful in the preparation and action stages (Ockene, 1992).

Confidence: In Study 2, subjective estimates of confidence were shown to be associated with both the initiation and the outcome of cessation attempts. Confidence was also associated with variables such as freedom from nicotine dependence, readiness to quit, fewer past cessation attempts and higher social status. These associations demonstrate some construct validity. Bandura's (1986) self-efficacy theory seems to be the most appropriate framework to conceptualise the confidence variable. There may, however, be some difficulty involved with the application of the theory. Bandura suggests that the construct be measured using a number of items dealing with a smoker's perceived efficacy over a number of situations, as self efficacy is seen as being highly situation specific. The confidence measure used here is a single item which may be contaminated by a number of general factors such as personality or efficacy over a number of different behaviours such as exercise persistence. It is also difficult to establish whether confidence plays a causal or a mediating role in behavioural change as there is insufficient empirical evidence for either of these propositions (Lee, 1989c).

Confidence may be seen as a relatively non situation-specific construct rather than the specific construct for which Bandura (1986) argues. There is evidence from factor analytic studies which suggests that multi-item self-efficacy scales are highly intercorrelated. Baer, Holt and, Lichtenstein (1986) found that their self-efficacy scale was unidimensional with a high reliability. It may be the case that confidence is more usefully viewed as a construct similar to self esteem which is seen as being the result of social learning, but is not situation-specific nor does it vary greatly over short time periods (Rosenberg, 1965). The implications of this perspective are that levels of confidence would depend upon a wider combination of cognitive, behavioural and personality variables as opposed to the few specific variables which are said to affect self-efficacy. For example, the achievement of an unrelated, but difficult to attain, behavioural goal such as maintaining an exercise programme may increase an

individual's self-confidence and assist them to stop smoking . This view could be supported by studies which show associations between perceptions of personal efficacy for behaviours other than smoking and the ability to stop smoking. It would also be interesting to examine the possibility of establishing generalisation gradients for different behaviours such as dietary restraint and exercise maintenance.

Attribution and dissonance models: Eiser (1982) suggests that smokers who are aware of the health effects of smoking but continue to smoke will perceive a dissonance between their smoking behaviour and the knowledge that smoking is harmful. One way of resolving this dissonance is for smokers to attribute their smoking to personally uncontrollable factors such as addiction. Smokers surveyed in Study 3 (Chapter 7) who had made five or more cessation attempts and had not been able to stop smoking for greater period of time than a week were more likely to attribute relapse to uncontrollable factors such as addiction, despite the fact that they were not heavier smokers. This attribution may serve to resolve a dissonant state created by continued smoking, but, according to Eiser (1982), it may also have other undesirable effects. Smokers may be less likely to try to stop if they perceive themselves as being uncontrollably addicted to nicotine. Further evidence for the dissonance perspective would be provided by research which demonstrates an increase in attributions to uncontrollable factors, in response to manipulations of the perceived severity of health threats. The implications for public health campaigns, in terms of constructing health messages, may be profound.

Marlatt and Gordon (1985) suggest that smokers who are prone to making attributions for their relapses (or other negative events) to their own perceived character flaws are less likely to be able to sustain behavioural change. In Study 6 (Chapter 9), the attributions smokers made for their last relapse were not associated with their ability to stop smoking. Curry, Marlatt, and Gordon (1987) also did not find that the tendency to make characterological attributions for relapse affected the likelihood of future relapse. They did find, from retrospective reports, that smokers who attributed slips to characterological factors were more prone to experiencing full relapses. However, due to the failure of prospective studies to show an effect, it is currently difficult to accept this hypothesis.

Cessation history: The number and duration of cessation attempts were predictors of future cessation in Studies 2 and 6. The number of prior cessation attempts and the duration of the last attempt were also related to both confidence and the perceived difficulty of successful cessation in Study 3. These results were interpreted as supporting a model implying that future cessation would be less likely if the smoker had a history of many short previous cessation attempts. Brownell et al's (1986) incremental learning model, suggesting that experience with cessation attempts (operationalised in this study by having a number of cessation attempts, one of which was of a long duration) is helpful in achieving future cessation, was not supported. However, due to reasons presented in the discussion of that study the analyses may be seen as insensitive to such an effect, and there may be cause to re-examine the incremental learning model using a more powerful method of analysis. However the relationships between confidence, difficulty, the number of cessation attempts and the duration of the longest does imply that the smoker becomes discouraged when cessation attempts are not successful. The implication of this finding is that premature cessation attempts should be discouraged and that shorter term goals may be more appropriate (see Section 3, Chapter 7).

Nicotine dependence: Variables derived from nicotine dependence theory were expected to be associated with the outcome of smoking cessation attempts. However, an index of nicotine dependence was not found to relate to smoking cessation in Study 2 (Chapter 6), nor was smoking rate associated with confidence or perceived difficulty in stopping smoking in Study 3 (Chapter 7). Furthermore, the comparison of the population sample with the health centre sample showed that the population sample made fewer attributions for relapse to withdrawal symptoms (see Table 3, Section 2, Chapter 5). Nicotine dependence and habit strength may be more likely to influence smoking behaviour in clinical samples who are heavier smokers but more motivated to stop than smokers in samples taken from the general population.

Risk perception and evaluation: Models such as protection motivation theory, the theory of reasoned action and the health belief model suggest that cessation attempts are more likely to be initiated if smoking is perceived as being a threat to health. Two risk perception items

were included in Study 2 and were, indeed, related to future attempts to stop smoking. This suggests that the perception of risk is an important (and perhaps necessary) aspect of the smoking cessation process. A low perception of health risk may be affected by a number of factors. The smoker may be genuinely ignorant of health problems associated with smoking. The perception of risk may also be influenced by dissonance processes where a smoker, unable or unwilling to stop, rationalises their smoking by insisting that it does not constitute a great health risk (Lee, 1989a).

Educational attainment: The findings of Study 2 (Chapter 6) showed that educational attainment was positively associated with the outcome of a cessation attempt. Borland, et al. (1991) also found this. It is not known how educational attainment is implicated in the cessation process. Educational attainment may be an indicator of social status and be associated with smoking behaviour in this way. Study 4 was designed to identify some of the ways that educational attainment may influence smoking behaviour. Findings suggested that; the perception of benefits accrued from cessation were less immediate and that there were more smokers in the environments of people of a lower social status. The instrument used to measure educational attainment in Study 4 did, however, measure participation in educational activities, not their achievement. It may be the case that an instrument measuring achievement better predicts smoking behaviour and smoking-related attitudes.

Educational attainment may be, more directly, related to smoking behaviour through a number of dispositional and situational factors such as intelligence, social conditioning and persistence. Each of these factors may influence the cessation of smoking independently of social status. It is also possible that education has a causal influence on the behavioural change process, as benefits may be gained from the educational process itself. Cognitive-behavioural theories stress that the cessation process is enhanced by the learning of new skills and attitudes, often using self-instructional formats. The ability to do this effectively requires some educational attainment. For example, Marlatt and Gordon's (1985) relapse prevention model suggests that the maintenance of behavioural change is associated with cognitive flexibility (see section 2.1.2), something which may be a result of educational attainment.

Further research, following some of the suggestions presented above, may serve to identify the processes which influence the relationship between education and cessation.

Occupational prestige: The occupational prestige variable is regarded by some as the most comprehensive single measure of current social status (Daniel, 1984). Occupational prestige was only associated with measures of smoking behaviour, perceptions of the immediacy of health benefits after cessation and the likely presence of other smokers in the individuals' social environments. The empirical study of factors mediating the relationship between variables such as occupational prestige, educational attainment and health-related behaviours is still in its infancy, but there is certainly potential in this area, as social gradients in health are a cause for considerable public health concern (Pierce, et al., 1989). Section 1 of Chapter 11 suggests a framework whereby such factors may be identified and studied.

10.3 The need for research on contextual factors affecting smoking behaviour

In their descriptions of behavioural epidemiology, Heggenhougen and Shore (1986) and Raymond (1989) stress the contribution of social and environmental factors in the maintenance and change of behaviour. Currently, psychological theories, applied to smoking, offer accounts of individually mediated factors in smoking cessation (eg. Sutton, 1987). There has been little research devoted to studies of the effects created by differing types of environmental variables (see Section 2.3 of Chapter 3). Researchers have only recently began to examine the effects upon smoking cessation of factors such as social support (Mermelstein, et al., 1986), familial factors (Knutsen & Knutsen, 1991) and smoking bans (Borland, Chapman, Owen, & Hill, 1989). Several authors (Winett, King, & Altman, 1989; Ewart, 1991; Stokols, 1992) argue that psychology and public health will only be fully integrated when this discipline (psychology) is able to provide models in which contextual variables are given a greater role. Such models should be able to describe and explain the behavioural processes which occur when public health procedures such as taxation and legislation are implemented. The findings reported in Study 4 may be explained by such models. The concentration of smoking prevalence in younger males of a lower social status suggests that

there may be sub-cultural factors which influence the uptake and maintenance of smoking. This may be especially the case, given that there is a greater likelihood that these smokers live and socialise with other smokers.

There are arguments derived from sociological and anthropological studies which suggest that broad structural environments influence individuals' behaviour patterns (Chapman, 1980; Powles & Salzburg, 1989). These were addressed in study 4. Other, smaller scale environments also influence smoking behaviour. For example, Shiffman (1982,1984) has demonstrated that relapse to cigarette smoking is influenced by stimuli in the social and physical environment. Physical, cultural, social and economic environments may also affect smoking behaviour. These environments may influence the smoker in a number of different ways such as creating strain, providing stimulation, transmitting behavioural norms, providing access to knowledge and affecting physical well being (Stokols, 1992). Characteristics of both individuals (behavioural history, habit strength and confidence) and their environment (availability of social support, the number of smoking-related stimuli) may combine to act in ways which influence the maintenance and cessation of smoking behaviour.

Public health interventions which influence smoking prevalence will, therefore, be most effective if they address aspects of the smoker' environments in addition to characteristics of the smokers themselves (Winett, King and Altman, 1989; Stokols, 1992). Public health workers have been active in the study and use of strategies such as taxation, restrictions on product availability and advertising bans. Such measures have, generally, been credited with causing the fall of smoking prevalence in recent years (Winett, King, & Altman, 1989). Other strategies have included the imposition of worksite smoking bans which have met with a moderate degree of success in changing smoking behaviour (Owen, et al., 1989). The challenge for psychologists is to develop ways of contributing to these wider issues, whilst retaining a uniquely psychological perspective.

There are several psychological models which incorporate the notion of reciprocal person-environment interactions. Bandura's (1986) social cognitive theory stresses that

environments influence behaviour through the agency of internal processes such as self-efficacy. Communication theory, derived from social psychology examines the effects of different modes and forms of communication upon attitude and behavioural change (Solomon & Maccoby, 1984). Reinforcement theories suggest that the behaviour of an organism is predictable given an adequate knowledge of environmental contingencies influencing that behaviour. Systems theory offers an overview of factors affecting patterns of change in a system when changes occur to some of its units (Stokols, 1992). Neither the reinforcement-based approach nor the systems approach assumes a knowledge of internal personal processes affecting the change.

One problem which may arise when psychologists work in this area is that few models used by other disciplines have been expressed in psychological terms. For example, Smith, Fawcett and Balcazar (1991) suggest that the concept of empowerment is important for the development of a social action strategy against population-based problems such as smoking prevalence. However, it has only been within the last few years that attempts have been made to translate the concept of empowerment into psychological or behavioural terms.

The effects of public health strategies such as increasing sales tax on cigarettes may be investigated using psychological models such as the decisional balance model used by Velicer, et al. (1985) to explain motivation to stop smoking. It may be observed, from this model, that there are some limitations on the effectiveness of such a strategy. Increasing the price of cigarettes to control smoking may help to stimulate cessation attempts, but is less likely to result in cessation as there is little support for the attempts themselves. Another example of using a theory derived from an individualistic perspective in a social context would be the cue-exposure model presented in section 2.1. This model implies that environmental cues may provoke relapse and that the removal of such cues by restricting advertising and smoking itself would have beneficial effects upon the maintenance of non-smoking behaviour.

Studies which manipulate aspects of the physical and cultural environments can provide valuable information regarding the causal influences of environmental variables. Glass

and Singer (1972) developed an experimental, laboratory-based, paradigm for analysing the effects of urban environments upon stress responses in humans. Some work has been done regarding the effects of experimentally-induced stress upon nicotine self-administration (Epstein & Perkins, 1988) but, generally, studies where the environment has been experimentally manipulated have been neglected.

Current, individually oriented, models of behavioural change may only contribute a portion of the knowledge base required to implement effective interventions which reduce the prevalence of smoking. Future behavioural research can expand the role of psychologists by employing theoretical models which emphasise the interactions between smokers and specific structural and personal environments. This will be valuable in helping to guide the development of regulatory and non-regulatory approaches to the reduction of smoking prevalence.

10.4 Theoretical overview

Most variables used in the empirical work were related to smoking behaviour in a population context, as they are in clinical contexts. However, their relative contribution to the prediction of smoking behaviour changed, as was the case for nicotine dependence. The relative contribution of theoretically-derived variables also may vary from sub-group to sub-group, so a high level of specificity is required when defining populations for intervention. This may support the argument in favour of using behavioural epidemiologic techniques, as studies need to be conducted on a population basis to provide an accurate picture of the prevalence and possible causes of behaviours.

The use of aggregate data also allows for the identification of relationships which may be obscured when working with individuals and small samples. The effects of social status upon smoking related variables only becomes apparent when a large sample is used, as relevant sub-groups are identified and between-group comparisons can be made. Other variables such as social support also become important when large samples are used (see

Section 2.2 of Chapter 3). Given the recent interest in broad social and environmental factors on behaviour (see Section 4 of Chapter 8), this is an important point in favour of a behavioural epidemiologic perspective.

10.5 Summary

Most variables used in this thesis were shown to be useful in predicting smoking behaviour in populations. This supports the use of the research paradigm suggested in this thesis. The readiness to quit measure was shown to be predictive of future abstinence and represents an important organising construct for research and intervention. Measures of confidence and risk perception were shown to be potentially useful in a population setting as was Eiser's (1982) application of the construct of cognitive dissonance. Variables concerned with cessation history, such as the number and duration of previous cessation attempts, were also found to be predictors of behavioural change. However, measures of nicotine dependence such as smoking rate and time taken between waking and smoking were less important in population-representative samples than with clinical groups. Education and occupational prestige were associated with smoking behaviour, especially in younger males. However, their association with smoking-related psychological variables was relatively weak. The influence of structural and personal environments on smoking behaviour was seen to be a potentially important area for future investigation.

CHAPTER 11

BEHAVIOURAL EPIDEMIOLOGY AND SMOKING CESSATION - REVIEW AND CONCLUSIONS

Several major public health problems such as cardiovascular disease and cancer are associated with the prevalence of behaviours such as smoking. Psychologists are able to contribute much to the analysis of factors which maintain smoking behaviour (Matarazzo, 1982). However, the validity and usefulness of psychological research in a public health context may be increased, if some fundamental differences in orientation and scope between the disciplines of psychology and public health are addressed and resolved (eg. Winett, King, & Altman, 1989; Stokols, 1992).

Behavioural epidemiologic research may help to address some of these differences, as it provides a framework for testing psychological theories in a population context (see Chapter 3). The use of this framework preserves the scientific rigour of psychology and allows for the extension of the analysis from individuals to populations. This chapter is devoted to the discussion of the behavioural epidemiologic model, and the consideration of its implications for future research and practice. Such implications include the need for theories which identify and explain social and contextual influences on health-related behaviours, the development of interventions and implications for the future of public health psychology are also discussed.

11.1 The case for behavioural epidemiology.

In Chapter 3, differences between the disciplines of psychology and public health were identified and discussed. A behavioural epidemiologic framework was seen to be a better way of integrating psychological theory into the study of public health issues such as smoking prevalence. This thesis reports several studies which have addressed the need for, and the feasibility of using, such a framework. From the findings of the empirical studies, there are

four arguments which can be made to support the use of a behavioural epidemiologic perspective:

1. A population sample was shown to be quantitatively different, on a number of key dimensions, to a self-selected sample, typical of samples often used in psychological research on smoking cessation. The self-selected sample showed a bias toward smokers who were more motivated to change their behaviour but would possibly experience more difficulty in doing so. This difference between the two samples underscores the problems of generalising findings from non-representative samples to populations. The use of population data sets such as those which have been employed in this thesis will help to overcome this problem in two ways: They allow for greater generalisability of findings; and, they help to create a context, within which findings using self-selected and other opportunistic samples may be considered.

2. Data from Study 2 helped to establish that theoretically-derived variables such as risk perception, confidence, behavioural intention and readiness to quit may be used in population surveys, apparently without losing their ability to predict smoking behaviour. This is crucial to any application of psychological theory to population-based problems. Although they retain high levels of predictive validity, it is not entirely certain that these variables retain their original theoretical meaning as, in the case of confidence, they may be distorted from their original form to enable convenient administration in an interview situation. These issues were discussed more fully in Chapter 10.

3. The relative importance of some theoretically-based variables seems to differ in population, as opposed to clinical, samples. Nicotine dependence, for example, was not associated with behavioural change or confidence in being able to change behaviour in a population sample as strongly as it is in clinical samples. Some key variables which were shown to be associated with smoking behaviour in population samples were age, gender, readiness to quit, behavioural intention and confidence. It may also be concluded that contextual factors such as the social environment and social status play a role in smoking behaviour.

The use of behavioural epidemiologic techniques can help to identify such influences (Raymond, 1989). The study of social status and smoking behaviour (Study 4) was designed to identify some of the reasons why smokers of a low social status are less likely to stop smoking. The potential and the implications of using psychological theory to examine the impact of social and environmental factors on behaviour are examined in Section 2 of this chapter.

4. There is potential for the more-extensive use of minimal-contact interventions with large populations. It has been demonstrated, in controlled trials, that self-instructional materials are effective aids to smoking cessation. Findings presented in the last chapter suggest that the effectiveness of these materials may not be solely dependent upon the implementation of their content, but may be influenced by a number of diverse factors. There are several intervention options such as the use of social support which have been shown to assist smokers to stop (Windsor, Lowe, & Bartlett, 1988; Ossip-Klein et al., 1991; Curry et al., 1991). Other intervention strategies which may show promise concern the broad issue of empowering people to try to control their health-related behaviours (Ewart, 1991) and the modification of smokers' environments by the prohibition of advertising and smoking in certain public places (Owen & Halford, 1988; Borland, Chapman, Owen, & Hill, 1990).

A behavioural epidemiologic framework represents a potentially informative and interesting way of examining the maintenance and change of smoking behaviour in a population. The remainder of this thesis is devoted to the development of future research agendas and an exploration of the role of behavioural epidemiologic research in public health and wider community contexts.

11.2 Theoretical basis for population research.

Public health researchers have long been interested in the effects of social and cultural factors on morbidity and mortality (eg, McMichael, 1985). Recently, health psychologists have begun to acknowledge the importance of these factors in the maintenance and change of behaviour

(Winett, King, & Altman, 1989; Ewart, 1990; Bunton, Murphy, & Bennett, 1991; Stokols, 1992). This trend is encouraging, because it extends the scope of psychological theorising, and permits an analysis of topics which are of interest to public health professionals. Behavioural epidemiologic techniques may be useful in this context, because entire populations are the focus of study and comparisons can be made between different social groups. Raymond (1989) makes the analysis of social contexts explicit in his definition of behavioural epidemiology. This was done in the study of social status and smoking (Study 4). Given that broad cultural and social environments are represented within an individual's attitudes and behaviours, a behavioural epidemiologic perspective can help to demonstrate their influences.

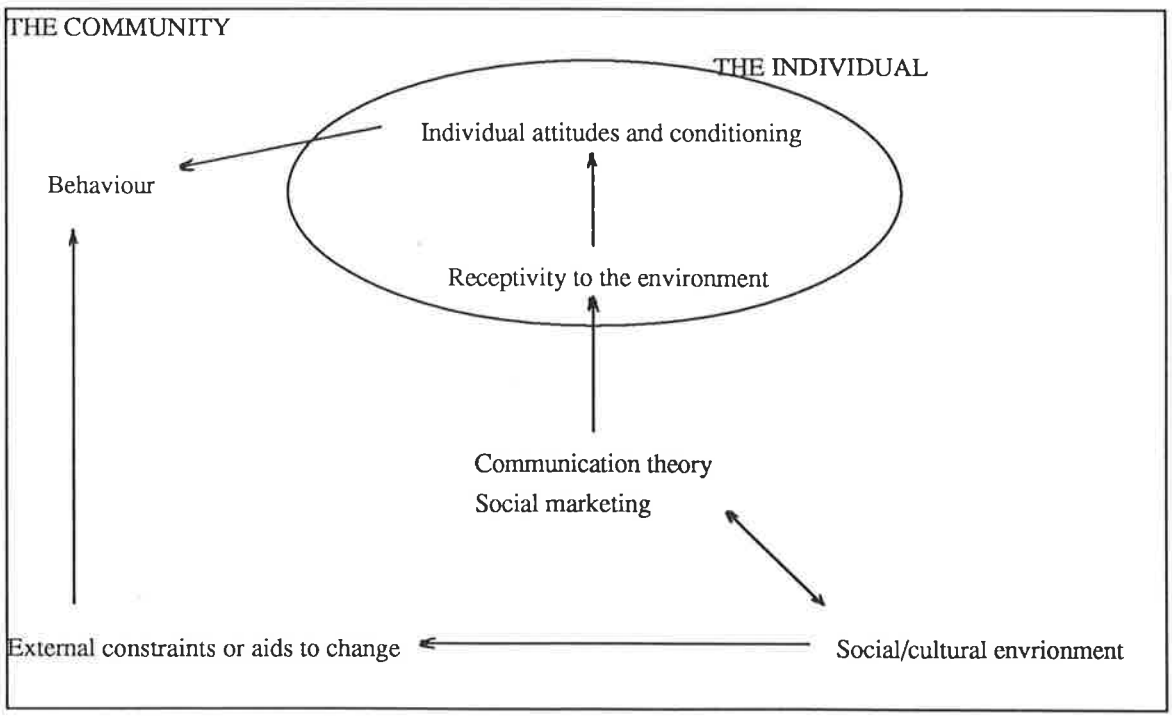
Perspectives from areas such as communication theory, social and behavioural ecology and social marketing theories may assist psychologists to employ multi-level analyses of smoking behaviour. Another advantage is that these perspectives can provide better interfaces with other disciplines such as sociology, anthropology and social ecology because they address similar subject matter (Stokols, 1992). Examples of such research may include analyses of the empowerment process (Smith, Fawcett, & Balcazar, 1991; Ewart, 1991), receptivity to different messages and communications (Flay, 1986), social support (Felton & Shinn, 1992) and the response of smokers to the manipulation of their environments such as smoke bans (Borland, Chapman, Owen, & Hill, 1990). Studies of the differences between cultural groups may also serve to demonstrate the role of environmental factors in the maintenance and change of smoking behaviour (Jeffery, 1989).

The designers of mass-reach health promotion campaigns have often attempted to manipulate aspects of smokers social and physical environments (Puska, et al., 1985; Farquhar, et al., 1985; Novotney, et al., 1992), but research psychologists give this less emphasis. This has meant that such campaigns may lack a well-established theoretical base. A similar criticism could be made of this thesis as most variables used were taken from theories which concentrate upon individually mediated perspectives. This may have led to a concentration upon these factors to the exclusion of others. For example, the low recruitment

to the self-instructional intervention study (see Section 7, Chapter 9) may have been avoided if more attention been paid to social marketing perspectives and promotion of the programme itself.

Figure 11.1 shows a schematic representation of factors which can influence health-related behaviours. All are potential targets for research and intervention, although psychologists have tended to concentrate upon the attitudinal and behavioural level. Individual factors and the environment are seen to be linked, and to influence behaviour in both joint and independent ways. The importance of psychologically-based perspectives such as social marketing and communication, which operate within the community but outside any one individual, is emphasised and these are potential research areas for psychologists. The existence of external constraints to behaviour such as smoking restrictions or social conventions is also emphasised. Individuals' receptivity to specific environmental input such as their trust of health authorities and attentional factors may also be important in determining how they will react to mass-reach smoking-cessation programmes.

Figure 11.1 Relationships between individually and socially mediated factors in the maintenance and change of behaviour.



Behaviour may also result from interactions between individual and environmental factors. In Chapter 1, regulatory strategies were discussed as being different to those which encourage volitional behavioural change, as the former was not seen to be relying on a high component of psychological material. However, it may be seen in Figure 11.1 that regulation of advertising, smoking in public places and taxation policy creates an environment which may affect behaviour in a diverse number of ways. For example the imposition of higher taxes may change smoking behaviour because cigarettes are simply not affordable, or it may be the case that the smoker perceives that the costs of smoking are too high. The distinction between regulated and volitional behavioural change then becomes somewhat artificial as there are components of both in the smoker's actions. There have been few studies by psychologists on these issues (Borland, Chapman, Owen & Hill, 1990), but in future they may become extremely important for public health intervention (Novotney, et al., 1992).

Research and intervention strategies should, therefore, seek to address multiple influences on behaviour, direct and indirect. Psychologists are, presently, predisposed to the study of factors within the individual. These are important research priorities, but there is a need for priority to be assigned to other contextually-oriented factors. For behavioural epidemiology to fulfil its potential, psychologists need to apply their expertise to the study of processes, and interactions between, all of these factors.

11.3 Implications for intervention at a population level.

A number of current mass-reach intervention strategies were reviewed in Chapter 1. They included community smoking-cessation campaigns, worksite interventions and programmes delivered by medical and para-medical practitioners. The results of behavioural epidemiologic research should be used to assist in the design and implementation of these intervention strategies. In this thesis, it has been argued that the use of a behavioural epidemiologic framework enables researchers to more-accurately define target groups, to describe psychological processes which maintain and change smoking behaviour and to develop intervention options.

Behavioural epidemiology may provide a research perspective which will assist in the identification of target groups, the identification of outcome measures and the identification of factors which may influence the maintenance and change of smoking in these groups (Hastings & Haywood, 1991; Donovan & Owen, in press). For example, in study 4, young males of a low social status were shown to be more likely to be smokers and, if they were smokers, to be less likely to quit. It was suggested that this may be attributable to greater concentrations of smokers in members' social environments and that interventions could be directed toward groups of smokers as well as individual smokers.

The targeting of specific groups within the population will assist in the design of intervention strategies which address specific problems. This enterprise is extremely difficult if the population parameters of each behaviour are unknown. The effects of intervention with a particular group of smokers will not be known, in population terms, unless the size of that group and the extent to which it differs from the rest of the population is known. For example, the empirical studies suggest that there is a substantial sub-group within the population who are willing to stop smoking and make attempts to do so, yet they are not able to succeed. This group is of interest to public health researchers and practitioners as they are more likely (due to their high smoking rates) to suffer from ill health. However, they are motivated to stop smoking and are potentially amenable to intervention. This group is characterised by having made a number of unsuccessful cessation attempts of short duration, having a low educational attainment and a lack of confidence that they can quit. Other studies (e.g., Borland, et al., 1991; Hellman, et al., 1991) agree with this characterisation and add that these smokers are more likely to be dependent upon nicotine and have a greater level of habit strength. Possible modes of intervention with this group are discussed in Section 3 of Chapter 7.

The transmission of behaviour-change skills to participants in minimal-contact interventions is a key issue in population intervention. The use of printed self-instructional materials was argued to be as a promising method of doing this (see Chapter 4). A review of controlled, randomised evaluations showed that such materials are an effective means of

assisting people to stop smoking. It is not clear why these materials are effective, as users of the material often did not report implementing large portions of the specific content. An intervention study was designed to increase the effectiveness of a cessation manual, employing minimal therapist contact to increase the use of its specific content. The addition of telephone support to a cessation manual was not shown to produce superior results to the use of a manual alone. However, the findings of similar studies, using greater sample sizes, suggest that including minimal-contact therapist and social support components in self-instructional programmes does increase cessation rates (Brown & Owen, 1992). There are few studies which examine processes contributing to the success of self-instructional programmes. Further research is needed to identify factors which may contribute to the effectiveness of self-instructional smoking cessation materials and to determine how personal or therapist support may best be used to improve cessation rates.

The availability of social support, and smokers' ability to elicit it, predict whether they will be able to achieve and maintain smoking cessation (Prochaska, et al., 1985; Mermelstein, et al, 1986). Windsor, Lowe and Bartlett (1988) implemented a large scale intervention, successfully recruiting the aid of non- or ex-smoking friends and spouses to provide support for quitting smokers. It is likely that the development of more specific models of social support and behavioural change (see Section 3.C, Chapter 2) will allow for the design of more powerful intervention strategies. Felton and Shinn (1992) suggest that the contribution of social support may be made even more useful if the concept is expanded to incorporate social networks other than dyadic ones, to improve a given smoker's general sense of social integration. Ewart (1991) suggests that the manipulation of values and attitudes within the social environment, which encourage people to make changes to their behaviour, are likely to increase the number of people stopping smoking. For example, the control and cessation of smoking may be promoted as an expression of personal and group independence for target groups such as young people who are concerned with these issues. Strategies which address the contexts within which people live and their ability to manipulate these contexts may, potentially, have a large effect upon the prevalence of health-related behaviours. The use of social support in interventions is confounded by some theoretical uncertainty regarding the

mechanisms by which outcomes are attained (see Section 4 of Chapter 2). There is a need for more basic research to help elaborate causal links to assist in the application of social support components to mass-reach behaviour-change programmes.

An important aspect of scientific inquiry is the manipulation of independent variables to examine causal processes. In a population setting, the expense of controlled experiments for research purposes is large difficult to justify. The epidemiological equivalent of controlled experimentation is usually an intervention trial. There is a need to introduce some theory testing components into these trials and to develop methodologies which can compensate for threats to validity such as recruitment bias, non-homogeneous populations, non-expert application of interventions and participant attrition (Owen & Lee, 1986b; Brown & Owen, 1990). In order to maximise a trial's contribution to theory it is necessary to include an analysis of process (as distinct to outcome), keep a clear separation of intervention components for each condition and to examine processes of recruitment, participation and attrition (Flay, 1986; Owen & Lee, 1986b).

11.4 Problems and perspectives in behavioural epidemiology.

Winett, King, and Altman (1989) finish their book "Health psychology and public health: An integrative framework", concluding that they have defined and identified some tensions existing between the individualistic orientation of psychology and the social orientation of public health. Work in this thesis has used a behavioural epidemiologic framework to address some of these issues, and to suggest some potentially fruitful activities for psychological researchers interested in public health issues. Behavioural epidemiology provides a theoretical and methodological framework whereby psychological theories may be used to examine factors contributing to the population prevalence of individual behaviours. This framework is potentially useful because health psychologists are encouraged to adopt wider, and more contextually oriented, viewpoints and are given a methodology, whereby they may conduct meaningful population-based research. This is consistent with a recent trend within psychology to emphasise the effect of social and cultural factors on behaviour (Winett, King,

& Altman, 1989; Ewart, 1990; Bunton, Murphy, & Bennett, 1991; Stokols, 1992). The framework may also be helpful in the study of factors which contribute to other social problems such as crime and race relations.

This does not, however, mean that all issues have been resolved. There still exists a tension between empirically- and non-empirically-based researchers. Other social sciences, such as sociology, have strong traditions of non-empirical investigation, based upon the argument that empirical research methods are insensitive to subtle influences and processes. The focus of this thesis is strongly empirical, but there are certainly aspects of population research which may benefit from forms of qualitative analysis. The use of focus groups in the development of health promotion messages is an example of this (Flay, 1986; Basch, 1987).

It must also be noted that the methodological problems with large scale surveys, alluded to in Section 1 of Chapter 10, still require some attention. These involve the internal validity problems encountered when single item questions are used and the assessment of complex behaviours using survey techniques (e.g., the assessment of diet-related behaviours). The problems are not insurmountable, and, doubtless, will be addressed in future research. Specific details of the research are discussed in Section 10.1.

Issues concerned with the training of psychologists to work in the public health arena have not been entirely resolved. Many psychologists currently working in this area have been trained in clinical modes of intervention and may carry values and assumptions pertaining to this. Such values may include the expectation of large effect sizes, preferences for intensive individual intervention and an acceptance of findings obtained from non-population-representative data, such as that often found in the clinical literature. Specialist training programmes for psychology graduates may be instituted at masters or doctoral level and consist of exposures to disciplines such as economics, sociology and epidemiology in order develop broader perspectives. Behavioural epidemiology may be taught as a follow on from these disciplines. It may also be appropriate to introduce topics such as HIV risk behaviours which, as opposed to smoking, are not covered by an extensive clinical literature. This may

underscore the differences between clinical and population modes of intervention. Training graduates of other disciplines may require the reverse approach, they may require additional training in aspects of psychological theory and an orientation to individualised approaches.

It is expected that the field of behavioural epidemiology will grow. Smoking is now seen by psychologists as being a public health problem as much as a clinical one, and there may be greater opportunities for research funding in the public health area (Lichtenstein & Glasgow, 1992). Other health-related behaviours such as alcohol use, road safety, exercise and diet are priority areas for public health. Psychologists will be searching for ways to assimilate their knowledge into a wider public health framework. Furthermore, behavioural epidemiology offers an opportunity for researchers engaged in social marketing to determine the readiness and ability of potential consumers to participate in health-related behavioural change. Researchers will be able to target people on the basis of psychological as well as demographic characteristics and test the most appropriate media and environments in which change may be encouraged. As social marketing approaches may be enhanced by the use of behavioural epidemiologic techniques, it is possible that growth in this area may facilitate the development of a behavioural epidemiologic framework.

Behavioural researchers in Australia have been active in theoretically-based behavioural epidemiology for some time (e.g. Oldenburg & Owen, 1990; Owen & Bauman, 1992; Owen, Wakefield, Roberts, & Esterman, 1992; Wilson, Wakefield, & Taylor, 1992; Wilson, Wakefield, Owen, & Roberts, 1992). These researchers have, to a great extent, stimulated the author's interest in the area. There has also been research from Britain and North America in the areas of population surveys (e.g. Sutton, Marsh, & Matheson, 1990) and mass-reach intervention using minimal-contact methods (e.g. Lichtenstein, Nettekoven, & Ockene, 1991).

An argument has been presented, suggesting that the use of behavioural epidemiologic frameworks will assist the implementation of psychological theory into a public health context. The implications of this are that differing styles of research methodology, psychological

theories and interventions are required. The content of this thesis has provided a framework within which to examine the issues, but they do need to be explored in greater depth. Areas for further research are indicated in the text and include the need for theories which are more contextually-oriented and some methodological refinements. The challenge for psychologists working in this area will be to further develop imaginative research and intervention strategies to understand and influence the prevalence of smoking (and other health-related behaviours) in the population. It is hoped that the work presented in this thesis has helped to establish a conceptual framework which will allow for the more effective development of this understanding.

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APPENDIX 1

Methods of data collection used in this thesis.

Due to the potential problems of inference to the general population when using self-selected samples (see Study 1, Chapter 5), the empirical work in this thesis employs either population-representative samples or samples whose characteristics can be compared to population parameters. Much care is taken concerning the methods employed in the collection of a population-representative sample. The Australian Bureau of Statistics, for example, uses cluster sampling techniques based upon the basic unit of a collector's district (a collector's district is a unit of approximately 300 households - named because each is allocated to an individual Census collector). The districts are randomly chosen (although they may be stratified; e.g. to represent urban - rural differences) and households are randomly chosen from within the districts. One interviewee is chosen from each household using a randomisation method such as interviewing the person who has most recently had a birthday. In urban areas, up to five call-backs are required before sample replacement whilst, in rural areas, three call backs are made. The sample then may be compared to the most recent population Census figures (the data sets in this thesis use 1986 figures) to determine the need for weighting and, if necessary, to calculate the appropriate weights.

This is a complex and expensive procedure. Negotiations were made with a number of organisations to obtain access to appropriate data. Three population-representative data sets were used in this thesis: A data set belonging to the Australian Bureau of Statistics, one belonging to the Anti-Cancer Council of Victoria and one belonging to the South Australian Health Commission. Negotiations were made complex by the fact that each agency had their own aims and objectives. Access to the data sets was made contingent upon meeting at least some of these. Below are presented accounts of negotiations and procedures which were completed in order that this access be granted.

A data set was collected by the Australian Bureau of Statistics (ABS) during 1987 as part of their labourforce survey of that year. It is used for the study on sampling methodology in Chapter 4 and the study on the effects of previous unsuccessful cessation attempts on the smoker's confidence and perceived difficulty of future cessation in Chapter 6. The A.B.S. is the Australian federal government agency which is responsible for the collection of statistics, and respondents are legally bound to participate in certain surveys such as the labourforce and Census surveys. Consequently, this set uses the best sampling procedure of all the data sets, as refusal rates are minimised. A full description of the methodology is given in the publication *Smoking and Asthma in South Australia* (A.B.S., 1988).

The A.B.S. is a commercially-oriented organisation which does not have a particular interest in health. They were not willing to release the data set to any outside organisation without the payment. The study comparing characteristics of a clinical with a population sample in Chapter 4 was done using data presented in the *Smoking and Asthma* publication and comparing it with that obtained from a questionnaire administered to a sample from a community health centre which was specially designed for the purpose. The analysis was done by hand from the raw frequencies in this publication. The findings presented in Chapter 5 were also derived from this data set. The ABS were not willing to release the data, but they agreed to perform a pre-specified analysis for an agreed fee of A$ 1,000 (about US$ 720). An analysis plan which would help to elucidate a theoretical problem, was developed. Part of the problem involved the categorisation of dependent and independent variables to best reflect current theoretical thought. These categorisations and the theoretical rationales for them are presented in Chapter 6.

A major difficulty encountered with working in this way is that the person who is in possession of the theoretical knowledge is not in actual contact with the analysis and is not able to experiment with different approaches. For example, the association of confidence with the number of previous cessation attempts may be curvilinear but the ABS officer only tested for a linear relationship (see Section 3, Chapter 7). This relationship is of considerable theoretical interest, and it is unfortunate that the conduct of the analysis was not flexible

enough to test for this. The arrangement with the A.B.S. meant that the officer who performed the analysis was not aware of these theoretical possibilities and the opportunity was lost.

The analysis performed was, however, highly competent and is presented in Chapter 7.

The Centre for Behavioural Research in Cancer (CBRC) of the Anti-Cancer Council of Victoria, Melbourne, Australia, had commissioned the Roy Morgan Market Research company to survey a population-representative sample of smokers in Victoria. Baseline measures of attitudinal and behavioural factors were taken and a randomly selected sub-sample were followed-up after a period of three and twelve months to examine changes in smoking behaviour. This data set is important because it combines the advantages of population sampling with those of using longitudinal research designs. The results are presented in Chapter 6 and used to evaluate the efficacy of baseline measures in predicting future changes in smoking behaviour. The CBRC is a research organisation with an interest in population based studies of smoking behaviour and were prepared to allow access to their data free of cost.

The CBRC do, however, have their own aims which had to be considered during negotiation. It was resolved that, in return for access to the data, a jointly-authored paper with CBRC staff would be written and submitted for publication. Any analyses would be available for this thesis. The analyses and results are presented in Chapter 6.

A South Australian Health Commission (SAHC) data set was used to study the relationship between social status and smoking behaviour and some possible psychological mediators of this relationship. In a similar fashion to the arrangement with the CBRC, work was conducted in co-operation with the Behavioural Epidemiology Unit of the SAHC. A data set collected by the Harrison Market Research company, but owned by the SAHC was used. Negotiations with staff of the Behavioural Epidemiology Unit were made easier by the author

having worked there during the previous year and their enthusiasm for the research topic. An agreement was made, whereby access to the data would be granted provided that analyses would only be performed within the physical boundaries of the unit itself. This arrangement was made to ensure that the data was secure and not allowed to leave the premises. As with the CBRC a condition of being able to use the data was that a paper would be written and submitted for publication.

The study offered an opportunity to design the questionnaire in order to collect data for a specific purpose rather than work within the constraints of data which was designed for other purposes. Most of the items in Chapter 8 were designed by myself in negotiation with the unit's staff. This results are reported in Chapter 8.

APPENDIX 2

Statistical appendices.

APPENDIX 2.1 Intercorrelations for all dependent variables in study 2.

	2	3	4	5	6	7
1 Age	.06	.20**	-.19**	-.16*	.07	.15*
2 Sex		-.07	-.13	.07	-.10	.07
3 Smoking rate			-.18**	-.49***	-.16*	.07
4 Highest education				.07	.13	-.09
5 Time after waking					-.16*	.07
6 No. previous attempts						-.35***

	8	9	10	11	12
1 Age	-.33***	-.27***	-.10	-.27**	-.20**
2 Sex	-.08	-.11	.10	.01	-.01
3 Smoking rate	-.02	-.09	-.29**	-.10	-.17*
4 Highest education	.22**	.31***	.13	.11	.18
5 Time after waking	-.05	.13	.32***	.08	.06
6 No. previous attempts	.10	.14*	-.06	.25***	.11
7 Time since last attempt	-.13*	-.14*	-.05	-.20**	-.20**
8 Chance of a fatal illness		.68***	.13	.25***	.21**
9 Chance of a health problem			.17*	.22**	-.29***
10 Confidence				.23**	.30***
11 Intention					.37***
12 Readiness to quit					

APPENDIX 2.2 Permutations of the readiness to quit variable from Study 2 and it's relationship with the initiation and outcome of cessation attempts.

Using the ladder as a continuous variable with five values, t-tests showed a significant association with initiation of cessation attempts ($t_{(170)}$=3.20, p<.01; means attempters 3.19 (1.04), non-attempters 2.69 (1.03)) but not their outcome ($t_{(80)}$=1.89, n.s.; means non-smokers 3.48 (0.97), smokers 3.04 (1.04)). Crosstabulations of the component stages with the initiation and outcome of cessation attempts are presented below.

	No attem. (n=90)	Attempt (n=82)	Chi-sq	Unsuccess (n=53)	Successful (n=29)	Chi-sq
Precontemplation	12	6	1.66	5	1	0.99
Contemplation 1	26	12	5.06*	8	4	0.03
Contemplation 2	34	31	0.00	24	7	3.56
Preparation 1	14	26	6.27*	12	14	5.69*
Preparation 2	4	7	1.2	4	3	0.19

These data suggest that a binomial variable consisting of a combination of the precontemplation, contemplation 1 and contemplation 2 stages compared to a combination of the two preparation stages may be a strong predictor of the initiation and the outcome of smoking cessation attempts. The crosstabulation presented below shows this to be the case.

	No attem. (n=90)	Attempt (n=82)	Chi-sq	Unsuccess (n=53)	Successful (n=29)	Chi-sq
Precont, contem 1 & 2	72	49		37	12	
			8.43**			6.30*
Preparation 1 & 2	18	33		16	17	

APPENDIX 2.3 Percentages of respondents in age and gender categories, and means and standard deviations for daily smoking rate in study 3.

Variable	One attempt	5+ attempts	< 1 week	> 1 month
Age - 15-29	39.1	28.8	56.2	29.8
30-44	34.4	35.2	27.4	36.4
45-59	15.3	19.7	9.2	19.1
60+	11.1	16.3	7.2	14.8
Gender - Male	54.2	56.8	45.5	57.6
Female	45.8	43.2	54.5	42.4
Smoking rate	17.87 (6.57)	17.41 (8.17)	20.55 (11.97)	17.04 (5.67)

Appendix 2.4 Prevalences of current smokers and ex-smokers in each age, gender and social status category in Study 6..

	Current smokers			Ex-smokers		
	High	Medium	Low	High	Medium	Low
Full sample						
Education	21.6	28.5	26.8	24.8	24.7	24.8
Occ. prestige	19.4	35.0	32.0	26.6	22.5	19.5
Males under 40						
Education	23.5	34.8	53.9	22.5	13.9	13.0
Occ. prestige	17.8	42.2	39.0	25.3	15.6	13.5
Males over 40						
Education	18.3	25.9	21.5	37.6	41.5	53.6
Occ. prestige	16.7	28.5	24.2	39.8	34.3	38.8
Females under 40						
Education	25.7	25.7	37.3	17.8	18.7	20.8
Occ. prestige	25.4	32.3	33.0	17.0	22.2	19.3
Females over 40						
Education	16.8	19.0	14.7	23.2	23.9	17.7
Occ. prestige	17.5	21.2	23.6	19.6	18.8	16.1

APPENDIX 2.5 Bivariate relationships between educational attainment and smoking-related variables for the full sample in study 4.

Variable	Number	High	Medium	Low	Chi-square
Smoking behaviour					
Daily smoking rate (%>20)	785	38.5	44.9	56.5	18.14**
Smoking > 10 yrs	807	64.9	59.7	69.4	6.21*
Time after waking (<30 min)	785	39.8	41.2	40.4	0.76
Perceived difficulty (% diff)	779	69.3	76.3	72.3	2.73
Readiness to quit (% prep)	657	40.5	36.8	31.3	4.07
Risk-related items					
Likely to suffer health probs	807	50.7	52.5	51.5	2.71
Time before risk stops	807	46.3	55.3	50.2	10.51*
Reason for last relapse					
Stress	807	17.4	22.0	19.4	1.53
Friends smoke	807	6.0	2.5	4.5	3.29
Other priorities	807	5.8	5.0	5.4	0.14
Social environment					
50% or more friends smoke	807	31.4	43.3	36.6	6.97**
Smokers in the household	759	50.0	52.5	51.1	0.28

* p< .05, ** p< .01, *** p< .001

APPENDIX 2.6 Bivariate relationships between occupational prestige and smoking-related variables for the full sample in study 4.

Variable	Number	High	Medium	Low	Chi-square
Smoking behaviour					
Daily smoking rate (%>20)	468	36.3	53.6	38.7	18.80**
Smoking > 10 yrs	480	55.4	62.1	66.7	4.46
Time after waking (<30 min)	468	31.5	44.9	40.7	5.63*
Perceived difficulty (% diff)	467	71.7	73.0	75.9	0.75
Readiness to quit (% prep)	454	41.1	36.5	35.6	0.95
Risk-related items					
Likely to suffer health probs	482	45.3	53.2	48.2	19.15**
Time before risk stops	483	52.6	45.1	49.4	12.11*
Reason for last relapse					
Stress	483	22.7	15.3	22.2	3.52
Friends smoke	483	3.5	4.4	5.7	0.63
Other priorities	483	3.8	3.6	4.2	1.00
Social environment					
50% or more friends smoke	483	41.2	27.8	36.8	0.04
Smokers in the household	466	51.4	52.9	51.5	0.96

* p< .05, ** p< .01, *** p< .001

APPENDIX 2.7 Bivariate relationships between educational attainment and smoking-related variables for males in study 4.

Variable	Number	High	Medium	Low	Chi-square
Smoking behaviour					
Daily smoking rate (%>20)	432	47.2	48.5	68.6	17.40***
Smoking > 10 yrs	454	67.5	61.9	70.4	3.04
Time after waking (<30 min)	432	33.0	42.7	54.0	10.36
Perceived difficulty (% diff)	426	70.7	67.9	83.5	11.89
Readiness to quit (% prep)	357	41.7	39.4	36.8	0.47
Risk-related items					
Likely to suffer health probs	454	54.8	49.7	41.0	8.91*
Time before risk stops	454	48.9	44.1	37.2	13.72*
Reason for last relapse					
Stress	454	21.2	15.4	18.2	1.46
Friends smoke	454	3.5	5.8	2.8	9.09*
Other priorities	454	9.7	5.6	6.3	1.60
Social environment					
50% or more friends smoke	454	56.3	71.1	72.2	7.51*
Smokers in the household	433	47.0	47.6	56.5	3.31

APPENDIX 2.8 Bivariate relationships between educational attainment and smoking-related variables for females in study 4.

Variable	Number	High	Medium	Low	Chi-square
Smoking behaviour					
Daily smoking rate (%>20)	353	31.9	33.6	45.7	6.50*
Smoking > 10 yrs	353	62.9	52.6	68.5	4.99
Time after waking (<30 min)	353	47.1	30.7	44.5	4.89
Perceived difficulty (% diff)	344	74.9	73.5	80.5	1.58
Readiness to quit (% prep)	300	40.0	29.6	26.5	4.82
Risk-related items					
Likely to suffer health probs	352	50.8	54.1	41.1	14.87*
Time before risk stops	353	60.1	53.1	36.7	20.52***
Reason for last relapse					
Stress	353	22.6	23.7	33.9	5.19
Friends smoke	353	4.5	5.0	6.6	0.34
Other priorities	353	1.3	6.5	1.4	4.58
Social environment					
50% or more friends smoke	353	57.0	60.9	63.7	1.28
Smokers in the household	326	42.9	42.4	47.8	0.85

APPENDIX 2.9 Bivariate relationships between occupational prestige and smoking-related variables for males in study 4.

Variable	Number	High	Medium	Low	Chi-square
Smoking behaviour					
Daily smoking rate (%>20)	284	48.9	58.2	46.9	3.15
Smoking > 10 yrs	299	75.2	61.5	55.0	7.44*
Time to smoke (<30 min)	284	32.3	47.4	39.9	4.17
Perceived difficulty (% diff)	287	68.4	72.3	76.0	1.12
Readiness to quit (% prep)	255	50.5	36.6	44.6	3.23
Risk-related items					
Likely to suffer health probs	299	48.9	51.2	51.9	19.67**
Time before risk stops	299	48.8	40.3	56.0	15.5*
Reason for last relapse					
Stress	299	18.8	12.7	19.9	2.56
Friends smoke	299	3.9	6.1	3.6	6.58*
Other priorities	299	3.7	4.4	5.0	0.16
Social environment					
50% or more friends smoke	298	61.9	75.1	61.8	5.96
Smokers in the household	291	51.6	48.0	50.2	0.25

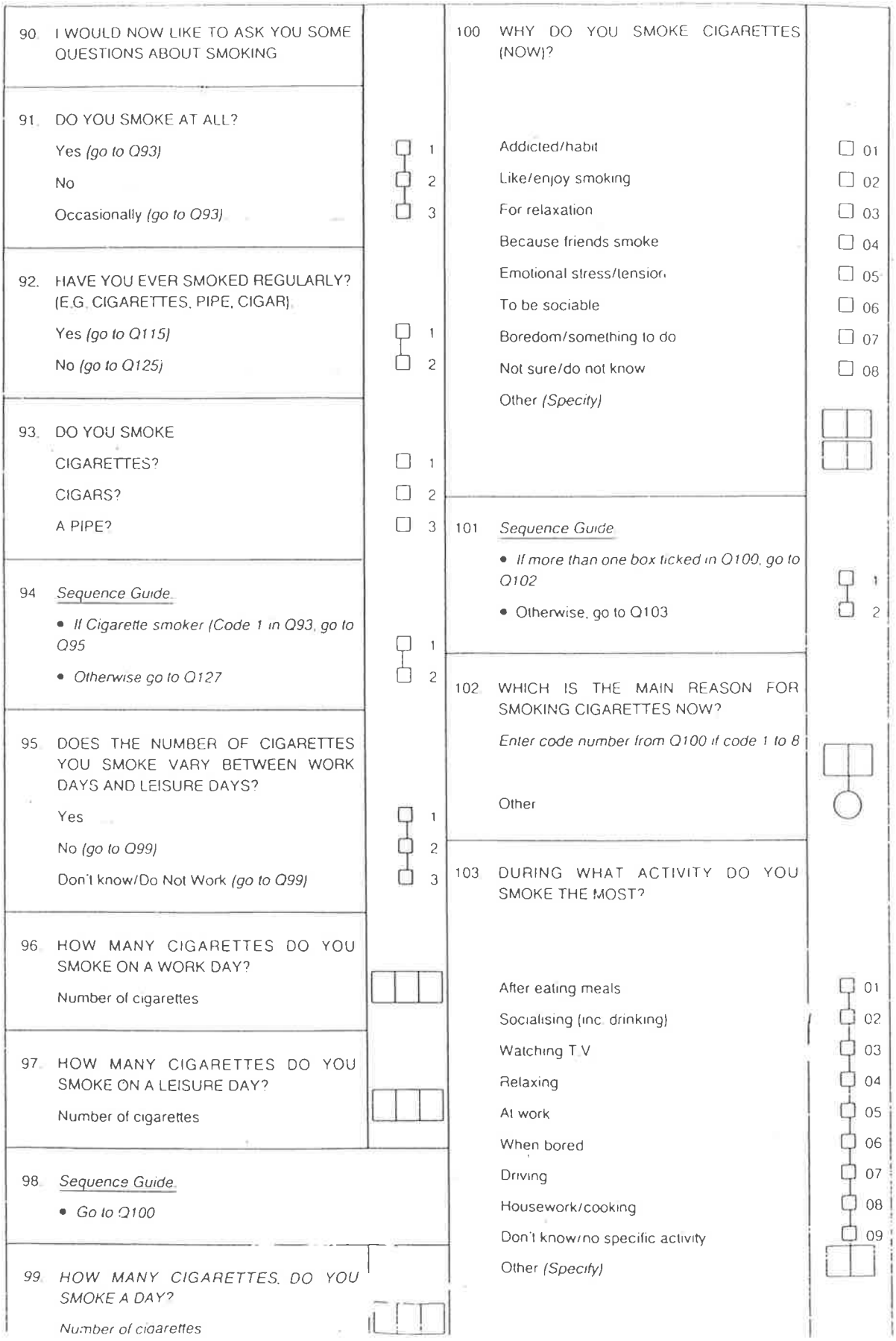
APPENDIX 2.10 Bivariate relationships between occupational prestige and smoking-related variables for females in study 4.

Variable	Number	High	Medium	Low	Chi-square
Smoking behaviour					
Daily smoking rate (%>20)	184	25.0	32.1	29.8	0.67
Smoking > 10 yrs	184	58.3	64.9	55.8	0.72
Time after waking (<30 min)	184	30.8	33.2	41.7	2.11
Perceived difficulty (% diff)	180	74.8	76.7	75.7	0.04
Readiness to quit (% prep)	166	32.4	36.1	26.2	1.12
Risk-related items					
Likely to suffer health probs	184	41.5	63.2	44.0	9.95*
Time before risk stops	184	56.4	62.5	44.0	6.27
Reason for last relapse					
Stress	184	26.6	28.2	24.8	0.14
Friends smoke	184	7.0	6.8	5.3	0.21
Other priorities	184	3.8	3.3	3.0	1.84
Social environment					
50% or more friends smoke	184	55.6	58.4	64.7	1.39
Smokers in the household	175	51.3	76.2	53.1	5.64

APPENDIX 3

Instruments used in this thesis.

APPENDIX 3.1: Survey form used by the Australian Bureau of Statistics (Studies 1 and 3).



90 I WOULD NOW LIKE TO ASK YOU SOME QUESTIONS ABOUT SMOKING

91 DO YOU SMOKE AT ALL?
- Yes *(go to Q93)* ☐ 1
- No ☐ 2
- Occasionally *(go to Q93)* ☐ 3

92 HAVE YOU EVER SMOKED REGULARLY? (E.G. CIGARETTES, PIPE, CIGAR)
- Yes *(go to Q115)* ☐ 1
- No *(go to Q125)* ☐ 2

93 DO YOU SMOKE
- CIGARETTES? ☐ 1
- CIGARS? ☐ 2
- A PIPE? ☐ 3

94 *Sequence Guide*
- *If Cigarette smoker (Code 1 in Q93, go to Q95* ☐ 1
- *Otherwise go to Q127* ☐ 2

95 DOES THE NUMBER OF CIGARETTES YOU SMOKE VARY BETWEEN WORK DAYS AND LEISURE DAYS?
- Yes ☐ 1
- No *(go to Q99)* ☐ 2
- Don't know/Do Not Work *(go to Q99)* ☐ 3

96 HOW MANY CIGARETTES DO YOU SMOKE ON A WORK DAY?
Number of cigarettes ☐☐☐

97 HOW MANY CIGARETTES DO YOU SMOKE ON A LEISURE DAY?
Number of cigarettes ☐☐☐

98 *Sequence Guide*
- *Go to Q100*

99 *HOW MANY CIGARETTES, DO YOU SMOKE A DAY?*
Number of cigarettes ☐☐☐

100 WHY DO YOU SMOKE CIGARETTES (NOW)?
- Addicted/habit ☐ 01
- Like/enjoy smoking ☐ 02
- For relaxation ☐ 03
- Because friends smoke ☐ 04
- Emotional stress/tension ☐ 05
- To be sociable ☐ 06
- Boredom/something to do ☐ 07
- Not sure/do not know ☐ 08
- Other *(Specify)* ☐☐

101 *Sequence Guide*
- *If more than one box ticked in Q100, go to Q102* ☐ 1
- Otherwise, go to Q103 ☐ 2

102 WHICH IS THE MAIN REASON FOR SMOKING CIGARETTES NOW?
Enter code number from Q100 if code 1 to 8 ☐☐
Other ○

103 DURING WHAT ACTIVITY DO YOU SMOKE THE MOST?
- After eating meals ☐ 01
- Socialising (inc. drinking) ☐ 02
- Watching T.V ☐ 03
- Relaxing ☐ 04
- At work ☐ 05
- When bored ☐ 06
- Driving ☐ 07
- Housework/cooking ☐ 08
- Don't know/no specific activity ☐ 09
- Other *(Specify)* ☐☐

104 IN THE LAST 12 MONTHS, HAVE YOU BEEN ADVISED BY A DOCTOR TO GIVE UP SMOKING?

Yes — 1
No — 2

105 HOW DIFFICULT DO YOU THINK IT WOULD BE TO STOP SMOKING?

Very difficult — 1
Fairly difficult — 2
Not at all difficult — 3
Never intend to stop *(go to Q106)* — 4

106 HOW CONFIDENT ARE YOU THAT YOU COULD QUIT SMOKING WITHIN THE NEXT 3 MONTHS?

Very confident — 1
Fairly confident — 2
Not at all confident — 3
Not interested in quitting *(go to Q108)* — 4

107 A NUMBER OF METHODS ARE CURRENTLY AVAILABLE TO HELP PEOPLE STOP SMOKING.
WHICH OF THESE METHODS, IF ANY, WOULD HELP YOU TO STOP SMOKING

A STOP SMOKING GROUP? — ☐ 01
A LECTURE? — ☐ 02
A TELEPHONE COUNSELLING SERVICE? — ☐ 03
A BOOK, PAMPHLET, OR QUITKIT? — ☐ 04
A T.V. PROGRAM OR VIDEO? — ☐ 05
A PROGRAM CONDUCTED THROUGH [illegible] — ☐ 06
A PROGRAM THROUGH YOUR DOCTOR? — ☐ 07
A PROGRAM THROUGH OTHER HEALTH PROFESSIONAL? — ☐ 08
None — ☐ 99

108 HAVE YOU EVER TRIED TO GIVE UP SMOKING CIGARETTES?

Yes — ☐ 1
No *(go to Q127)* — ☐ 2

109 HOW MANY TIMES HAVE YOU TRIED TO GIVE UP SMOKING CIGARETTES?

Once — ☐ 1
2-4 times — ☐ 2
5-9 times — ☐ 3
10 times or more — ☐ 4

110 WHY DID YOU TAKE UP SMOKING AGAIN (THE LAST TIME)?

Enjoy smoking too much — ☐ 01
Emotional stress/tension — ☐ 02
Not enough will power — ☐ 03
Craving for cigarettes too strong — ☐ 04
Other smokers encouraged me to start again — ☐ 05
Too irritable without them — ☐ 06
Was not really serious — ☐ 07
Boredom/something to do — ☐ 08
Stopped only for pregnancy — ☐ 09
Was putting on weight — ☐ 10
Don't know/no reason — ☐ 11
Other *(Specify)* — ☐☐

111 *Sequence Guide*

If more than one box ticked in Q110, go to Q112 — 1
Otherwise, go to Q113 — 2

112 WHICH IS THE MAIN REASON FOR TAKING UP SMOKING AGAIN (THE LAST TIME)?

Enter code from Q110 if code 1 to 11 — ☐☐
Other — ○

113 WHAT WAS THE LONGEST PERIOD YOU GAVE UP SMOKING CIGARETTES?

Less than 1 week — 1
1 week to less than 1 month — 2
1 month to less than 6 months — 3
6 months to less than 1 year — 4
1 year or more — 5

114 *Sequence Guide*

- *Go to Q127*

115 DID YOU REGULARLY SMOKE

CIGARETTES? ☐ 1

CIGARS? ☐ 2

A PIPE? ☐ 3

116 *Sequence Guide*

- *If was cigarette smoker (Code 1 in Q115), Go to Q117* ☐ 1
- *Otherwise go to Q125* ☐ 2

117 BEFORE YOU GAVE UP SMOKING HOW MANY CIGARETTES DID YOU SMOKE A DAY?

Number of cigarettes ☐☐☐

Don't know ☐999

118 HOW LONG AGO DID YOU GIVE UP SMOKING CIGARETTES (REGULARLY)?

Less than 6 months ☐ 01

6 months to less than 1 year ☐ 02

1 year to less than 2 years *(go to Q120)* ☐ 03

2 years to less than 3 years *(go to Q120)* ☐ 04

3 years to less than 4 years *(go to Q120)* ☐ 90

4 years to less than 5 years *(go to Q120)* ☐ 91

5 years or more, record number of years (go to Q120) ☐☐

119 IN THE LAST 12 MONTHS HAVE YOU BEEN ADVISED BY A DOCTOR TO GIVE UP SMOKING?

Yes ☐ 1

No ☐ 2

120 WHY DID YOU GIVE UP SMOKING CIGARETTES?

- Advice of family/friends/doctor

Interviewer:

Ask "WHY DID ADVISE YOU TO GIVE UP?"

- Health

Interviewer:

Ask "WHAT PARTICULAR ASPECT OF HEALTH DO YOU MEAN?"

— smoking harmful to health/cancer/heart disease ☐ 01

— Cough/sore throat ☐ 02

— respiratory ☐ 03

— interferes with sport/other activities ☐ 04

— Other health reasons/operations/pregnancy ☐ 05

- Expense ☐ 06
- Social/group pressure ☐ 07
- No longer enjoyed it ☐ 08
- Work place restrictions ☐ 09
- Unclean ☐ 10

Other reasons *(Specify)* ☐☐

121 *Sequence Guide*

- *If more than one box ticked in Q120, go to Q122* ☐ 1
- *Otherwise, go to Q123* ☐ 2

122 WHICH WAS THE MAIN REASON FOR GIVING UP SMOKING CIGARETTES?

Enter code from Q120 if code 1 to 10 ☐☐

Other

123 HOW DIFFICULT WAS IT FOR YOU TO GIVE UP SMOKING?

Very difficult ☐ 1

Fairly difficult ☐ 2

Not at all difficult ☐ 3

124 BEFORE YOU GAVE UP SMOKING, HOW MANY TIMES DID YOU ATTEMPT TO GIVE UP?

- None ☐ 1
- Once ☐ 2
- 2-4 times ☐ 3
- 5-9 times ☐ 4
- 10 times or more ☐ 5

125 DO YOU DISLIKE PEOPLE SMOKING NEAR YOU?

- Yes ☐ 1
- Depends ☐ 2
- No *(go to Q127)* ☐ 3

126 WHY DO YOU DISLIKE PEOPLE SMOKING NEAR YOU?

- Smell of smoke ☐ 1
- Harmful to health/cancer/heart disease ☐ 2
- Eyes irritated ☐ 3
- Dirty ☐ 4
- Other *(Specify)* ☐

127 I WOULD NOW LIKE TO ASK YOU SOME QUESTIONS ABOUT RESPIRATORY AND BREATHING PROBLEMS

128 HAVE YOU EVER HAD ASTHMA?

- Yes ☐ 1
- No *(go to Q133)* ☐ 2
- Don't know *(go to Q133)* ☐ 3

129 WAS YOUR ASTHMA CONFIRMED BY A DOCTOR?

- Yes ☐ 1
- No ☐ 2
- Don't Know ☐ 3

130 AT WHAT AGE DID YOUR ASTHMA START?

- 0 to less than 10 years ☐ 1
- 10 to less than 20 years ☐ 2
- 20 to less than 30 years ☐ 3
- Over 30 years of age ☐ 4

131 DO YOU STILL HAVE ASTHMA?

- Yes *(go to Q133)* ☐ 1
- No ☐ 2
- Don't know *(go to Q133)* ☐ 3

132 AT WHAT AGE DID YOUR ASTHMA STOP?

- 0 to less than 10 years ☐ 1
- 10 to less than 20 years ☐ 2
- 20 to less than 30 years ☐ 3
- Over 30 years of age ☐ 4

133 IN THE LAST 12 MONTHS, HAS YOUR CHEST SOUNDED WHEEZY OR WHISTLY?

- Yes ☐ 1
- No *(go to Q141)* ☐ 2
- Not sure *(go to Q141)* ☐ 3

134 (IN THE LAST 12 MONTHS) HAS YOUR CHEST SOUNDED WHEEZY OR WHISTLY FREQUENTLY OR ONLY OCCASIONALLY?

- Frequently ☐ 1
- Only occasionally ☐ 2

APPENDIX 3.2: Questionnaire administered to enrolees in the smoking cessation programme at the Tea Tree Gully Community Health Service (Studies 1 and 6).

We wish to keep in contact with you in order to evaluate our service. This will mean that we will attempt to telephone you after three, six and twelve months to assess your progress. We may also wish to do some tests so that we are able to assess whether you are smoking or not. These tests will involve taking samples of your breath or saliva. We may wish to telephone some of you more regularly in order to encourage you and to collect research data. All data collected in this project will be kept seperately from your regular medical files and only Mr. Stephen Brown of Adelaide University will have access to it. You are at liberty to stop your involvement in the project at any time.

I agree to take part in this programme under the terms stated below

Signed .....

Name ..... Date ..../..../..... .

Address

.....

Home telephone number ..... .

This questionnaire is designed to help us evaluate and improve our stop smoking service. Could you fill it in by ticking the correct boxes

1. Gender [] Male [] Female

2. How many cigarettes, on the average, would you smoke per day?

..... cigarettes

3. How old were you when you started regular smoking?

.....yrs

4. How many <u>serious</u> attempts have you made to give up smoking?

.....attempts

5. How long ago did you last try to give up smoking?

.....years .....months .....weeks ago

6. When you last tried to stop, how long did you stop for?

[] less than 1 day
[] between 1 and 3 days
[] between 3 and 7 days
[] between7 days and 1 month
[] between 1 and 3 months
[] between 3 and 6 months
[] more than 6 months Specify.....

7.What was the main reason that you took up smoking again after your last attempt to stop?

Please tick only one box

[]	enjoy smoking too much	[]	boredom/something to do
[]	emotional stress/tension	[]	too irritable without them
[]	not enough willpower	[]	was putting on weight
[]	craving too strong	[]	Other, please specify
[]	encouraged by other smokers		.....

8. How confident are you that, this time, you will be able to stop smoking for at least a week?

[] Not at all confident
[] Alittle
[] Moderately
[] A lot
[] Extremely confident

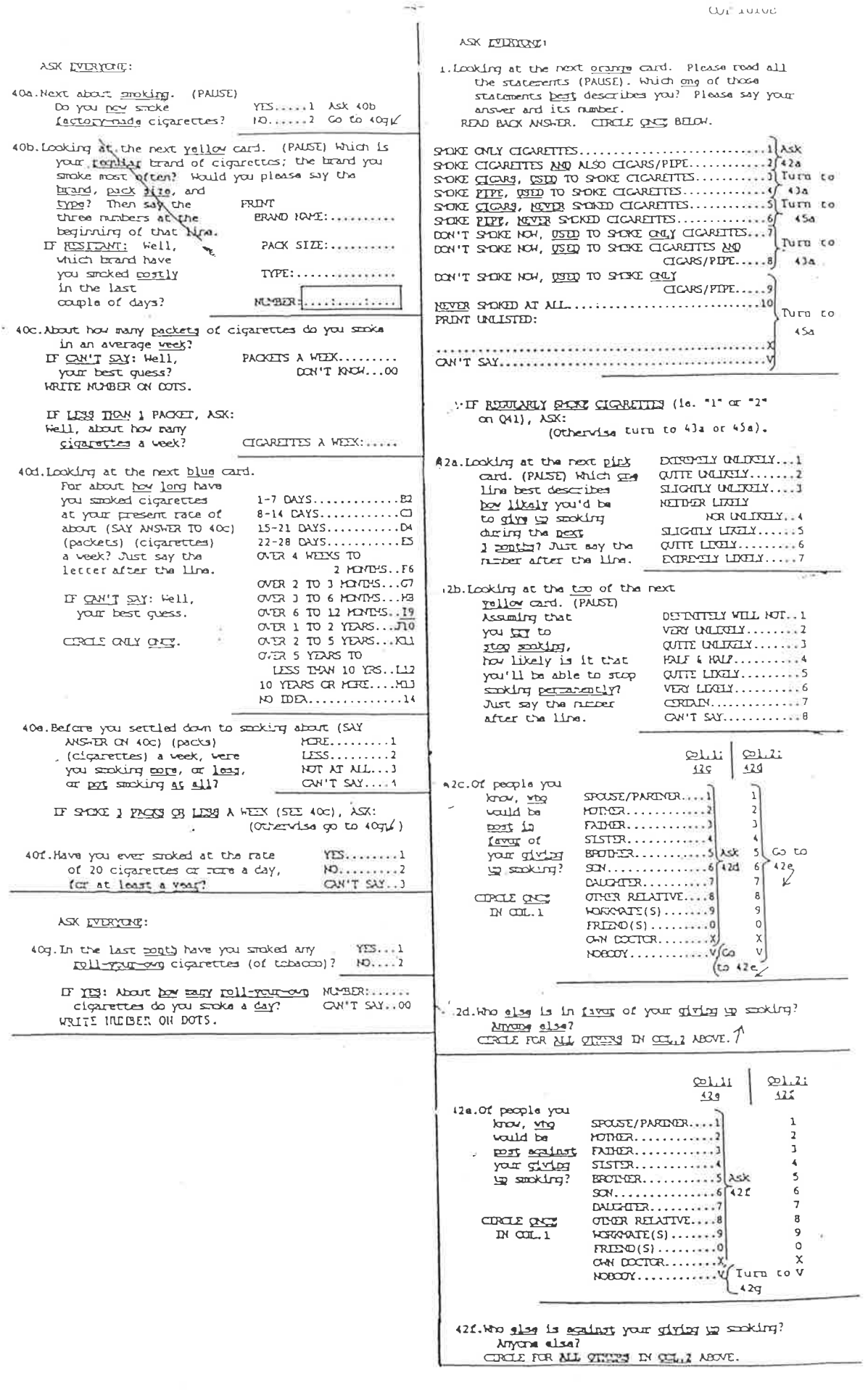
9. How confident are you that, this time, you will be able to stop smoking for at least three months?

[] Not at all confident
[] Alittle
[] Moderately
[] A lot
[] Extremely confident

10. Many smokers who are trying to give up have slips which involve smoking one or two cigarettes. If this happens to you how confident are you that you will avoid taking up regular smoking again?

[] Not at all confident
[] Alittle
[] Moderately
[] A lot
[] Extremely confident

APPENDIX 3.3: Initial (baseline) survey used in Study 2.



ASK EVERYONE:

40a. Next about smoking. (PAUSE)
Do you now smoke factory-made cigarettes? YES.....1 Ask 40b; NO.....2 Go to 40g

40b. Looking at the next yellow card. (PAUSE) Which is your regular brand of cigarettes; the brand you smoke most often? Would you please say the brand, pack size, and type? Then say the three numbers at the beginning of that line.
IF RESISTANT: Well, which brand have you smoked mostly in the last couple of days?
PRINT
BRAND NAME:.....
PACK SIZE:.....
TYPE:.....
NUMBER:.....

40c. About how many packets of cigarettes do you smoke in an average week?
IF CAN'T SAY: Well, your best guess?
WRITE NUMBER ON DOTS.
PACKETS A WEEK.....
DON'T KNOW...00

IF LESS THAN 1 PACKET, ASK:
Well, about how many cigarettes a week?
CIGARETTES A WEEK:.....

40d. Looking at the next blue card.
For about how long have you smoked cigarettes at your present rate of about (SAY ANSWER TO 40c) (packets) (cigarettes) a week? Just say the letter after the line.
IF CAN'T SAY: Well, your best guess.
CIRCLE ONLY ONE.

1-7 DAYS.....B2
8-14 DAYS.....C3
15-21 DAYS.....D4
22-28 DAYS.....E5
OVER 4 WEEKS TO 2 MONTHS..F6
OVER 2 TO 3 MONTHS...G7
OVER 3 TO 6 MONTHS...H8
OVER 6 TO 12 MONTHS..I9
OVER 1 TO 2 YEARS...J10
OVER 2 TO 5 YEARS...K11
OVER 5 YEARS TO LESS THAN 10 YRS..L12
10 YEARS OR MORE....M13
NO IDEA.....14

40e. Before you settled down to smoking about (SAY ANSWER ON 40c) (packs) (cigarettes) a week, were you smoking more, or less, or not smoking at all?
MORE.....1
LESS.....2
NOT AT ALL...3
CAN'T SAY....4

IF SMOKE 1 PACK OR LESS A WEEK (SEE 40c), ASK:
(Otherwise go to 40g)

40f. Have you ever smoked at the rate of 20 cigarettes or more a day, for at least a year?
YES.....1
NO.....2
CAN'T SAY...3

ASK EVERYONE:

40g. In the last month have you smoked any roll-your-own cigarettes (of tobacco)?
YES...1
NO....2

IF YES: About how many roll-your-own cigarettes do you smoke a day?
WRITE NUMBER ON DOTS.
NUMBER:.....
CAN'T SAY..00

ASK EVERYONE:

41. Looking at the next orange card. Please read all the statements (PAUSE). Which one of those statements best describes you? Please say your answer and its number.
READ BACK ANSWER. CIRCLE ONE BELOW.

SMOKE ONLY CIGARETTES.....1 Ask 42a
SMOKE CIGARETTES AND ALSO CIGARS/PIPE.....2 Ask 42a
SMOKE CIGARS, USED TO SMOKE CIGARETTES.....3 Turn to 43a
SMOKE PIPE, USED TO SMOKE CIGARETTES.....4 Turn to 43a
SMOKE CIGARS, NEVER SMOKED CIGARETTES.....5 Turn to 45a
SMOKE PIPE, NEVER SMOKED CIGARETTES.....6 Turn to 45a
DON'T SMOKE NOW, USED TO SMOKE ONLY CIGARETTES...7 Turn to 43a
DON'T SMOKE NOW, USED TO SMOKE CIGARETTES AND CIGARS/PIPE.....8 Turn to 43a
DON'T SMOKE NOW, USED TO SMOKE ONLY CIGARS/PIPE.....9 Turn to 45a
NEVER SMOKED AT ALL.....10 Turn to 45a
PRINT UNLISTED:
.....X
CAN'T SAY.....V

42. IF REGULARLY SMOKE CIGARETTES (1a. "1" or "2" on Q41), ASK:
(Otherwise turn to 43a or 45a).

42a. Looking at the next pink card. (PAUSE) Which one line best describes how likely you'd be to give up smoking during the next 3 months? Just say the number after the line.
EXTREMELY UNLIKELY...1
QUITE UNLIKELY.....2
SLIGHTLY UNLIKELY....3
NEITHER LIKELY NOR UNLIKELY..4
SLIGHTLY LIKELY.....5
QUITE LIKELY.....6
EXTREMELY LIKELY.....7

42b. Looking at the top of the next yellow card. (PAUSE)
Assuming that you DID try to stop smoking, how likely is it that you'll be able to stop smoking permanently? Just say the number after the line.
DEFINITELY WILL NOT..1
VERY UNLIKELY.....2
QUITE UNLIKELY.....3
HALF & HALF.....4
QUITE LIKELY.....5
VERY LIKELY.....6
CERTAIN.....7
CAN'T SAY.....8

		Col.1: 42c	Col.2: 42d
42c. Of people you know, who would be most in favour of your giving up smoking? CIRCLE ONE IN COL.1	SPOUSE/PARTNER....1		1
	MOTHER.....2		2
	FATHER.....3		3
	SISTER.....4		4
	BROTHER.....5	Ask 42d	5 Go to 42e
	SON.....6	Ask 42d	6 Go to 42e
	DAUGHTER.....7		7
	OTHER RELATIVE....8		8
	WORKMATE(S).....9		9
	FRIEND(S).....0		0
	OWN DOCTOR.....X		X
	NOBODY.....V	Go to 42e	V

42d. Who else is in favour of your giving up smoking? Anyone else?
CIRCLE FOR ALL GIVEN IN COL.2 ABOVE.

		Col.1: 42g	Col.2: 42f
42e. Of people you know, who would be most against your giving up smoking? CIRCLE ONE IN COL.1	SPOUSE/PARTNER....1		1
	MOTHER.....2		2
	FATHER.....3		3
	SISTER.....4		4
	BROTHER.....5	Ask 42f	5
	SON.....6	Ask 42f	6
	DAUGHTER.....7		7
	OTHER RELATIVE....8		8
	WORKMATE(S).....9		9
	FRIEND(S).....0		0
	OWN DOCTOR.....X		X
	NOBODY.....V	Turn to 42g	V

42f. Who else is against your giving up smoking? Anyone else?
CIRCLE FOR ALL GIVEN IN COL.2 ABOVE.

IF REGULARLY SMOKE CIGARETTES, ASK:

42g. Looking at the bottom of the yellow card. (PAUSE) If you continue to smoke, what do you think is the percentage chance that smoking will cause you a fatal illness? Just say the percentage chance.

CIRCLE ONLY ONE.

NO CHANCE....1
10% CHANCE...2
20% CHANCE...3
30% CHANCE...4
40% CHANCE...5
50% CHANCE...6
60% CHANCE...7
70% CHANCE...8
80% CHANCE...9
90% CHANCE...0
100% CHANCE..X
CAN'T SAY....V

42h. Compared with other people who smoke the same amount as you, do you think your chance of getting a fatal illness from smoking is greater, the same, or less than them?

GREATER....1
SAME.....2
LESS.....3
CAN'T SAY..4

42i. Do you currently have any health or fitness problems which were caused or made worse by smoking?

YES....1 Go to 421
NO.....2 Ask 42j,k

IF NO:

42j. Looking again at the bottom of the yellow card. If you continue to smoke, what do you think the percentage chance is that smoking will contribute to you getting health or fitness problems? Just say the percentage chance.

CIRCLE ONLY ONE.

NO CHANCE...1
10% CHANCE..2
20% CHANCE..3
30% CHANCE..4
40% CHANCE..5
50% CHANCE..6
60% CHANCE..7
70% CHANCE..8
80% CHANCE..9
90% CHANCE..X
100% CHANCE.Y
CAN'T SAY...V

42k. Compared with other people who smoke about the same amount as you, do you think your chance of getting health or fitness problems is greater, the same, or less than them?

GREATER.....1
THE SAME....2
LESS.....3
CAN'T SAY...4

42l. Approximately how many times, if any, have you tried to give up smoking?

CIRCLE ONLY ONE.

ONCE.....1
TWICE.....2
3 TIMES.....3 } Ask 42m
4 TIMES.....4 }
5 TIMES OR MORE..5 }
CAN'T SAY.....6 }
NONE.....7 } Toss to 44a

IF TRIED TO GIVE UP, ASK:

42m. Looking at the next blue card. (PAUSE) About how long ago did you make your last attempt to give up smoking? Just say the letter after the line.

→ IF CAN'T SAY: Well, your best guess?

CIRCLE ONLY ONE.

1-7 DAYS.....B2
8-14 DAYS.....C3
15-21 DAYS.....D4
22-28 DAYS.....E5
OVER 4 WEEKS TO 2 MONTHS..F6 } Go to 43b
OVER 2 TO 3 MONTHS..G7 }
OVER 3 TO 6 MONTHS..H8 }
OVER 6 TO 12 MONTHS..I9 }
OVER 1 TO 2 YEARS..J10 }
OVER 2 TO 5 YEARS..K11 }
OVER 5 TO LESS THAN 10 YEARS...L12 }
10 YEARS OR MORE...M13 }
NO IDEA.....14 }

IF USED TO SMOKE CIGARETTES (3, 4, 7 or 8 circled on Q41), ASK: (Otherwise toss to 44a)

43a. Looking at the next blue card. (PAUSE) About how long ago did you finally give up smoking cigarettes? Just say the letter after the line.

→ IF CAN'T SAY: Well, your best guess?

CIRCLE ONLY ONE.

1-7 DAYS.....B2
8-14 DAYS.....C3
15-21 DAYS.....D4
22-28 DAYS.....E5
OVER 4 WEEKS TO 2 MONTHS..F6 } Ask 43b
OVER 2 TO 3 MONTHS..G7 }
OVER 3 TO 6 MONTHS..H8 }
OVER 6 TO 12 MONTHS..I9 }
OVER 1 TO 2 YEARS..J10 }
OVER 2 TO 5 YEARS..K11 }
OVER 5 TO LESS THAN 10 YEARS...L12 }
10 YEARS OR MORE...M13 }
NO IDEA.....14 }

→ IF TRIED TO GIVE UP OR USED TO SMOKE, ASK:

43b. On your last attempt to quit, what was the one main thing that influenced you to (try to) quit smoking?

CAN'T SAY...X
NOTHING.....V

.....

.....

.....

43c. Looking at the next pink card. (PAUSE) Which of those things influenced your decision to try to quit smoking? Just say the number after each. Which others? Any others?

CIRCLE FOR ALL MENTIONED.

HAVING AN ILLNESS THAT IS RELATED TO SMOKING...1
HAVING OTHER HEALTH PROBLEMS.....2
CONCERN ABOUT FUTURE HEALTH & FITNESS.....3
OTHER PEOPLE WANTING ME TO STOP.....4
CONCERN ABOUT EFFECTS OF MY SMOKING ON OTHERS..5
PRICE OF CIGARETTES.....6
NONE 7

43d. When you were trying to quit, who or what did you find most helpful?

DO NOT ADD: What else?

CAN'T SAY..X
NOTHING....V

.....

.....

.....

43e. Looking at the next white card. (PAUSE) Which, if any, of those things did you find helpful when trying to quit?
Just say the number after each.
Which others? Any others?

CIRCLE FOR ALL MENTIONED.

QUIT SMOKING ADS.....1
A BOOK, PAMPHLET, OR QUIT KIT.....2
A TV PROGRAM OR VIDEO.....3
AN ARTICLE IN A NEWSPAPER OR MAGAZINE.....4
A TELEPHONE QUIT-SMOKING SERVICE.....5
A STOP-SMOKING GROUP.....6
ANOTHER PROGRAM OR HELP FROM A SPECIALIST.....7
NICOTINE CHEWING GUM.....8
ADVICE FROM YOUR DOCTOR.....9
ADVICE FROM OTHER HEALTH CARE PROFESSIONALS..10
HELP FROM OTHER PEOPLE.....11
NONE, I DID IT ON MY OWN.....12

→ Toss over clip to 44a.

IF REGULARLY SMOKE CIGARETTES, ASK:
(Otherwise go to 45a)

44a. The next green card has a ladder, where each step shows where various smokers are in their thinking about quitting. (PAUSE) Please read each statement, then say the number that best describes you, in regard to quitting. You can say any number on the ladder.

RECORD NUMBER — NUMBER: ..... CAN'T SAY.....V

44b. Because many places have smoking restrictions, do you think you now smoke less due to those restrictions or still about the same amount? — YES, LESS..1 Ask 44c; SAME.....2 Go to 44d; CAN'T SAY..3 Go to 44d

IF LESS:

44c. About how many less a day would you smoke because of those restrictions? — NUMBER:..... CAN'T SAY....0

44d. If you didn't exert any self control over your smoking, do you think you'd smoke more than you do now, or about the same as you do now? — MORE.....1 Ask 44e; SAME.....2 Go to 44f; CAN'T SAY..3 Go to 44f

IF MORE:

44e. About how many more cigarettes a day would you smoke if you didn't exert any self control? — NUMBER..... CAN'T SAY.....0

44f. When you're with children, do you smoke more than normally, less than normally, about the same amount, or not at all? — MORE.....1 Go to 44h; LESS.....2 Ask 44g; SAME.....3 Go to 44h; NOT AT ALL..4 Ask 44g; CAN'T SAY...5 Go to 44h

CIRCLE ONLY ONE

IF LESS OR NOT AT ALL, ASK:

44g. Is that because you want to set a good example, or because you don't want to expose children to the smoke, or is there some other reason? — SET GOOD EXAMPLE...1; NOT TO EXPOSE THEM TO SMOKE....2; PRINT OTHER: .....3; DON'T KNOW.....4

CIRCLE FOR ALL MENTIONED

44h. About how many minutes or hours after you wake up do you usually smoke your first cigarette?

MINUTES..... OR HOURS..... CAN'T SAY...VV

ASK EVERYONE:

45a. In your opinion, are there any illnesses caused by smoking? — YES..1 Ask 45b; NO...2 Go to 45c.

IF YES:

45b. Which illnesses? Which others? Any others? — ASTHMA.....1; BLOOD PRESSURE.....2; BRONCHITIS.....3; CIRCULATORY PROBLEMS.....4; COUGH.....5; EMPHYSEMA.....6; FLU/COLDS.....7; HEART DISEASE.....8; CANCER: LUNG.....9; CANCER: OTHER.....10; CANCER: NO TYPE GIVEN.....11; PREGNANCY COMPLICATIONS....12; RESPIRATORY DISEASES.....13; STROKE/VASCULAR DISEASE....14; ULCERS.....15; PRINT UNLISTED:.....16; NONE.....17; CAN'T SAY.....18

DO NOT AID! CIRCLE FOR ALL MENTIONED

45c. Recently, have you read, seen, or heard any anti-smoking advertising? — YES.....1 Ask 45d,e; NO.....2 Go to 45f; CAN'T SAY..3 Go to 45f

OFFICE USE 1

IF YES:

45d. Where did you read, see or hear that anti-smoking advertising? Where else have you read, seen or heard any anti-smoking advertising? — BILLBOARDS.....1; CINEMA.....2; FAMILY.....3; FRIENDS.....4; MAGAZINES.....5; NEWSPAPERS.....6; POSTERS.....7; RADIO.....8; AT SPORTING EVENTS..9; TV.....10; VIDEOS.....11; PRINT UNLISTED: .....12; CAN'T SAY.....13

DO NOT AID! CIRCLE FOR ALL MENTIONED.

45e. What were the main things said or shown in that advertising? What else? PRINT ANSWER. CAN'T SAY.X

.....

.....

.....

ASK EVERYONE:

45f. Are you now in paid employment? — YES....1 Ask 45g-k; NO.....2 Go to 45j

45g. Looking at the next grey card. (PAUSE) Which one of those statements best describes the smoking restrictions, if any, at your normal work place? Just say the number after the line. — A TOTAL BAN ON SMOKING.....1; A BAN EVERYWHERE EXCEPT FOR A SMOKING ROOM..2; A BAN IN SOME AREAS: INCLUDING WHERE I NORMALLY WORK..3; A BAN IN SOME AREAS: BUT NOT WHERE I NORMALLY WORK..4; NO RESTRICTIONS.....5

45h. Do those restrictions apply to indoor areas, outdoor areas, or in vehicles? Anywhere else? CIRCLE FOR ALL MENTIONED. — INDOOR.....1; OUTDOOR.....2; VEHICLES.....3; CAN'T SAY....4

45i. When you're working, do you mainly work indoors, outdoors, or in a vehicle? — INDOORS.....1; OUTDOORS.....2; VEHICLE.....3; VARIES/EQUAL..4; CAN'T SAY.....5

ASK EVERYONE:

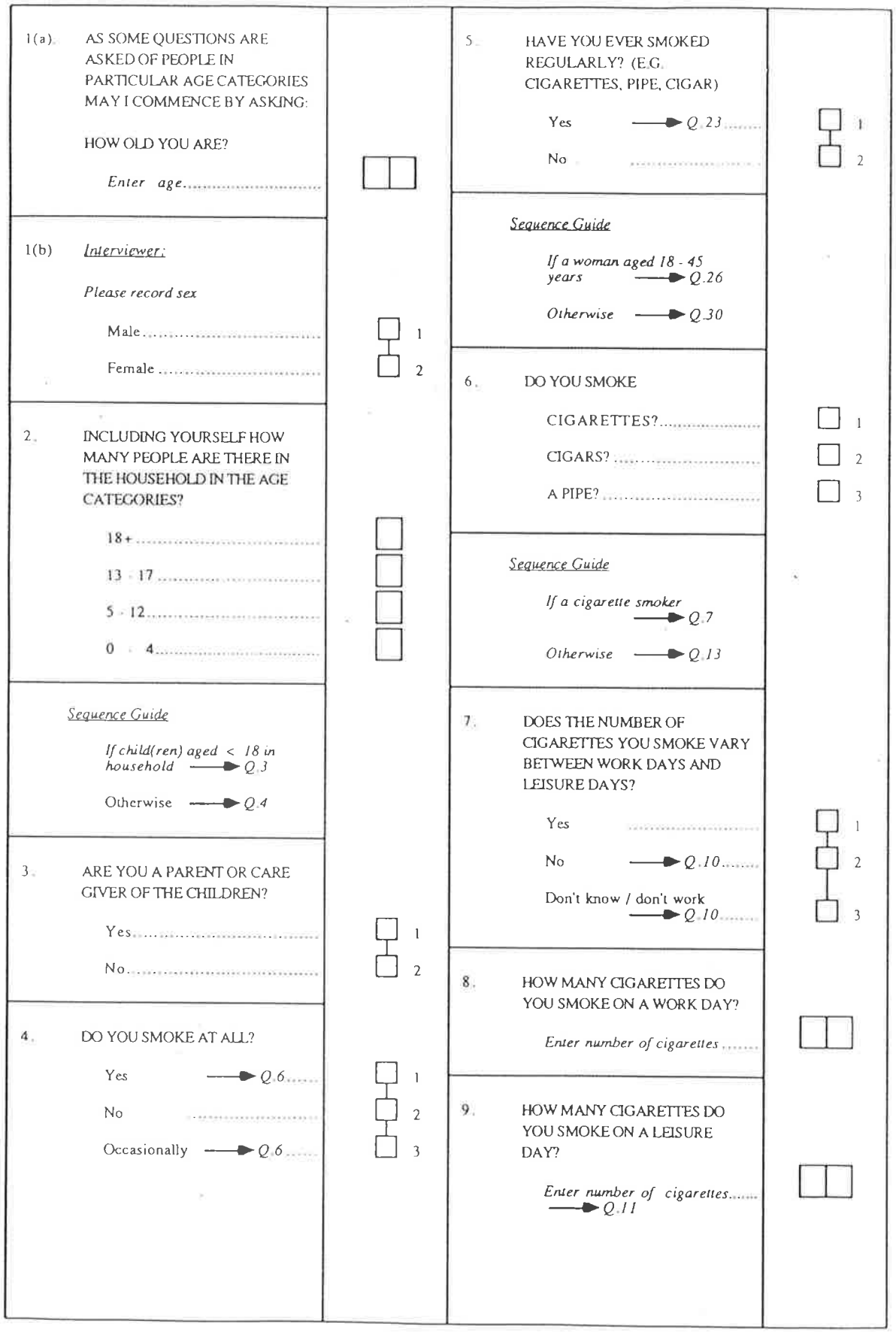
45j. (Including yourself), how many people living in this household are regular smokers? — NUMBER:..... NONE.....0

45k. Are visitors usually discouraged from smoking in this house, or not? — YES.....1; NO.....2; SOMETIMES/DEPENDS..3; CAN'T SAY.....4

(There is no Q46)

Toss over clip to 47a.

APPENDIX 3.4: Survey form used in Study 4.



1(a) AS SOME QUESTIONS ARE ASKED OF PEOPLE IN PARTICULAR AGE CATEGORIES MAY I COMMENCE BY ASKING:

HOW OLD YOU ARE?

Enter age..... ☐☐

1(b) *Interviewer:*

Please record sex

Male..... ☐ 1

Female..... ☐ 2

2. INCLUDING YOURSELF HOW MANY PEOPLE ARE THERE IN THE HOUSEHOLD IN THE AGE CATEGORIES?

18+..... ☐

13 - 17..... ☐

5 - 12..... ☐

0 - 4..... ☐

Sequence Guide

If child(ren) aged < 18 in household → *Q.3*

Otherwise → *Q.4*

3. ARE YOU A PARENT OR CARE GIVER OF THE CHILDREN?

Yes..... ☐ 1

No..... ☐ 2

4. DO YOU SMOKE AT ALL?

Yes → *Q.6*..... ☐ 1

No ..... ☐ 2

Occasionally → *Q.6*..... ☐ 3

5. HAVE YOU EVER SMOKED REGULARLY? (E.G. CIGARETTES, PIPE, CIGAR)

Yes → *Q.23*..... ☐ 1

No ..... ☐ 2

Sequence Guide

If a woman aged 18 - 45 years → *Q.26*

Otherwise → *Q.30*

6. DO YOU SMOKE

CIGARETTES?..... ☐ 1

CIGARS?..... ☐ 2

A PIPE?..... ☐ 3

Sequence Guide

If a cigarette smoker → *Q.7*

Otherwise → *Q.13*

7. DOES THE NUMBER OF CIGARETTES YOU SMOKE VARY BETWEEN WORK DAYS AND LEISURE DAYS?

Yes ..... ☐ 1

No → *Q.10*..... ☐ 2

Don't know / don't work → *Q.10*..... ☐ 3

8. HOW MANY CIGARETTES DO YOU SMOKE ON A WORK DAY?

Enter number of cigarettes..... ☐☐

9. HOW MANY CIGARETTES DO YOU SMOKE ON A LEISURE DAY?

Enter number of cigarettes..... ☐☐

→ *Q.11*

10. HOW MANY CIGARETTES DO YOU SMOKE A DAY?

Enter number of cigarettes..... ☐☐

11. WHAT SIZE PACKET OF CIGARETTES DO YOU USUALLY BUY?

20s.....	1
25s.....	2
30s.....	3
35s.....	4
40s.....	5
50s.....	6
Other (*specify*)	7
.....	
.....	

Office use only ☐

12. HOW SOON AFTER YOU WAKE UP DO YOU USUALLY SMOKE YOUR FIRST CIGARETTE?

0 - 14 minutes	1
15 - 29 minutes.....	2
30 - 59 minutes.....	3
1 - 2 hours	4
More than 2 hours	5

13. HOW DIFFICULT DO YOU THINK IT WOULD BE TO STOP SMOKING?

Very difficult.....	1
Fairly difficult.....	2
Not at all difficult.....	3
Never intend to stop → *Q.15*	4

14. *Show Prompt Card 1*

EACH NUMBER ON THIS SCALE SHOWS WHERE VARIOUS SMOKERS ARE IN THEIR THINKING ABOUT QUITTING. WHICH NUMBER BEST SHOWS WHERE YOU ARE NOW?

Enter number ..... ☐☐

15. *Show Prompt Card 2*

FROM YOUR POINT OF VIEW, WHICH ONE OF THE FOLLOWING IS THE MAIN FACTOR STOPPING YOU FROM QUITTING SMOKING AT THE MOMENT?

I'm addicted to smoking	1
Smoking helps me cope with stress.....	2
I enjoy it too much	3
I would gain weight.....	4
I have no willpower	5
My friends (or relatives or workmates) smoke.....	6
Other things are more important at the moment.....	7
Don't know.....	8

16. HAVE YOU EVER TRIED TO GIVE UP SMOKING?

Yes	1
No → *Q.20*.....	2

17. HOW LONG AGO DID YOU LAST TRY TO GIVE UP SMOKING?

3 months or less	91
> 3 months to 6 months.....	92
> 6 months to 1 year.....	93
Enter whole years → *Q.19*.....	☐☐

18. HOW MANY SERIOUS ATTEMPTS HAVE YOU MADE TO QUIT SMOKING IN THE LAST 12 MONTHS?

Enter number of attempts..... ☐☐

19. FOR HOW LONG DID YOU GO WITHOUT SMOKING ON THE LAST OCCASION YOU TRIED TO QUIT?

Less than one day.....	☐ 1
1 day to less than 1 week.....	☐ 2
1 week to less than 1 month.....	☐ 3
1 month to less than 6 months..	☐ 4
6 months to less than 1 year.....	☐ 5
1 year or more	☐ 6

20. ARE THERE OTHER MEMBERS OF YOUR HOUSEHOLD WHO ARE SMOKERS?

Yes.....	☐ 1
No.....	☐ 2
Not applicable.....	☐ 3

21. AMONG YOUR CLOSE FRIENDS, ABOUT WHAT PERCENTAGE WOULD BE SMOKERS?

Almost none or none.....	☐ 1
Minority.....	☐ 2
About half.....	☐ 3
Majority.....	☐ 4
Nearly all or all.....	☐ 5
Don't know / no friends.....	☐ 6

22. HOW LONG HAVE YOU BEEN SMOKING REGULARLY?

3 months or less	☐ 91
> 3 months to 6 months	☐ 92
> 6 months to 1 year.....	☐ 93
Enter whole years.....	☐☐

Sequence Guide

If a woman aged 18 - 45 years → *Q.26*

Otherwise → *Q.30*

23. DID YOU REGULARLY SMOKE

CIGARETTES?.....	☐ 1
CIGARS?	☐ 2
A PIPE?	☐ 3

Sequence Guide

If was a cigarette smoker → *Q.24*

Otherwise → *Q.25*

24. BEFORE YOU GAVE UP SMOKING, HOW MANY CIGARETTES DID YOU SMOKE A DAY?

Enter number	☐☐
Don't know.....	☐ 99

25. HOW LONG AGO DID YOU GIVE UP SMOKING REGULARLY?

3 months or less	☐ 91
> 3 months to 6 months.....	☐ 92
> 6 months to 1 year.....	☐ 93
Enter whole years.....	☐☐

Sequence Guide

If a woman aged 18 - 45 years → *Q.26*

Otherwise → *Q.30*

26. HAVE YOU GIVEN BIRTH TO A CHILD IN THE LAST 5 YEARS?

Yes 1

No → *Q.30* 2

Sequence Guide

If quit more than 5 years ago (see Q.25) or never smoked (i.e. code 2 in Q.5) → *Q.30*

Otherwise → *Q.27*

27. WITH RESPECT TO YOUR MOST RECENT CHILD, WERE YOU A SMOKER AT THE TIME YOU FOUND YOU WERE PREGNANT?

Yes 1

No → *Q.30* 2

28. DURING THE COURSE OF THAT PREGNANCY, DID YOU TRY TO CHANGE THE AMOUNT YOU SMOKED?

Yes 1

No → *Q.30* 2

29. WHAT HAPPENED - DID YOU STOP, REDUCE A LOT, REDUCE A LITTLE, MAKE NO CHANGE, OR INCREASE?

Stopped smoking 1

Reduced a lot 2

Reduced a little 3

No change 4

Increased 5

30. IN YOUR OPINION, ARE THERE ANY ILLNESSES THAT PEOPLE GET THAT ARE AGGRAVATED OR CAUSED BY SMOKING?

Yes → *Q.31* 1

No 2

Don't know 3

Sequence Guide

If an ex-smoker or non-smoker → *Q.36*

Otherwise → *Q.32*

31. NOW I AM GOING TO READ OUT A LIST OF ILLNESSES.

IN YOUR OPINION, WHICH, IF ANY OF THESE ILLNESSES THAT PEOPLE GET ARE AGGRAVATED OR CAUSED BY SMOKING?

ASTHMA

Yes 1

No 2

Don't know 3

FLUS AND COLDS

Yes 1

No 2

Don't know 3

ARTHRITIS

Yes 1

No 2

Don't know 3

HEART DISEASE

Yes 1

No 2

Don't know 3

6

LUNG CANCER

Yes 1
No 2
Don't know 3

SOME OTHER CANCERS

Yes 1
No 2
Don't know 3

EMPHYSEMA, BRONCHITIS OR RESPIRATORY DISEASES

Yes 1
No 2
Don't know 3

CIRCULATORY PROBLEMS

Yes 1
No 2
Don't know 3

PREGNANCY COMPLICATIONS

Yes 1
No 2
Don't know 3

STROKES

Yes 1
No 2
Don't know 3

Sequence Guide

If an ex-smoker or non-smoker → *Q.36*

Otherwise → *Q.32*

32. TO WHAT EXTENT DO YOU THINK THAT YOUR SMOKING HAS HAD A BAD EFFECT ON YOUR HEALTH?

Very much 1
Moderately 2
A little 3
Not at all 4
Don't know 5

33. IF YOU CONTINUE TO SMOKE AT YOUR CURRENT LEVEL, HOW LIKELY ARE YOU TO SUFFER ANY SERIOUS SMOKING-RELATED HEALTH PROBLEMS IN FUTURE?

Certain 1
Very likely 2
Moderately likely 3
Slightly likely 4
Not at all likely → *Q.35* 5
Don't know → *Q.35* 6

34. SUPPOSE YOU WERE TO GIVE UP SMOKING NOW, HOW LONG DO YOU THINK IT WOULD BE BEFORE YOU WERE TO GET RID OF THIS RISK TO YOUR HEALTH?

Less than one year 1
More than 1 year to 3 years 2
More than 3 years to 5 years 3
More than 5 years to 10 years 4
More than 10 years 5
Never 6
Don't know 7

232. DO YOU FEEL THAT THE POSSESSION OR CULTIVATION OF SMALL QUANTITIES OF MARIJUANA FOR PERSONAL USE SHOULD BE LEGAL OR ILLEGAL?

- Legal 1
- Illegal 2
- Don't know 3

233. *Show Prompt Card 22*

WHAT DO YOU THINK SHOULD BE THE PENALTIES, IF ANY FOR THE POSSESSION OR CULTIVATION OF COMMERCIAL (LARGE SCALE) QUANTITIES OF MARIJUANA ?

- No penalty 1
- Expiation notice (ticket) and fine 2
- Court - fine 3
- Court - jail term - short 4
- Court - jail term - long 5
- Don't know 6

Sequence Guide

If aged 55+ → *Q.234(a)*

Otherwise → *Q.235(a)*

234(a). SINCE TURNING 55 YEARS OF AGE HAVE YOU BEEN CARAVANING, TOWING YOUR OWN VAN OR IN A CAMPER VAN?

- Yes 1
- No → *Q.235(a)* 2

234(b). AT A LATER DATE A SURVEY IS TO BE CONDUCTED AMONG PEOPLE ABOUT THEIR CARAVANING EXPERIENCES. ARE YOU PREPARED TO TAKE PART IN THIS SURVEY?

- Yes 1
- No 2

235(a). I WOULD NOW LIKE TO ASK YOU SOME GENERAL QUESTIONS

AT WHAT AGE DID YOU LEAVE SCHOOL?

- Still attending → *Q.238* 1
- Never went to school 2
- Under 14 years 3
- 14 years 4
- 15 years 5
- 16 years 6
- 17 years 7
- 18 years or more 8

235(b). SINCE LEAVING SCHOOL HAVE YOU OBTAINED A TRADE QUALIFICATION, CERTIFICATE, DIPLOMA, DEGREE, OR ANY OTHER QUALIFICATION?

- Yes 1
- No → *Q.237* 2

39

236. *Interviewer:*

Show prompt card 23

WHICH OF THESE GROUPS BEST DESCRIBES THE HIGHEST QUALIFICATION YOU HAVE OBTAINED?

Bachelor degree or higher	1
Trade Qualification / Apprenticeship	2
Certificate or Diploma	3
Secondary school	4
Other	5

237. WHAT KIND OF WORK HAVE YOU DONE FOR MOST OF YOUR LIFE?

.....

.....

.....

Office use only

238. WHAT IS YOUR MARITAL STATUS?

Married	1
De facto	2
Separated	3
Divorced	4
Widowed	5
Never married	6

239. IN WHICH COUNTRY WERE YOU BORN?

Australia	001
UK and Ireland	002
Italy	003
Greece	004
Yugoslavia	005
Holland	006
Germany	007
New Zealand	008
Other (*specify*)	

.....

240. CAN YOU TELL ME THE TOTAL ANNUAL HOUSEHOLD INCOME, THAT IS THE INCOME OF ALL HOUSEHOLD MEMBERS BEFORE TAX IS TAKEN OUT. LOOKING AT THIS CARD COULD YOU PLEASE SAY WHICH LETTER APPLIES.

Show prompt card 24

A. Up to $12,000	1
B. $12,001 - $20,000	2
C. $20,001 - $30,000	3
D. $30,001 - $40,000	4
E. $40,001 - $50,000	5
F. $50,001 - $60,000	6
G. $60,001 - $80,000	7
H. $80,001 or more	8
I. Not stated	9

APPENDIX 3.5: Follow-up questionnaires used in Study 6.

PROCESS QUESTIONNAIRE - WEEK ONE

Name ..... Date ...../...../8..... .

How many cigarettes have you smoked today? .....

Have you read our manual? [] Yes [] No
(If yes) **Have you tried to use it?** [] Yes [] No
(If not) Reinforce the fact that it is up to the client to use the manual when and if they choose to do so. However they should be encouraged to use it as soon as possible. Make an arrangement whereby they undertake to use the manual at a certain time and call them then.

You should be up to the ..... stage, which skills have you attempted to use?

Do you believe that you understand all of these skills?
[] Yes [] No
(If not) **Which skills don't you understand?**

Tick a box if the client reports using the techniques. If the client does not understand the techniques and you explain them cross the box. If the client does not use the technique leave blank.

Part 1. Preparing to stop.

[] Listing advantages of quitting
[] Self monitoring of smoking rate
[] Relaxation skills

Part 2. Stopping

[] Signing personal contract
[] Halving smoking rate
[] Use of substitute activities
[] Challenging
[] QUIT technique

PROCESS QUESTIONAIRRE - WEEK 2 AND BEYOND

Name ..... Date ...../...../8..... .

Have you smoked any cigarettes today? [] Yes [] No

(If so) **How many?** .....
Have you tried to stop smoking yet? [] Yes [] No
(If so) **How long ago did you try?** .....
(if not) **Do you intend to try (again)?** [] Yes [] No

(If person is abstinent)
How long ago did you give up? .....
Have you smoked at all since giving up? [] Yes [] No
(if so) **On how many different occasions?** .....

If the person has smoked at all since the last time they were interviewed ask the following questions based upon the last time they began smoking.

When did you have the first cigarette (or were tempted)?...../...../8...
(For smokers) **How many did you smoke on that day?** .....
How many days did you smoke for? .....
Are you now abstinent? [] Yes [] No

What is the main reason you started smoking again? *Tick only one*
[] Lack of willpower
[] Cravings too bad
[] People offered cigarettes
[] Needed them to cope with neg. affect
[] Giving up created withdrawl symptoms
[] Tired of vigilance and coping
[] Other .....

Have you read our manual? [] Yes [] No
(If yes) **Have you tried to use it?** [] Yes [] No
You should be up to the ..... stage, do you feel confident that you understand the skills? [] Yes [] No
(If not) **Which skills don't you understand?**

Tick a box if the client reports using the techniques. If the client does not understand the techniques and you explain them cross the box. If the client does not use the technique leave blank.

Part 1. Preparing to stop.
[] Listing advantages of quitting
[] Self monitoring of smoking rate
[] Relaxation skills

Part 2. Stopping

[] Signing personal contract
[] Halving smoking rate
[] Use of substitute activities
[] Challenging
[] QUIT technique

Part 3. Learning to be a non smoker.

[] Negative image technique
[] Monitoring urges
[] Follow dietary advice
[] Reminds self of what smoking does to health

Part 4. Remaining a non smoker

[] Prospectively identifies high risk situations and coping strategies
[] Reminds self of benefits of non smoking
[] Signs contract to remain non-smoker

APPENDIX 3.6: Example of prompt card for the measurement of the readiness to quit variable (Studies 2, 3 and 4).

10. → Taking action to quit (cutting down, enrolling in a programme)

9.

8. → Starting to think about how to change my smoking patterns

7.

6.

5. → Think I should quit but not quite ready

4.

3.

2. → Think I need to consider quitting some day

1.

0. → No thought of quitting

APPENDIX 4

List of the author's presentations and publications during the period of candidature, and copies of publications in refereed journals.

Appendix 4.1: List of presentations.

Brown, S.L., Hunt, G. and Owen, N. (1989). Evaluation of a community based smoking cessation programme. Paper presented at the 12th National Conference of the Australian Behaviour Modification Association, Perth, Australia.

Brown, S.L. and Owen, N. (Feb. 1990). A prospective study of relapse with smokers using self-instructional smoking cessation materials. Paper presented at the Fifth International Conference for the Treatment of the Addictive Behaviours, Sydney, Australia.

Owen, N. and Brown, S.L. (Feb. 1990). Behavioural epidemiology and uses of population data: Smokers who are chronically unsuccessful with cessation. Paper presented at the Fifth International Conference for the Treatment of the Addictive Behaviours, Sydney, Australia.

Brown, S.L. and Owen, N. (1990). Non-drug treatments for essential hypertension. A book review. Australian Journal of Psychology, 42, 221-223.

Brown, S.L. (1991). Examining the use of cognitive-behavioural strategies in minimal-intervention smoking cessation programmes. Departmental seminar, Department of Psychology, University of Adelaide.

Brown, S.L. and Ryan, C. (1992). Evaluation of theoretical models explaining relapse to the legal addictions. Paper presented at the Third National Social Research Conference, Sydney, Australia.

Appendix 4.2: List and copies of publications in refereed journals.

Brown, S.L. and Owen, N. (1990). Population versus clinical perspectives on smoking behaviour. *Behaviour Change, 7*, 120-125.

Owen, N. and Brown, S.L. (1991). Smokers unlikely to quit. *Journal of Behavioral Medicine, 20*, 627-636.

Brown, S.L., and Owen, N. (1992). Self-help smoking cessation materials. *Australian Journal of Public Health, 16*, 188-191.

Brown, S.L., Hunt, G., and Owen, N. (1992).The effect of adding telephone contact to the use of self-instructional smoking cessation materials. *Behaviour Change, 9,* 216-222.

Brown, S.L. & Owen, N. (1990) Population versus clinical perspectives on smoking behaviour. *Behaviour Change, v. 7(3), pp. 120-125*

Owen, N. & Brown, S.L. (1991) Smokers unlikely to quit.
Journal of Behavioral Medicine, v. 14(6), pp. 627-636

Owen, N. & Brown, S.L. (1992) Self-help smoking cessation materials.
Australian Journal of Public Health, v. 16(2), pp. 188-191

Brown, S.L., Hunt, G. & Owen, N. (1992) The effect of adding telephone contact to the use of self-instructional smoking cessation materials. *Behaviour Change, v. 9(4), pp. 216-222*