

COGNITIVE AND BEHAVIOURAL STRATEGIES IN THE  
MAINTENANCE OF SMOKING CESSATION

by

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## ABSTRACT

Sixty-five subjects were randomly assigned to one of five conditions -- combined, cognitive, behavioural, oversmoking control and minimal treatment control. Subjects in the first four (treatment) conditions underwent a core procedure, oversmoking, designed to help them quit smoking. These subjects then received either a cognitive, behavioural, combination or no treatment package designed to enhance the durability of change in smoking behaviour achieved with the core procedure. Subjects in the minimal treatment condition were informed at a single session about treatment procedures (excluding oversmoking) and encouraged to implement a programme on their own.

A comprehensive package (combined) proved more effective than the simple package (cognitive or behavioural), which in turn did not differ from each other in maintaining reduced rates of smoking. However, subjects who received maintenance packages did not do significantly better than those who underwent the oversmoking only. Subjects in treatment maintained significantly lower rates of smoking than subjects in the minimal treatment control. The study provides a basis for the further development of maintenance strategies. The need to investigate the process of change, maintenance, and their interaction is discussed.

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## INTRODUCTION

The causal relationship between cigarette smoking and a variety of diseases has been well documented (Canada Commission of Inquiry into the Non Medical Use of Drugs, 1973; NMUD, 1976; USPHS, 1976; WHO, 1975). Public knowledge of the harmful effects of smoking has not resulted in any significant decline in the number of smokers (Gallup, 1974; NMUD, 1974).

The US Surgeon General's report (1964) became a landmark in the history of smoking research. The report drew the attention of both health professionals and the public to the problems of cigarette smoking. It gave a fresh impetus to the search for ways of helping people control or quit smoking. A dramatic increase in research followed and a variety of therapeutic techniques were brought to bear upon the problem. These have included the indirect approaches of legislation, education and advertising and the more direct interventions ranging from psychoanalysis, hypnosis and drugs through group therapy and a wide range of behaviour modification therapies encompassing both respondent and operant conditioning techniques.

By 1970 there was little to show in return for all the research investment. Reviews of the literature (Bernstein, 1969; Keutzer, Lichtenstein and Mees, 1968; Lichtenstein and Keutzer, 1971; McFall and Hammen, 1971; Schwartz, 1969) were unanimous about the inability of any procedure to produce long term smoking cessation. The typical pattern of results in a smoking research study has been a significant immediate reduction in smoking followed by a negatively accelerating relapse curve.



McFall and Hammen (1971), in a summary of 11 prominent studies, found a mean 13% (with a range of between 9% and 17%) of the original sample of subjects abstinent at six months after treatment. Hunt and Bospalec (1974) in a summary of abstinence data in 89 studies found that an average of 30% of subjects abstinent at termination were still abstinent six months later.

Bernstein (1969) attributed the state of affairs at that time to the use of unsatisfactory research methodology in the area and to the persual of a line of research which persisted with questions about the initial change of behaviour instead of exploring the factors which contributed to the maintenance of nonsmoking behaviour.

The next generation of reviews (Lichtenstein and Danaher, 1976; Bernstein and McAlister, 1976) described a still bleak picture but was more optimistic about the direction which research was now taking.

Lichtenstein and his colleagues at Oregon had succeeded in developing an aversive procedure, rapid smoking, which has proved to be an efficient and effective technique. They have reported 36% to 100% initial abstinence and 41% to 64% abstinence at between 3 and 6 months follow up when rapid smoking has been administered in a warm, socially supportive, laboratory environment (Harris and Lichtenstein, 1971; Lichtenstein, Harris, Birchler, Wahl and Schmahl, 1973; Kopel, 1974; Schmahl, Lichtenstein and Harris, 1972; Weinrobe and Lichtenstein, 1975).

A second reason for optimism is the increasing recognition that factors contributing to both initial abstinence and maintenance must be investigated. Recently a number of studies offering self-management treatment packages designed to deal with both change and maintenance

factors have emerged (e.g., Best, Owen and Trentadue, 1977; Chapman, Smith and Layden, 1971; Delahunt and Curran, 1976; Morrow, Sachs, Gmeinder and Burgess, 1973; Pomerleau and Ciccone, 1974).

The aim of this study is to investigate the effectiveness of a set of procedures which together comprise a package programme for the treatment of smoking. The rationale for developing this package is based on (1) a consideration of the factors which maintain smoking behaviour, (2) empirical evidence from previous smoking cessation studies, and (3) conceptual consideration of the kind of intervention which is needed to effect long term smoking reduction.

#### Factors Which Maintain Smoking Behaviour

We are still fairly ignorant as to factors contributing to the maintenance of smoking behaviour. Behavioural, affective, cognitive, sensori-motor, social and physical stimuli have been included either singly or in combination in the conceptual models of researchers and theorists in the area (Bernstein, 1969; Berecz, 1976; Best and Hakstian, 1977; Dunn, 1973; Glad, Tyre and Adesso, 1976; Russell, 1974; Tomkins, 1966).

These varying conceptualisations of smoking are not incompatible with the learning model of smoking which we adopt here. We believe that, because of our lack of understanding about which factors do contribute to the maintenance of smoking behaviour, we should not exclude any of them from our model of smoking.

It is consistent with the learning model to regard cigarette smoking as a conditioned response to stimuli both from within and without; and include cognitive, environmental, affective, social, physical and sensori-

motor stimuli. There is evidence that smoking is both an overlearned response (Hunt and Matarazzo, 1970) as well as having instrumental value for the smoker (Ferster, 1970; Jarvik, 1973). Cigarette smoking is maintained by a combination of respondent and operant conditioning (Bernstein, 1969).

It appears likely that to the extent that smoking has an operant value for individuals, reasons for smoking will differ from one person to another. Different mixes of functional variables will play more or less important roles in maintaining an individual's smoking behaviour. For one individual it may be that cigarettes relieve boredom or tension. Another may believe that it is masculine to smoke. A third may smoke for a combination of all three reasons.

A number of models of smoking have been developed which support the belief that smokers have different reasons for smoking (Best and Hakstian, 1977; Ikard, Green and Horn, 1969; McKennell, 1970, 1973; Mausner and Platt, 1971; Tomkins, 1966, 1968). The success of self-management programmes which have emphasised the use of functional alternative coping responses provides indirect support for this viewpoint (Best, Owen and Trentadue, 1977; Chapman, Smith and Layden, 1971; Danaher, 1976; Flaxman, 1974; McGrath and Hall, 1976; Morrow, Sachs, Gmeinder and Burgess, 1973; Pomerleau and Ciccone, 1974).

Best and Hakstian (1977) found that smoking tends to be relatively situationally specific. This is consistent with the behavioural viewpoint and its emphasis on the environment. Best and Hakstian (1977) point out that many behaviour modifiers have noted the increased specificity which smoking acquires as smokers reduce their daily rate

of consumption. Thus there appears to be differential importance placed upon cigarettes. The habit, situational component being important in a reducing phase while the functionality of smoking assumes importance once change has occurred and the smoker has quit.

### The Treatment of Smoking

An effective psychological treatment must produce change of behaviour, the generalization of that change and the enduring maintenance of the changed behaviour (Bandura, 1969). Maintenance may depend on factors entirely distinct from those which effect change and for this reason should be considered separately from change.

Operationally, change may be defined as the difference between pre and post treatment measures of the target behaviour, i.e., it is the alteration in behaviour which occurs during treatment. Maintenance refers to the post treatment durability of that change.

A serious shortcoming in smoking modification research has been the failure to recognize this distinction between maintenance and change of behaviour. Most researchers have concentrated on achieving initial abstinence without paying equal attention to developing techniques which would ensure the persistence of that change. Indeed, research has often failed to distinguish between techniques which appear best suited to change behaviour and those which are best suited to maintain that change. One view is that the reduction or cessation of an excessive target behaviour such as smoking may be achieved by a procedure which would immediately suppress that behaviour due to the potency of its impact (aversive procedures, contingency contracts). The maintenance

of change may be achieved by the acquisition of certain nonsmoking and self-control skills which the nonsmoker would include in his permanent cognitive/behavioural repertoire.

Most research in the treatment of smoking has focused on initial change without considering the issues of change and change maintenance either empirically or conceptually. This has resulted in the empirical fact of the negatively accelerating recidivism curve observed on follow-up. On the conceptual level, we find that a large number of studies employ techniques which can be construed as either only change appropriate or only maintenance appropriate. In addition, some researchers have compared these differentially appropriate techniques directly with each other.

Change appropriate techniques lead to reduced smoking without regard for the need to provide the smoker with a set of skills which he can use to counter the overlearned habit and the instrumental value of smoking.

These change techniques include aversive techniques as well as certain self-control procedures. The main aversive techniques used have been electric shock and oversmoking procedures. A series of studies have failed to achieve significant differences between experimental groups, treated by shocking the act of smoking, and control groups (Andrews, 1970; Conway, 1974; Levine, 1974; Powell and Azrin, 1968; Russell, Armstrong and Patel, in press; Whitman, 1969). Both Steffy, Meichenbaum and Best (1970) and Berez (1976) shocked cognitions about smoking rather than the act of smoking itself. They achieved greater reduction in smoking in the experimental groups than

in the control groups. It is possible that by consistently shocking cognitions the cognitive set of the smoker is being changed and this has a long term effect.

Wilson and Davison (1969) have argued that an aversive procedure which includes the same cues as the target behaviour is likely to have an effect which is more salient and generalized than the effect of a technique which stems from artificial sources. Thus it is not unexpected that the use of cigarette smoke has been shown to be the most effective procedure for reducing smoking. Cigarette smoke is used as an aversive procedure in two main ways -- firstly, where the subject is required to smoke much more than he usually smokes (satiation smoking) and, secondly, where the subject is required to smoke cigarettes much faster than he usually smokes (rapid smoking). The early success achieved with satiation (Resnick, 1968) has not been replicated (Claiborn, Lewis, and Humble, 1972; McCallum, 1971; Marston and McFall, 1971; Sushinsky, 1972). As mentioned earlier, rapid smoking has been demonstrated to be the most consistently effective procedure in the treatment of smoking. The maintenance effect of rapid smoking may, like the effect of shocking cognitions, be due to changing the individual's cognitive set. For example, the rapid smoking may provide the subject with the salient unpleasant experiences which Bandura (1969, p. 507) submits he can subsequently reinstate or rehearse cognitively in order to counteract the smoking urges which occur posttreatment (Lichtenstein and Danaher, 1976).

Self-control techniques, conceptually appropriate for producing change in smoking behaviour, have not been very successful in

producing either initial abstinence or an impressive reduction in smoking rates. It is noteworthy that those studies which have included an abrupt quitting procedure (Elliot and Tighe, 1968; Winett, 1973) did better than those which employed gradual quitting procedures (Azrin and Powell, 1968; Upper and Meredith, 1971; Claiborn, Lewis and Humble, 1972; Levenson et al., 1971; Marston and McFall, 1971; Nolan, 1968; Guttman and Marston, 1967). Flaxman (1974) studied this question of rate of quitting and her results provide direct support for this observation.

The self control techniques used for change have included increasing the stimulus interval between smoking (Azrin and Powell, 1968; Upper and Meredith, 1971; Bernard and Efran, 1972; Shapiro et al., 1971); hierarchical reduction (Pumroy and March, 1966; Guttman and Marston, 1967; Marston and McFall, 1971; Levenson et al., 1971); deposit systems (Tighe and Elliot, 1968; Winett, 1973) and social contracts (Tighe and Elliot, 1968; Guttman and Marston, 1967; Nehemkis and Lichtenstein, 1971).

Maintenance appropriate procedures serve to alter the subject's cognitive/behavioural repertoire in such a way that the effects of the procedure are retained after treatment has ended.

Studies which have relied on maintenance procedures only have included covert sensitization (Cautela, 1970; Gordon, 1972; Wisocki and Rooney, 1971), coverant control (Danaher and Lichtenstein, 1974; Hark, 1970); thought stopping (Wisocki and Rooney, 1971); contracting beyond treatment (Frederiksen, Peterson and Murphy, 1976) and a package of maintenance appropriate self-management techniques (McGrath and Hall,

1976).

The direct comparison of both change and maintenance appropriate procedures has resulted in an apparent methodological confound. These included the comparison of shock with operant self-control techniques (Ober, 1968); hierarchical reduction with covert sensitization (Sachs, Bean and Morrow, 1970); rapid smoking with coverant control (Johnson, 1968; Keutzer, 1968); rapid smoking with systematic desensitization (Kreitler, Shahrar and Kreitler, 1976); contingency management and contractual management with covert sensitization (Lawson and May, 1970) and the effectiveness of lobeline, psychotherapy, covert sensitization, rapid smoking and electric shock were all compared in one study (Brenzelman and Sedlmayr, 1975).

The package treatment developed as a response to the increasing awareness that changes in smoking behaviour are complexly determined. There has been a substantial increase in the number of package programmes in recent years. This increase has occurred despite the sacrifice of experimental rigour which occurs when a variety of techniques are included in a single treatment package.

The package programmes have usually included both a change and a maintenance focus. However, they have not always taken into account the multifactorial and individual nature of the smoking habit. Consequently they fail to provide a sufficiently comprehensive variety of treatments to meet the reasons people have for smoking. These programmes fall short of being able to tailor treatment fully according to the individual's reasons for smoking.

Some package programmes have included a change procedure with a



maintenance programme which does not consider the operant value of smoking. These include the use of shock with stimulus control, contingency management and covert reinforcement procedures (Conway, 1974), stimulus control, role playing and covert punishment (Chapman, Smith and Layden, 1971); rapid smoking with self reinforcement or punishment and incompatible responses (Delahunt and Curran, 1976); social contracting, imagery and self-control hints (Lewittes and Israel, 1975), stimulus control, role playing, alternative behaviour and rapid smoking on relapse (Morrow, Sachs, Gmeinder and Burgess, 1973), deposit system or social support or continued rapid smoking (Gordon and Katz, 1977), deposit system (Lando, 1976); satiation with public commitment, stimulus control, covert reinforcement and role playing (Pomerleau and Ciccòne, 1974); hypnosis with alternative self-control behaviours and monthly posttreatment sessions (Pederson, Scrimgeour and Lefcoe, 1975); a token economy with stimulus control, self-contracting, continued therapist contact and the principles of learning theory (Bornstein et al., 1975); abrupt quitting with education, a buddy system and group discussion (Schlegel and Kunetsky, 1976); a self-contract to reduce smoking with continued self-monitoring or contingency contracting or instructions to change (Miller and Gimpl, 1971).

Sutherland, Amit, Golden and Roseberger (1975) combine rapid smoking with progressive relaxation to produce a package whose maintenance component focuses on only one functional aspect of smoking while neglecting also the overlearned habit component of the behaviour.

Some researchers have included in their maintenance programme, components which address both the overlearned and functional aspects

of smoking. Pechacek (1976) uses a target date for quitting with stress management training as well as cognitive restructuring, stimulus control, self-reinforcement and problem solving training; Flaxman (1974) used a target date for quitting with relaxation training as well as contingency management, stimulus control and thought stopping; Danaher (in press) combined rapid smoking with relaxation training as well as stimulus control, self-reward and a cognitive ecology programme.

Finally, in this clinic we have combined change techniques with a maintenance programme which addresses both the habit and functional components of the smoker's behaviour. All the smoker's reasons for smoking are analyzed and treatment is tailored according to each smoker's pattern of smoking. Thus Best, Owen and Trentadue (1977) combine satiation and rapid smoking with self-control skills as well as a set of functional alternative ways of coping with tension, affect and other reasons which people have for smoking. Best, Bass and Owen (in press) added a component of phone support to the previous study while Suedfeld and Best (in press) combined sensory deprivation and satiation with a similar comprehensive maintenance programme.

Another desirable aspect of the package programme is the emphasis it places on the cafeteria-style self-management programme. Davidson (1976) points out that the cafeteria-style behavioural programme which trains a variety of skills is likely to be effective because it both increases self-attribution and increases the freedom of choice for the client and thereby reduces the likelihood of reactance. Delahunt and Curran (1976) hold that self-control is appropriate for altering the operant components of smoking behaviour. Self-control focuses on the

individual as the agent of change in his own environment thereby ensuring generalization of behaviour (Lichtenstein and Danaher, 1976) and the individual will be more able to include behaviours as needed in the problem situations (Best, Owen and Trentadue, 1977).

The present study includes the most important and successful components of smoking research to date -- a package treatment including oversmoking and a cafeteria style self-management programme of maintenance techniques. In the present study we investigate the comparative usefulness of package treatments which include behavioural techniques only, cognitive techniques only and the more comprehensive package which combines both the behavioural and cognitive packages.

The inclusion of cognitive modification procedures in smoking modification research is warranted for a number of reasons. Firstly, the recent upsurge of interest in cognitive behaviour modification research has led to the development of new procedures which deserve application in smoking research programmes (Bandura, 1969; Kanfer and Goldstein, 1976; Mahoney, 1975; Mahoney and Thoresen, 1974; Meichenbaum, 1974; Thoresen and Mahoney, 1974).

Secondly, central mediational processes are in many respects the most influential regulatory mechanisms (Bandura, 1969).

Thirdly, to the extent that certain aspects of smoking behaviour are cognitive in themselves, they might best be remediated cognitively.

Fourthly, early intervention in the cognitive/behavioural sequence of events leading to smoking might be more effective with a cognitive technique. Thus Cautela (1970) suggests that the urge to smoke could be managed by using coverant control.

Finally, offering both behavioural and cognitive procedures has two aims. Firstly, it expands the comprehensiveness of the package by providing alternative ways of coping with a greater variety of factors which maintain smoking. Secondly, it increases the versatility of the package by offering equivalent behavioural and cognitive techniques.

The strategy of the present study was to begin with a core set of procedures shown to have a significant impact in initiating immediate change and to then add different maintenance packages and to assess the differential effectiveness of these procedures on the durability of smoking change.

#### Experimental Hypotheses

- (1) Subjects in the combined behavioural/cognitive condition will be smoking significantly less on treatment follow-ups than subjects in the behavioural only and cognitive only conditions.
- (2) Subjects in the behavioural only and cognitive only conditions will not be smoking at significantly different levels on treatment follow-ups.
- (3) Subjects in the maintenance conditions (combined, behavioural only, cognitive only) will smoke at a significantly lower rate on treatment follow-ups than subjects in the no-maintenance condition (rapid smoking only).
- (4) Subjects in the treatment conditions will smoke at a significantly lower rate on treatment follow-ups than subjects in the minimal treatment control.

## METHOD

### Subjects

Subjects were recruited through advertisements in a local daily newspaper for a free smoking clinic. They were randomly assigned to successive treatment conditions in the order that they responded to the advertisement by phoning the clinic's receptionist. At this time they were given an outline of the clinic's approach and the basic procedures to be followed in the programme; given a medical screening; informed that they would be required to provide a physician's consent in order to participate in the programme; informed that the programme was free but that each subject would be required to make a deposit which would be refunded when research data was received at the three month followup. One in every five respondents to the advertisement was told that the programme was full. They were, however, encouraged to attend a single session where the procedures which the clinic used would be outlined to them. It was suggested that on the basis of this single session, they could develop their own quit-smoking programme. These subjects became the minimal control group.

Of the 129 respondents to the advertisement, 72 actually started the treatment programme and 65 subjects were included in the final sample (see Table 1). Subjects were considered medically unsuitable either if they reported a history indicative of cardiovascular or serious broncho-pulmonary disease or if their physicians refused consent for their participation in the clinic. Physicians were sent an article (Lichtenstein and Glasgow, 1976) which describes current research

Table 1  
Summary of Subject Survival and Mortality Between  
Initial Contact and End of Treatment

Final Sample	65
*Completed Treatment - Dropped from Study	1
*Dropped out during Treatment	6
Medically Unsuitable	14
1) Clinic Telephone Screening (11)	
2) S's physician (3)	
Unable to find Suitable Time	4
Changed Mind - Called in before Session 1	9
Failed to arrive at Treatment Session 1	27
*Other	3
	<hr/>
Total number of Respondents	129

\*See Footnote 1

on the effects of oversmoking (Appendix A). This treatment sample appeared to be a representative cross-section of the local community. The average age was 35.7 (S.D. = 9.8). They reported an average daily smoking rate of 28.6 cigarettes (S.D. = 10.5). They had been smoking for an average of 17.9 years (S.D. = 8.6). Forty-two percent of the treatment sample was male and 58% female.

### Experimental Design

Two treatment factors were factorially represented: two levels of cognitive procedures (cognitive versus no cognitive) and two levels of behavioural procedures (behavioural versus no behavioural). The design thus included a control condition in which subjects received no maintenance treatment procedures (i.e., no cognitive or behavioural procedures). Behaviour changes in this group were attributable only to the core treatment procedures and not to any of the procedures which were designed to promote enduring change. As mentioned, a minimal treatment control was also included. Behaviour change in this group was attributable to the subject's motivation to change and his success in self-implementation of the maintenance treatment procedures. There were a total of 65 subjects in the five cells: combined (14), cognitive only (12); behavioural only (12); oversmoking only control (14), minimal treatment control (13).

The only restriction placed upon random assignment of subjects to treatment conditions was that clients coming to the clinic together (married couples, work associates, friends, etc.) were assigned to the same treatment conditions.<sup>2</sup> This was necessary so that different

treatments across groups would not be easily contaminated.

The experimental hypotheses were tested by planned orthogonal contrasts. The minimal treatment control was included only in one contrast. The MSw term was then recalculated and analyses including the four in-treatment conditions were undertaken separately. Interaction between the treatment conditions was tested by using the 2x2 factorial design.

### Intake Procedures

All subjects attended an intake meeting in the groups to which they were assigned. There were three groups per condition. Subjects were required to complete a battery of questionnaires (Appendix A).

(1) Subjects completed a background information questionnaire related to age, sex, marital status, education and occupation as well as information about the individual's smoking habits. (2)

Two questionnaires, the Smoking Occasions and the Smoking Motivation questionnaires, were administered with the intention of making the subjects more aware of the different situations they smoked in and their reasons for smoking. (3) Subjects completed two personality measures:

the Wallston et al. (1976) Health Locus of Control Scale (HLOC) and

Snyder's (1974) Personal Reaction Inventory (PRI). (4) An imagery

scale was constructed and administered to give subjects an opportunity to become more aware of self-engendered imagery. (5) Two scales were

constructed to assess motivation for quitting -- these include (a) a motivation thermometer, on which subjects indicated the strength of

their motivation to quit smoking and (b) a desire thermometer on which



subjects indicated the strength of their desire to continue smoking.

All subjects were given a learning theory rationale for the maintenance of the smoking habit and the treatment to be followed. Subjects in the minimal treatment condition were given an overview of the clinic's approach to treatment and a detailed guide and outline to the implementation of procedures (excluding oversmoking). These subjects attended only the "intake" session. They were given no written materials.

The programme for the next four sessions was outlined for subjects in the four treatment conditions. They were told that their date for quitting smoking would be the day of the third session. It was emphasized that they should focus on that target date. The cigarette tally system was explained. The system required the recording of the time of day, the place, the activity in which the subject was involved and the subject's perceived reason for smoking each cigarette. Subjects were explicitly instructed not to change their smoking habits until the next meeting in one week's time. The importance of getting an accurate picture of their normal smoking was stressed. They were told to enlist the help of a friend or relative who would act as a confederate and check the daily record at the end of each day (see Best, 1975; Ober, 1968; Steffy et al., 1970). Subjects were asked to provide the clinic with the name and address of a confederate who could assist the subjects with their tallying. (Appendix A).

A data deposit was explained. Subjects were asked to sign a "data deposit agreement" (Appendix A) and to make a data deposit of \$25 payable to a local charitable organization. The deposit has proven

effective in ensuring that subjects both complete the course of treatment and submit all necessary cigarette tallies and questionnaires (Best, 1975; Best and Steffy, 1971; Keutzer, 1968; Mees, 1966). The deposit was refunded after a three month clinic follow up if the subject had complied with all requests for information. The return of the deposit was not contingent upon any aspect of the subject's smoking habit per se.

Finally subjects signed a research participation consent form (Appendix A).

Subjects took with them from the intake meeting a folder in which to keep clinic handouts; a 3"x5" wire-bound notebook for recording their cigarette tallies; a set of instructions explaining the tally system in detail, and a tally summary sheet (Appendix B).

#### Rationale Presented to Subjects

As mentioned, subjects were given a theoretical model for the development of smoking and the approach to treatment. The model conceptualized the development of the smoking habit as the development of S-R bonds. The rationale then differed according to treatment condition. Subjects in the oversmoking and combined conditions were told that these bonds were formed by the development of links between either environmental situations or thoughts and the smoking response. Subjects in the cognitive only condition were told that the bonds existed between thoughts and the smoking response. It was explained that this was so as most behaviour is at least cognitively mediated. Subjects in the behavioural only condition were told that

the bonds developed between environmental situations and the smoking response.

All subjects were told that quitting involved the disruption or breaking of these bonds. Further, subjects in the experimental conditions were told that to maintain abstinence they needed to replace the smoking behaviour with new behaviour. To do this, they would need to learn non-smoking skills.

Subjects in the combined condition were told that their new skills could be either cognitive or behavioural. Subjects in the cognitive only and behavioural only conditions were told, respectively, that only cognitive or only behavioural skills would be appropriate.

#### General Treatment Procedures

Following the intake meeting subjects were seen in the same groups, at weekly intervals, on four further occasions. Thus the programme comprised a total of five sessions.

At the second session, the subjects' tallies were collected and their reasons for smoking discussed. Subjects were given a rationale for aversive conditioning. They were instructed in the first of the oversmoking procedures, satiation. They were told that for the three days prior to the third session they were to smoke many more cigarettes than they usually smoked. They were told that the rule of thumb was to smoke at double the normal rate. It was explained, however, that the goal was subjective discomfort rather than smoking a certain number of cigarettes. It was emphasized that the procedure worked best if carried out for all three days. Subjects were given handouts which

explained the satiation procedure, a satiation "symptom rating scale" and a "satiation quota and tally system" blank (Appendix B). At the end of each evening subjects completed the symptom form, requiring severity judgements on a 5-point scale for each of 24 possible reactions. They then decided upon the number of cigarettes for the next day and allocated them on an hourly quota basis.

All subjects were instructed to quit smoking "cold turkey" after the three days of satiation, the day of the third session. At the third session rapid smoking was described. The first rapid smoking session was held in the clinic at the third session. Handouts supplemented the explanation and a "symptom rating scale" provided information about the subjects' experiences (Appendix B). The procedure on conditioning trials was as follows. The subject was to set himself up with a lighted candle, sufficient cigarettes placed close by on the table, an ashtray and a watch or clock with a second hand. The subject was instructed to inhale normally at six second intervals, lighting fresh cigarettes as necessary. A trial ended when the subject felt that he could not tolerate another inhalation. The subject would then crush out the cigarette while covertly verbalizing the aversiveness of smoking. At the end of the trial the subject recorded the number of cigarettes smoked to the nearest quarter. The subjects were permitted to drink water between trials. After two or three minutes for recuperation a second trial commenced. And similarly a third trial. Subjects were not obliged to complete three trials but rather to continue until they had achieved a maximal aversive effect. At the end of each rapid smoking session subjects completed the symptom rating

scale. The procedure was slightly varied at the first session -- only two trials were held and the experimenter called out "puff" at six second intervals.

Subjects were told, both when satiating and rapid smoking, to focus on their physical experiences. It was explained that this would help build in a memory component of cigarettes as unpleasant which would help them stay off cigarettes.

A total of 7 rapid smoking sessions were scheduled, the last six to be held at home. Sessions were initially massed (days 1, 2, 3) and then gradually spaced out (days 5 and 7 and then days 10 and 13). The final rapid smoking session was held the day before the fifth session.

Throughout the programme the experimenter maintained high levels of expectation of success and social support, equally across all groups.

#### Experimental Treatment Procedures

From the second session until the end of the programme subjects in the three experimental conditions concentrated on developing skills of non-smoking. The subjects in the oversmoking control condition were encouraged to discuss their progress and problems at sessions. The therapist's role in this group was non-directive.

The subjects in the experimental conditions developed self-control skills as well as functional alternative behaviours to cope with the different reasons they might have for smoking. The self-control skills refer to these procedures which the subject applies in order to change some aspect of his own behaviour (Lichtenstein and Danaher, 1976). Functional alternatives refer to behaviours which replace cigarettes

while purporting to serve the same perceived function for the subject as the cigarettes do. It was emphasized that: (1) the programme was a self-management programme, (2) like any other skill "getting good" at being a nonsmoker required practice and (3) they should select those procedures which best suited their needs in developing their programme.

### Behavioural Techniques

#### A. Self-Control Procedures

1. Stimulus control techniques aim to control behaviour by controlling the stimuli which elicit the smoking response. These include the following: (a) Avoiding or leaving certain situations, strongly tied to smoking. For example, not going out drinking. (b) Altering a routinized or ritualized pattern which includes smoking a cigarette. For example, drinking tea instead of coffee in the livingroom instead of at the table (c) Removing the eliciting stimuli from the environment. For example, disposing of all cigarettes and ashtrays in the house.

2. Non-Functional alternative behaviours such as chewing gum or sipping water when speaking on the telephone.

3. A self-reward system involving the reward of non-smoking behaviour. The reward system was outlined to the subjects at the third session and supplemented by a handout (Appendix B) which described the contingencies necessary for reward to be effective. Subjects reward programmes were then discussed at later sessions.

#### B. Functional Alternatives

Whenever it is considered that a cigarette is doing something for

the subject an attempt was made to control the urge to smoke by using a new response considered functionally equivalent to the cigarette under the circumstances. The following are some of the common techniques used:

1. Progressive relaxation using 16 muscle groups (Bernstein and Borkovec, 1973) was presented at the second session and supplemented with a handout (Appendix B). Subjects were told that to acquire effective skills in relaxation as an answer to tension they should practice the procedure twice daily. Once acquired the relaxation could be used as a coping skill in situations (Goldfried and Trier, 1974).
2. Deep-breathing was suggested as a second good alternative response to tension.
3. A cold shower or brisk exercise are good responses where a wake-up stimulant is needed.
4. Reading an exciting pocket novel, a crossword puzzle, planning the next day's business could serve as good responses when bored.
5. A short break from work helps maintain concentration on a job.
6. Find a new reward for reinforcement of a job completed.
7. When lonely or depressed, call a friend or do some other activity which will alter the mood state.

### Cognitive Techniques

#### A. Self-control procedures

1. Urge-management, an adaptation of covert control (Danaher, 1974; Homme, 1965, 1966; Mahoney, 1970) is designed to control the urge to smoke by consequenceing the urge with negative covert statements or

images about smoking. This is followed by a covertly verbalized decision not to smoke. This decision is reinforced with covert positive associations with nonsmoking. Clients were asked to generate their own lists of positive and negative associations and to vary them in applying the technique. The procedure was presented at the third session and supplemented with a handout (Appendix B).

2. The approach to self-instructional training was adopted from Meichenbaum (1975). Subjects in the cognitive conditions were instructed to record their self-statements about smoking. They did this for three days after the second session in addition to the self-monitoring described earlier. The following techniques were presented to help subjects control smoking through their self-statements. The explanation of procedures was supplemented by a handout (Appendix B).

a. practising redefining certain situations as nonsmoking situations. For example, the subject might be instructed to practice repeating to himself that he does a number of things after dinner but he does not smoke.

b. using coping imagery, especially where a difficult situation could be anticipated. For example, the subject who anticipated smoking at a party may spend a few minutes before the party imagining himself in the situation he fears and thus seeing himself coping without a cigarette in that situation.

c. becoming more rational about smoking by thinking through a self-statement in order to arrive at the irrationality of its conclusion. For example, a subject who says that he cannot enjoy a party without smoking might arrive at the conclusion that the worst thing



that could happen is that he would not enjoy the party.

d. preparing to use self-instruction directly in certain situations. For example, a subject may rehearse the coping strategies he will use in the critical situation. Once in the situation he can instruct himself in strategies for coping without smoking.

e. practising thinking positively about quitting. For example, a subject who is repeatedly telling himself that he will not be able to succeed in quitting can practice saying the opposite.

f. thought stopping (Wolpe and Lazarus, 1966) to stop constant thoughts and ruminations about smoking. Subjects were instructed to covertly "shout" "stop" and then to have planned thoughts upon which they could focus attention.

3. A Self-reward programme was presented in the same way as the behavioural programme except that rewards involved only the use of imagery.

#### B. Functional Alternatives

Similarly to the behavioural condition, whenever cigarettes are considered to be doing something for the smoker a new functional alternative behaviour must be substituted for smoking. The following procedures were used.

1. A relaxation procedure using relaxing imagery was presented to subjects at the second session. They were given the same general instructions about relaxation as in the behavioural condition, and a handout (Appendix B).

2. Functional imagery appropriate to different reasons for smoking were suggested. This involved using imagery which is appropriately

relaxing, stimulating, rewarding, etc.

### Termination

All subjects terminated treatment at the fifth session. At the end of this session the subjects assessed treatment by rank-ordering the different treatment components and by rating average discomfort with respect to urges to smoke during treatment and their confidence in maintaining abstinence (Appendix A).

### Dependent Variable

The principal dependent variables used were daily rate of cigarette smoking and abstinence or non-abstinence from cigarettes. Followup scores reflected subjects' estimates of their smoking rate during the preceding week.

### Followup

At the final session subjects were given a postage paid card to return a week later. They reported their smoking for the week on the card. Subjects were told that they would be contacted for followup information. At one, two and three months they estimated current smoking. Data deposits were refunded when the three month followup questionnaire was mailed to the subjects.

### Overview of Statistical Procedure

1. A 1-way Anovar was used to test for initial differences between conditions.
2. A 2-way Anovar was calculated at each time point (posttreatment, one month, two months and three months). The  $MS_w$  terms from these

calculations were used in the planned orthogonal contrasts involving the four treatment conditions.

3. A one way Anovar with all five conditions was calculated at one month, two months and three months. The  $MS_w$  terms from these calculations were used in the planned orthogonal contrasts involving all five conditions.
4. Planned orthogonal contrasts were carried out to test the main hypotheses at each time point.
5. A repeated measures Anovar was performed to test for interaction between the behavioural and cognitive conditions.
6. An analysis of proportions procedure (Marascuilo, 1966) was used to assess the differences between conditions on abstinence rates at each time point. X
7. A repeated measures Anovar was performed on subjects grouped by operant smoking rate.
8. A correlation matrix was computed on a number of demographic, personality, motivational and treatment process variables.

## RESULTS

Analyses of variance were performed to test for pretreatment differences in smoking rates between conditions and overall change in smoking rates between the pretreatment, posttreatment and follow-up time points. Mean and standard deviations are reported in Table 1.

Initial differences in smoking rates were not significant for either all five conditions compared on preestimated smoking rates,  $F(4,60) = 0.13$ ,  $p > .75$ , or the four treatment groups compared on operant smoking rates,  $F(3,48) = 0.25$ ,  $p > .75$  (Appendix C).

Subjects in the four treatment conditions reduced their smoking rates over the course of treatment (Table 2). From a recorded average of 23.38 cigarettes per day ( $SD = 8.9$ ) during the operant (first) week of the programme, subjects reduced their daily smoking to a mean of 5.71 cigarettes per day ( $SD = 9.17$ ) at posttreatment. Scheffé post hoc multiple comparisons on these differences were significant,  $F(4,46) = 6.67$ ,  $p < .001$ . At three month follow-up subjects had increased their smoking rates to an average of 15.56 cigarettes per day ( $SD = 14.35$ ). Scheffé comparisons found this to be still significantly less than pretreatment smoking rates,  $F(4,46) = 6.47$ ,  $p < .001$ . However, the increase in smoking rates from posttreatment to three months was also significant,  $F(4,46) = 3.76$ ,  $p < .01$ .

Furthermore, 21 of 52 or 40.38% of the subjects remained totally abstinent during the posttreatment week. Seventeen of 52 or 32.69% of the subjects were abstinent at the three month follow-up.

Reduction in smoking rates for all five conditions, based on pre-

TABLE 1  
MEANS FOR PRE AND POSTTREATMENT - CIGARETTES PER DAY,  
PERCENTAGE OF PRETREATMENT SMOKING RATE AND PERCENTAGE ABSTINENT

SMOKING RATES	COMBINED	COGNITIVE	BEHAVIOURAL	OVERSMOKING CONTROL	MINIMAL TREATMENT CONTROL	OVERALL MEAN
PRE-ESTIMATED	28.29 * ( 9.46)	26.83 ( 6.55)	29.00 (15.24)	29.14 (11.70)	29.69 ( 9.56)	28.61 (10.55)
OPERANT (PRETREATMENT RECORDED)	23.58 ( 7.48)	22.71 ( 5.71)	24.98 (14.36)	22.09 ( 7.20)	---	23.28 ( 8.90)
<u>POSTTREATMENT &amp; FOLLOWUP</u>						
<u>CIGS/DAY</u>						
1 week	1.74 ( 5.29)	6.13 ( 9.67)	9.46 (12.57)	6.14 ( 7.55)	---	5.71 ( 9.17)
1 month	3.52 ( 7.72)	13.39 (10.13)	16.13 (19.35)	15.26 (12.69)	25.12 (12.28)	14.52 (14.32)
2 months	4.53 ( 8.88)	16.75 (10.23)	19.50 (20.20)	18.48 (16.35)	24.15 (12.12)	16.47 (15.23)
3 months	8.11 (11.04)	16.55 (12.43)	20.45 (20.68)	17.93 (13.35)	24.75 (12.75)	17.38 (14.94)
<u>% PRE-ESTIMATED</u>						
1 month	12.86 (28.04)	50.92 (41.45)	43.87 (44.98)	53.08 (41.22)	63.67 (28.84)	48.44 (42.93)
2 months	16.64 (30.51)	62.70 (35.93)	51.53 (46.46)	61.05 (45.02)	80.21 (27.00)	53.86 (42.44)
3 months	32.45 (42.92)	60.44 (40.22)	54.65 (49.56)	62.93 (49.17)	83.01 (31.58)	58.39 (45.06)
<u>% OPERANT</u>						
1 week	7.71 (21.55)	24.05 (35.76)	37.10 (51.28)	31.21 (40.01)	---	24.46 (38.64)
1 month	17.59 (38.98)	57.57 (42.94)	49.46 (53.89)	65.01 (51.62)	---	46.94 (49.45)
2 months	21.75 (41.31)	72.19 (35.89)	59.50 (52.73)	78.11 (63.21)	---	57.04 (53.38)
3 months	43.51 (59.92)	70.37 (42.03)	62.53 (58.04)	75.88 (54.64)	---	62.81 (53.75)
<u>% ABSTINENT</u>						
1 week	57.14	25.00	50.00	28.57	---	40.38
1 month	71.40	16.66	41.66	21.42	7.69	32.31 (38.46)**
2 months	71.40	8.33	41.66	21.42	7.69	30.76 (36.54)**
3 months	50.00	16.66	41.66	21.42	7.69	27.69 (32.69)**

\* STANDARD DEVIATIONS ARE IN BRACKETS.

\*\* MEAN ABSTINENCE RATES EXCLUDING MINIMAL TREATMENT CONTROL.

Table 2

Repeated Measures Analysis of Variance on Operant, Posttreatment  
and Follow-up Smoking Rates Over Time -- Four Treatment Conditions

Source	<u>df</u>	<u>SS</u>	<u>MS</u>	<u>F</u>	<u>p</u>
Treatment Conditions (A)	3	3513.784	1171.26	2.367	>.05
Subjects (A)	47	32353.32	494.75		
Time (T)	4	8087.18	2021.79	29.67	<.001
A x T	12	1324.97	110.41	1.62	>.05
Subjects (A x T)	188	12811.89	68.14		

estimated smoking rates also proved significant at three month follow-up on the Scheffé comparisons,  $F(3, 61) = 5.49$ ,  $p < .001$  (Table 3).

Repeated measures analysis of variance based on percentage operant smoking rates are reported in Appendix C.<sup>3</sup>

#### Evaluation of the Experimental Treatment Effects

Experimental treatment effects were evaluated by comparing mean smoking rates per day for subjects in each condition (Figure 1). Effects were also evaluated by comparing abstinence rates between groups (Figure 2). Smoking data were available for posttreatment<sup>4</sup> and one, two and three month follow-up periods. Thus a time factor was included in the analysis of variance calculated to assess the effects of interaction between the cognitive and behavioural modes of treatment. As can be seen in Table 4, neither interaction over time nor between modes of treatment was significant. The significant time factor reflects relapse and increasing smoking rates following clinic termination. The mean daily rates were 5.71, 14.52, 16.47 and 17.38 for the posttreatment, one two and three month follow-up periods, respectively. Abstinence rates were compared on a multiple comparison procedure based upon a  $\chi^2$  analog of Scheffé's multiple comparison procedures (Marascuilo, 1966; Hakstian *et al.*, 1976). The results are reported in Table 5 and discussed below in the section which relates to the hypothesis being tested.

#### The Comprehensive Maintenance versus Simple Maintenance

Results support the hypothesis that subjects who received the combined maintenance package would reduce smoking more than subjects who received a simple cognitive or simple behavioural package only

Table 3

Repeated Measures Analysis of Variance for Pretreatment,  
 Posttreatment and Follow-up Estimated Smoking Rates  
 Over Time - Five Conditions

Source	<u>df</u>	<u>SS</u>	<u>MS</u>	<u>F</u>	<u>p</u>
Conditions (A)	4	6028.88	1507.22	2.86	<.05
Subjects (A)	60	31615.63	526.93		
Time (T)	3	7599.23	2533.07	47.73	<.001
A x T	12	1832.80	152.73	2.88	<.001
Subjects (A x T)	180	9551.75	53.07		



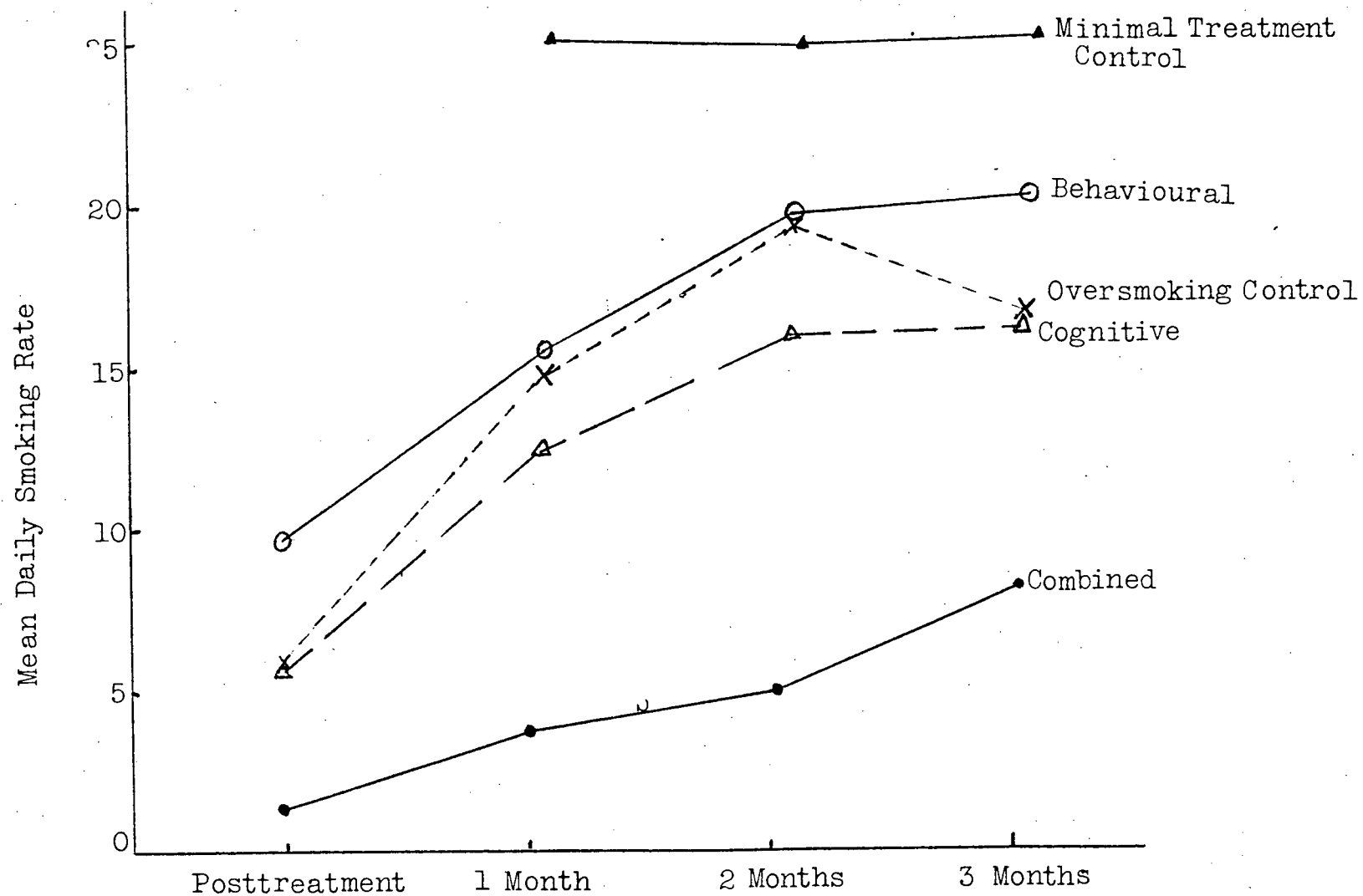


Figure 1. Posttreatment and Follow-up Smoking Rates over Time: All Conditions

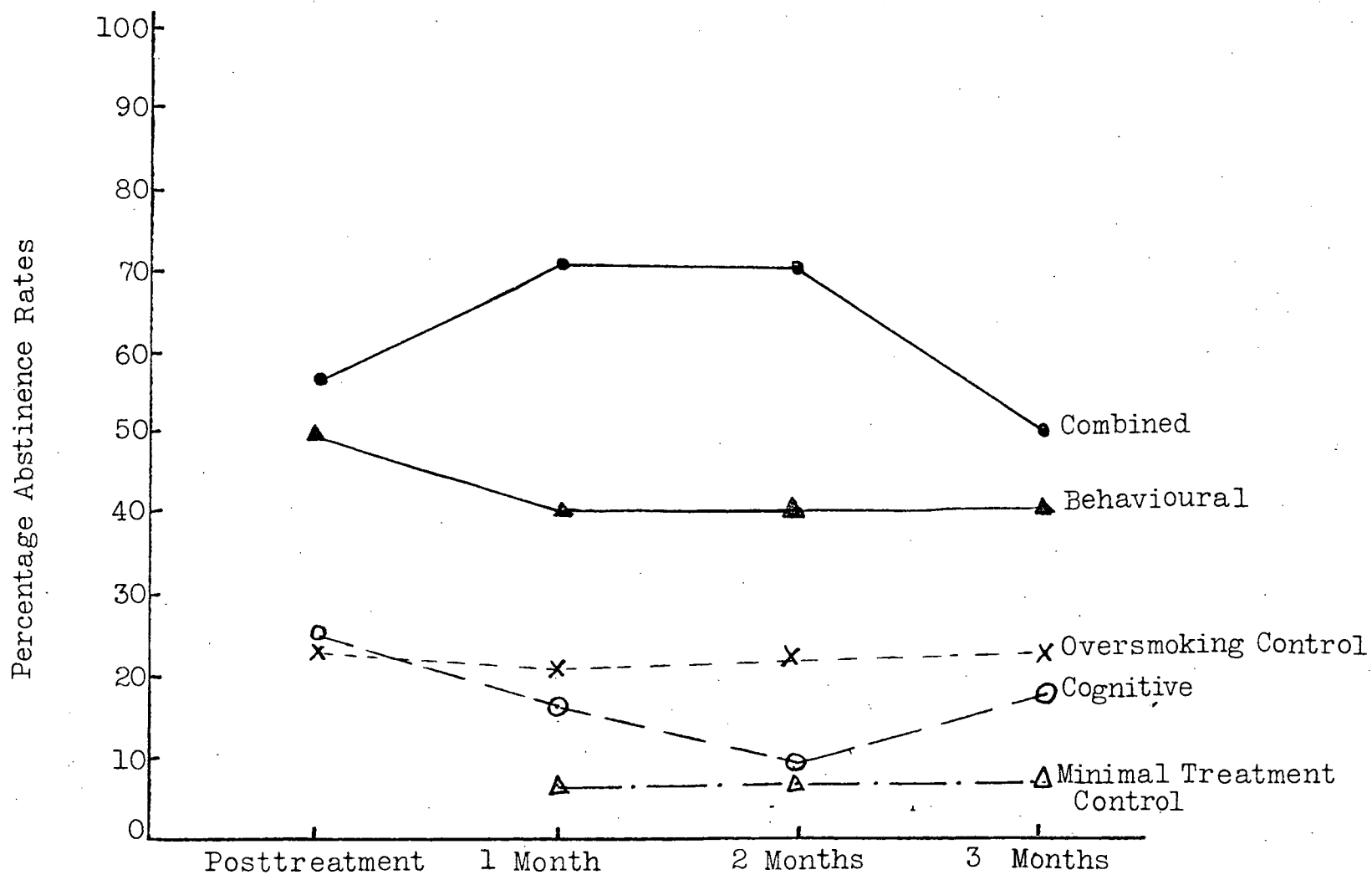


Figure 2. Posttreatment and Follow-up Abstinence Rates over Time: All Conditions

Table 4  
 Analysis of Variance for Posttreatment and Follow-up  
 Smoking Rates Over Time as Related to  
 Cognitive and Behavioural  
 Modes of Treatment

Source	<u>df</u>	<u>SS</u>	<u>MS</u>	<u>F</u>	<u>p</u>
Cognitive (A)	1	2366.67	2366.67	4.97	<.05
Behavioural (B)	1	674.66	674.66	1.42	<.10
A x B	1	1312.64	1312.64	2.76	<.05
Subjects (A x B)	47	22372.31	476.01		
Time (T)	3	3091.52	1030.51	14.96	<.001
A x T	3	166.8	55.6	0.81	<.25
B x T	3	218.43	72.81	1.06	<.25
A x B x T	3	39.7	13.23	0.19	<.50
Subjects (A x B x T)	141	9714.47	68.9		

Table 5

Summary Table of Multiple Comparisons Between Conditions\* for  
Differences in Mean Abstinence Rates Over Follow-ups

Contrast ( $\hat{\Psi}$ )***	.95 Confidence level for Q		Significance
Group 1 vs 2 and 3 Combined**			
1 month	.007	1.685	$p < .05$
2 months	.11	1.73	$p < .05$
3 months	-.4882	1.3082	n.s.
Group 1, 2 and 3 Combined vs Group 4			
1 month	-.51	1.85	n.s.
2 months	-.58	1.74	n.s.
3 months	-.73	1.65	n.s.
Group 2 vs Group 3			
1 month	-.75	.25	n.s.
2 months	-.79	.11	n.s.
3 months	-.75	.25	n.s.
Groups 1, 2, 3 and 4 Combined vs Group 5			
1 month	.012	2.36	$p < .05$
2 months	-.03	2.27	n.s.
3 months	-.2	2.16	n.s.

\* Group 1 = Combined; Group 2 = Cognitive only; Group 3 = Behavioural only; Group 4 = Oversmoking Control; Group 5 = Minimal Control.

\*\* Chi squared for Posttreatment was nonsignificant, therefore no multiple comparisons.

\*\*\* The first 3 sets of contrasts were done as if the experiment included only four groups, the fourth with five groups.

(Figure 3). Posttreatment planned orthogonal contrast showed a nonsignificant difference between the two sets of subjects,  $F(1,47) = 3.99$ ,  $p < .05$ . However, at all three follow-up points, one month,  $F(1,48) = 6.60$ ,  $p < .01$ , two months,  $F(1,48) = 7.73$ ,  $p < .10$ , and three months,  $F(1,48) = 4.44$ ,  $p < .05$ , differences were significant.

The combined group had a significantly greater number of subjects abstinent at the one and two month follow-ups than the other two maintenance conditions. Differences were not significant at posttreatment and three month follow-up (see Table 5). Mean rates of abstinence at the posttreatment, one month, two month and three month follow-up were 57.14%, 71.4%, 71.4% and 50% for the combined conditions and 37.5%, 29.16%, 24.99% and 29.16% for the simple maintenance conditions.

#### Cognitive only versus Behavioural only

Results were consistent with the hypothesis that there would be no difference in smoking rates between subjects who received a cognitive only maintenance package and subjects who received a behavioural only maintenance package (Figure 1). Differences were nonsignificant at posttreatment  $F(1,47) = 0.82$ ,  $p > .25$ , one month,  $F(1,48) = 0.27$ ,  $p > .50$ , two months,  $F(1,48) = 0.21$ ,  $p > .50$ , and three months,  $F(1,48) = 0.43$ ,  $p > .50$ .

Differences in rates of abstinence were also not significant at all time points (see Table 5). For mean rates of abstinence see Table 1.

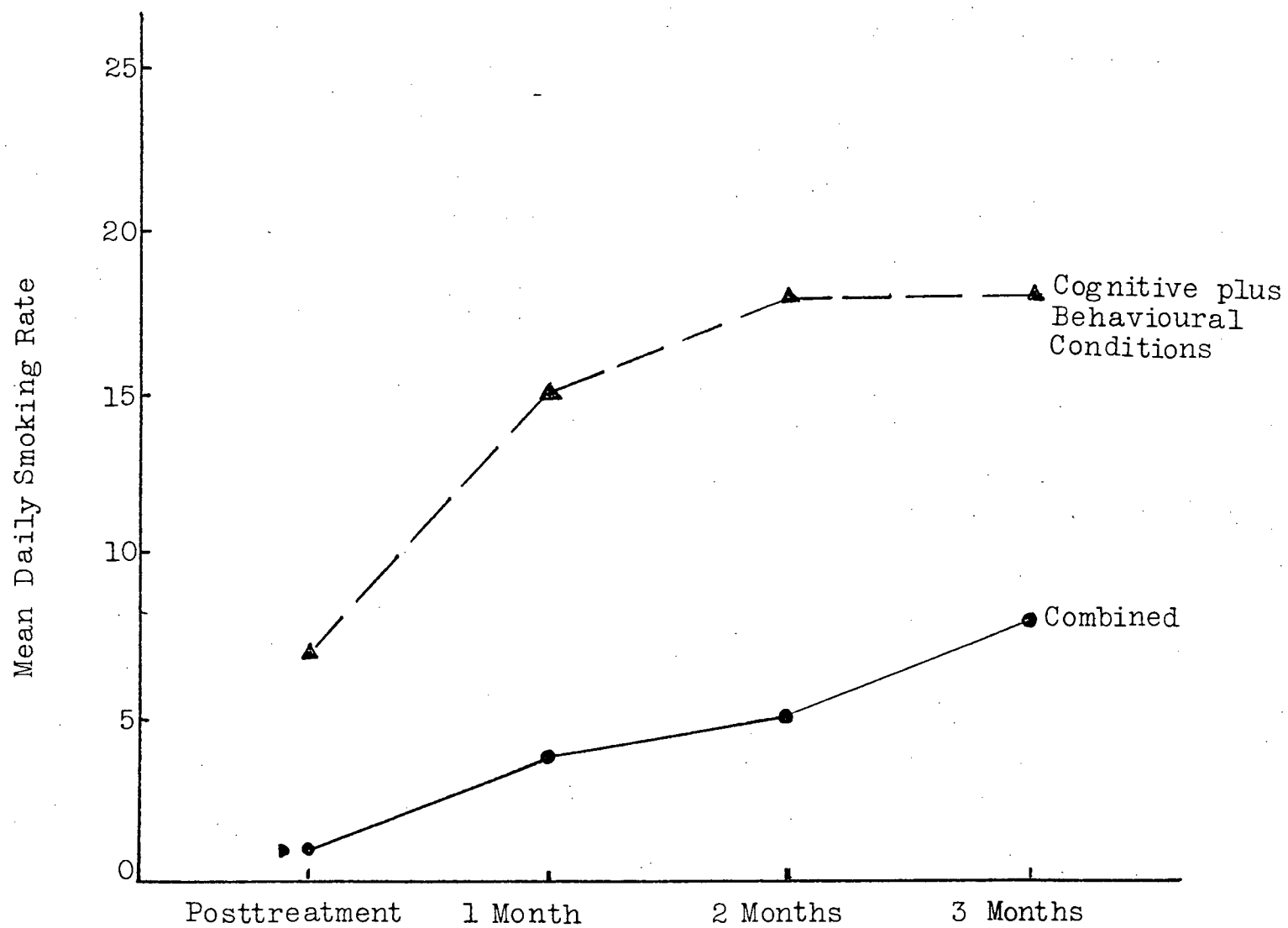


Figure 3. Posttreatment and Follow-up Smoking Rates over Time: Combined versus Cognitive and Behavioural Conditions.

### Maintenance versus No Maintenance

The hypothesis that subjects in the conditions which include a maintenance package would reduce smoking at follow-ups more than subjects who received only the oversmoking, the core treatment procedure, was not supported (Figure 4). Differences on the planned orthogonal contrasts did not achieve significance at posttreatment,  $F(1,47) = 0.02$ ,  $p > .75$ , one month,  $F(1,48) = 1.09$ ,  $p > .25$ , two months,  $F(1,48) = 1.15$ ,  $p > 0.25$ , and three months,  $F(1,48) = 0.40$ ,  $p > .5$ .

Differences in abstinence rates were not significant at any of the follow-up points. Mean abstinence rates at posttreatment, one month, two months and three months were 44.7%, 44.72%, 42.09%, 36.83% for the subjects in the maintenance conditions and 28.57%, 21.42%, 21.42%, and 21.42% for the oversmoking control subjects.

### Treatment versus Minimal Treatment

The hypotheses that subjects who were in conditions which included a full length treatment programme (the four treatment groups) would reduce smoking more than subjects in a minimal treatment condition, was supported (Figure 5). The planned contrasts were significant at one month,  $F(1,60) = 10.68$ ,  $p < .005$ , two months,  $F(1,60) = 4.56$ ,  $p < .05$ , and three months,  $F(1,60) = 4.1$ ,  $p < .05$ .

Differences in abstinence rates were significant at one month follow-up but not at two and three month follow-ups (see Table 5). Mean rates of abstinence at one month, two months and three months follow-up were 38.4%, 36.52% and 32.68% for the subjects in the treatment conditions and 7.69% at all times for the subjects in the minimal treatment conditions.

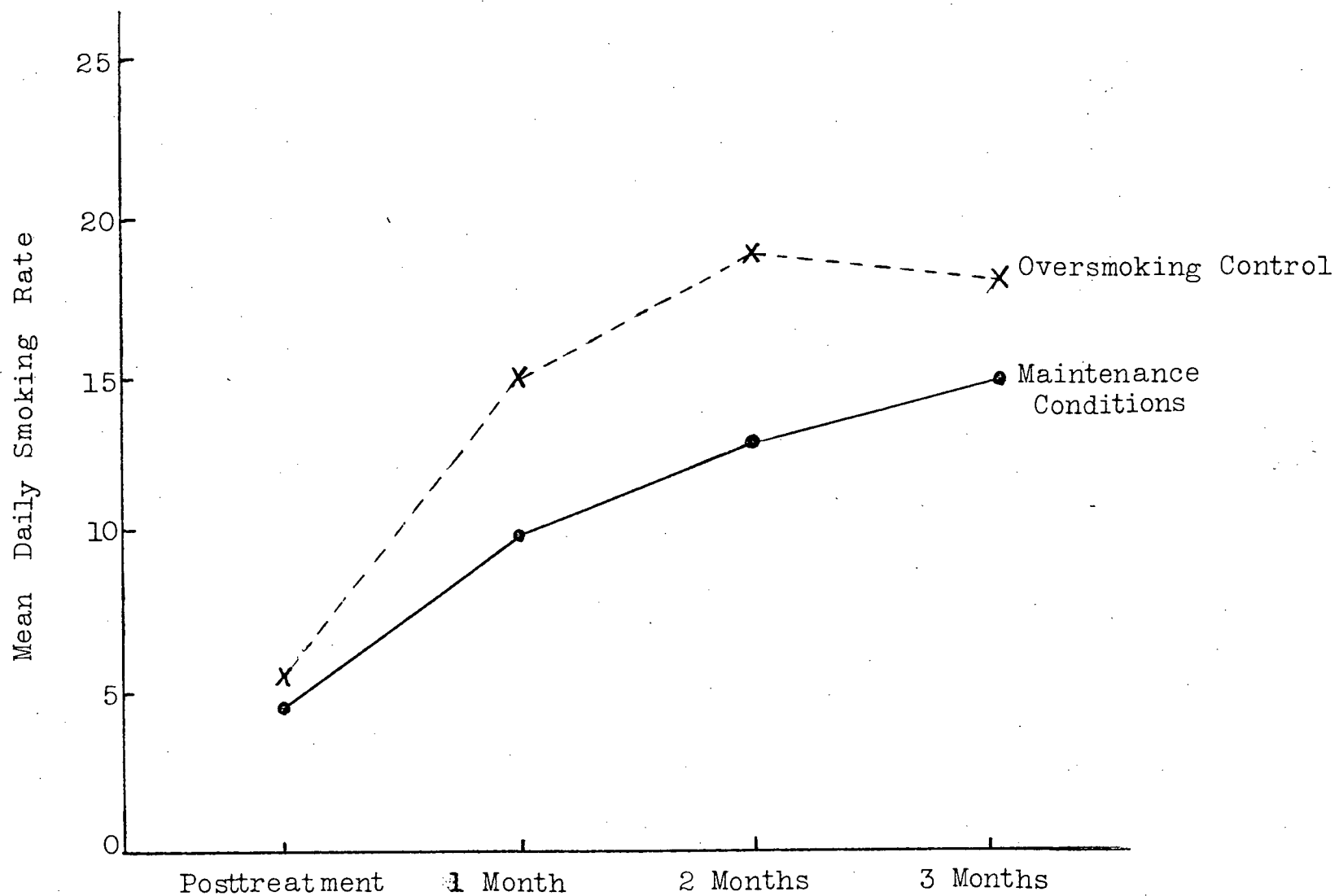


Figure 4. Posttreatment and Follow-up Smoking Rates over Time: Maintenance Conditions versus Oversmoking Control



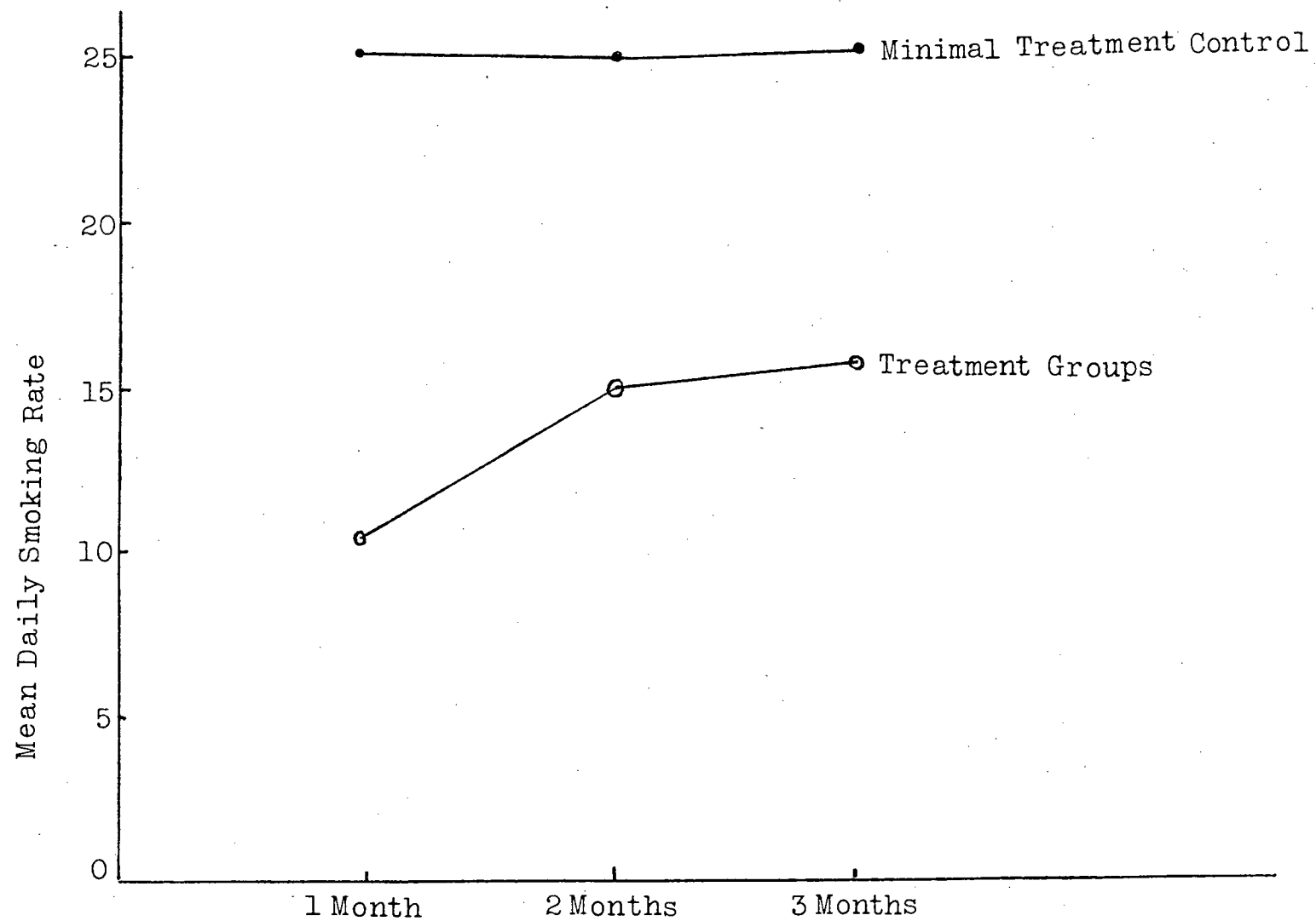


Figure 5. Follow-up Smoking Rates over Time: Treatment versus Minimal Treatment

## Relationship between Treatment Condition and Oversmoking Treatment

### Process Variables

In order to consider whether differences in subjects' behaviour and experience in relation to the core treatment procedures might offer an alternative explanation for differences in outcome, analyses of variance between treatment condition and the following variables were carried out: total sessions attended; mean number of cigarettes per day smoked during treatment; the mean number of cigarettes per day smoked during satiation; the number of cigarettes smoked during satiation as a percentage of operant smoking rate; the mean total of satiation reactions experienced; the mean satiation discomfort; total number of rapid smoking sessions; the mean number of trials per session; the mean number of cigarettes smoked per trial; the mean total rapid smoking reactions experienced and mean rapid smoking discomfort.

Of these variables only the number of cigarettes smoked during treatment was significantly different in the treatment conditions ( $F(3,48) = 3.01, p < .05$ ). Mean smoking rates during treatment for each condition were: combined 1.5 cigarettes (SD = 2.76); cognitive 5.8 cigarettes (SD = 9.6); behavioural 4.7 cigarettes (SD = 4.45) and oversmoking control 10.4 cigarettes (SD = 11.13). Analysis of variance for number of cigarettes smoked during treatment is reported in Appendix C. Means and standard deviations for variables descriptive of the course of treatment are reported in Appendix D.

### Operant Grouping and Treatment Outcome

The National Interagency Council on Smoking and Health Report (1974) has recommended that the collection of data should adhere to the categories used in recent national surveys on smoking habits. We have summarized our treatment sample operant smoking rates (Table 6). Table 7 reports the results of a repeated measures analysis of variance over time for subjects grouped according to operant smoking rates. Operant groupings based on daily smoking rates were: 5-14.9 (n=6); (15-24.9 (n=26); 25-34.9 (n=15) and over 35 (n=5). Differences between groupings were not significant,  $F(3,46) = 1.57$ ,  $p > .10$ .

### Relationship between Individual Differences, Course of Treatment and Treatment Outcome

A large number of scores were available for each subject in addition to the outcome date. These scores fell into four classes:

- A. Demographic, Personality and Motivational -- including age, sex, personality questionnaires, how motivated subjects were to quit, etc.
- B. Smoking Profile -- smoking behaviour before, during and after treatment, reasons for smoking
- C. Description of the course of treatment -- number of conditioning trials, perceived trial severity, number of sessions attended, etc. Means and standard deviations for treatment description variables can be found in Appendix C.

Table 6

Percent Reduction at Three Month Follow-up as a Function of Baseline Rate - Treatment Conditions

Baseline Rate	Percent Baseline at Termination	N	Percent Reduction from Baseline <sup>*</sup>				
			100%	75-99%	50-74%	15-49%	14%
5-14 (light smoker)	2.96 (sd=6.67)	6	66.6	16.7	0	0	16.7
15-24 (moderate smoker)	31.43 (sd=42.08)	26	22.5	3.8	7.6	11.5	53.8
25-34 (heavy smoker)	21.28 (sd=40.99)	15	40	0	0	20	40
35+ (very heavy smoker)	17.46 (sd=29.35)	5	20	0	0	20	60
Total							

\* Percentages shown reflect the proportion of subjects in each category

Table 7  
Repeated Measures Analysis of Variance by Operant  
Grouping Over Time

Source	<u>df</u>	<u>SS</u>	<u>MS</u>	<u>F</u>	<u>p</u>
Operant (A)	3	32649.7	10883.2	1.57	>.10
Subjects (A)	46	319584.8	6847.5		
Time (T)	3	34546.2	11515.5	12.27	<.001
A x T	9	7202.8	800.3	0.85	>.50
Subjects (A x T)	138	129493.0	938.4		

D. Posttreatment questionnaire -- assessing the perceived impact of treatment (Appendix A).

These four categories of scores were correlated with treatment outcome (Appendix C). The correlations were looked at on a post hoc basis for possible relationships that might warrant further investigation.

Both pre-estimated and operant smoking rates were positively correlated with smoking rates on follow-up. The correlations were  $+0.486$ ,  $df = 63$ ,  $p < .001$  at one month;  $+0.600$ ,  $df = 63$ ,  $p < .001$  at two months; and  $+0.526$ ,  $df = 63$ ,  $p < .001$  at three months with pre-estimated smoking rates. The correlations were  $+0.533$ ,  $df = 50$ ,  $p < .001$  at one month;  $+0.574$ ,  $df = 50$ ,  $p < .001$  at two months and  $+0.555$ ,  $df = 50$ ,  $p < .001$  at three months with the operant smoking rate. This suggests that heavier smokers before treatment will smoke more cigarettes after treatment.

The number of cigarettes smoked during treatment is the only process variable which appears to predict outcome. Correlations were significant at posttreatment ( $r = 0.602$ ,  $df = 49$ ,  $p < .005$ ), one month ( $r = 0.5142$ ,  $df = 50$ ,  $p < .001$ ), two months ( $r = 0.4557$ ,  $df = 50$ ,  $p < .001$ ), and three months ( $r = 0.442$ ,  $df = 50$ ,  $p < .001$ ) follow-up.

A number of posttreatment evaluation variables correlate with outcome. There was a negative correlation between the subjects evaluation of discussion of problems and the number of cigarettes smoked. In other words, the less relative value the subject placed on discussion the better his outcome. Correlations were significant at posttreatment ( $r = -0.255$ ,  $df = 49$ ,  $p < .05$ ), one month ( $r = -0.248$ ,  $df = 50$ ,  $p < .05$ )

and two months ( $\underline{r} = -0.2355$ ,  $\underline{df} = 50$ ,  $\underline{p} < .05$ ) but not at three months.

There was also a negative correlation between the subjects evaluation of the importance of relaxation as a therapeutic procedure and outcome. In other words, the less relative importance the subject placed on relaxation the better was his outcome. Correlations were significant at two months ( $\underline{r} = -0.344$ ,  $\underline{df} = 24$ ,  $\underline{p} < .05$ ), and three months ( $\underline{r} = -0.3504$ ,  $\underline{df} = 24$ ,  $\underline{p} < .05$ ).

Subjects' end of treatment evaluation of the difficulty they had in quitting was positively correlated with the number of cigarettes they smoked at posttreatment ( $\underline{r} = 0.398$ ,  $\underline{df} = 49$ ,  $\underline{p} < .005$ ), one month ( $\underline{r} = 0.358$ ,  $\underline{df} = 50$ ,  $\underline{p} < .005$ ), two months ( $\underline{r} = 0.3352$ ,  $\underline{df} = 50$ ,  $\underline{p} < .01$ ), and three months ( $\underline{r} = 0.455$ ,  $\underline{df} = 30$ ,  $\underline{p} < .001$ ).

Finally, the confidence subjects felt about staying off was negatively correlated with the number of cigarettes smoked after treatment. That is, the less confident a subject felt the more cigarettes he smoked. Results were significant at posttreatment ( $\underline{r} = -0.506$ ,  $\underline{df} = 48$ ,  $\underline{p} < .001$ ), one month ( $\underline{r} = -0.505$ ,  $\underline{df} = 49$ ,  $\underline{p} < .001$ ), two months ( $\underline{r} = -0.5205$ ,  $\underline{df} = 49$ ,  $\underline{p} < .001$ ).

In summary, a few smoking profile, process and evaluation variables correlated with outcome. The higher a subject's pretreatment smoking rate and the more he smoked during treatment the more he smoked at follow-up. In evaluating the clinic those subjects who placed higher value on the discussion and relaxation components of treatment had worse outcomes at follow-up than those who did not. Those subjects who reported greater difficulty in quitting and had less confidence in staying off smoked higher rates at follow-up.

## DISCUSSION

The clinic had a substantial impact upon the smoking behaviour of subjects in the treatment conditions. Subjects reduced smoking significantly by 75.5% from 23.3 cigarettes a day pretreatment to 5.71 cigarettes per day at treatment termination. However, by three months follow-up, subjects were smoking at a mean of 62.8% of their pretreatment level or a mean of 17.2 cigarettes per day, a significant increase in smoking rates since treatment termination.

Abstinence was 40.4% posttreatment and 27.7% at three months follow-up. This compared favourably with the average 13% abstinence on follow-up for a sample of representative studies reported by McFall and Hammen (1971). Furthermore by three months follow-up only 31.5% of subjects abstinent at posttreatment had relapsed, compared with the approximately 75% of initial successes that ultimately relapsed reported by Hunt and Bospalec (1974).

Compared with some of the more recent studies using oversmoking our abstinence rates are somewhat poorer. Lichtenstein and his colleagues have reported around 60% abstinence at six months (Lichtenstein *et al.*, 1973; Schmahl *et al.*, 1972). These comparisons are complicated by procedural differences. Lichtenstein's results were obtained in the laboratory whereas ours is essentially a take home procedure. Lichtenstein continued sessions of rapid smoking until subjects had reached a criterion level of abstinence and reported that they felt able to control their urges. We, on the other hand, used a fixed number of sessions. The three month follow-up abstinence rate of 50% of our combined treatment



group is closer to the Oregon results.

The results in this study supported the first two hypotheses, that a more comprehensive maintenance package would be more effective than simple packages and that there would be no difference between the cognitive and behavioural packages. The superiority of the combined treatment is possibly due to its greater comprehensiveness compared with each of the simple packages. The combined package offers (1) equivalent procedures both in the behavioural and cognitive modes, e.g., a subject may choose to relieve his boredom either by doing something exciting or thinking about something exciting; (2) complementary procedures in either the behavioural or the cognitive mode, e.g., a subject may play with worry beads to keep his hands occupied and he may use thought-stopping to control constant ruminations about smoking. The fact that there was no significant difference on follow-up between the three maintenance conditions and the oversmoking control suggests that the results should be interpreted with caution. In addition as only one therapist saw all subjects the possibility of therapist bias cannot be excluded as an alternative explanation for the superior performance of the subjects who received the comprehensive maintenance package.

The status of the oversmoking only condition in this study is ambiguous. To the extent that the subjects in this condition are a control for the maintenance procedures it is equivalent to Bernstein's (1969) "attention-placebo" control group which experiences equivalent

therapist involvement. However, subjects are actively involved in treatment and therefore it is also an experimental condition.

The minimal treatment control group is similar to Bernstein's (1969) "effort control" group who are asked to quit on their own. But our control condition took this one step further. The clinic's programme was described to the clients who were encouraged to implement it. It was thus both an effort and an informational control. The success of the treatment groups compared with this more powerful control group is encouraging in the relative context of this experiment as a whole.

As mentioned before and also apparent from the results of this study, the problem of recidivism had not been solved, despite the recent improved trend. One reason for relapse may be that quitters do not continue to practise their skills of nonsmoking so that the new behaviours may become an established part of the response repertoire, powerful enough to consistently compete with the engrained smoking responses. They forget how to not smoke. It is likely that some clients may relapse because they never adhere to the treatment regimen and therefore never acquire the skills of nonsmoking. It is apparent that overall some treatment strategies are superior to others. However, a subgroup of individuals may be better suited to a different treatment. The clue to this difference may be found in the subjects' compliance with the treatment regimen (Best and Bloch, 1977).

A second reason for recidivism may be due to the fact that relapse is determined by a variety of factors. The scope of this study had not permitted the examination of the wide variety of individual variables

which clients bring with them to treatment. However, research findings on the relationship between demographic, personality and motivational variables and treatment outcome has been equivocal. Studies have found that some demographic variables do predict outcome (e.g., Delarue, 1973; Curtis, Simpson and Cole, 1976; Raw, 1976). But these relationships have often not been found and where they have the effect is typically small. Similarly specific traits have not been shown to consistently contribute to accurate prediction of outcome in smoking research (Best, 1975; Best and Steffy, 1971; Lichtenstein et al., 1973; Marston and McFall, 1971). And again, while a number of studies have found that prediction is enhanced by measuring two variables specific to the smoking habit, motivation to change or expectation of success (e.g., Best, Bloch and Owen, 1977. McFall and Hammen, 1971; Schlegel and Kunetsky, 1976) and pretreatment smoking rate (Best, Bloch and Owen, 1977; Delarue, 1973), a far larger number of studies have failed to find these relationships. A number of researchers have investigated the interaction between client and treatment variables. Clients have benefited from assignment to treatment on the basis of both personality and motivational variables (Best, 1975; Best and Steffy, 1971). Client variables such as "level of commitment" (Hildebrandt and Feldman, 1976), attribution of response control (Conway, 1974) and level of anxiety (Pechacek, 1976) have been suggested to interact with treatment. Again the findings are not consistent, nor are the effects large. This is consistent with the broader literature on individual differences which finds weak relationships between general trait measures and response to specific

circumstances (Bowers, 1973; Mischel, 1968). So while on the one hand we recognize that smoking is determined by a variety of factors, on the other hand the specific controlling variables appear to elude us. This brings us back at least part way to where we started from -- to a consideration of variables in the person's current smoking pattern. We need to investigate more thoroughly variables such as degree of addiction, depth of inhalation, situations in which smoking occurs and the individual's reasons for smoking. We need to explore client variables, pertinent to the current smoking habit, and the ways in which they interact with treatment.

A third contributing cause to recidivism may be found by exploring more carefully the processes of maintenance and change at their interface. There is generally a dearth of process directed research in the area of smoking and as a result there is little upon which to base speculation at this stage. It is possible that maintenance procedures fail when they are combined with an inadequate change procedure. Relapse may occur because the skills of nonsmoking do not have sufficient opportunity to establish themselves. One problem in exploring this question is the conceptual difficulty of separating change from maintenance. Change could be operationalized as the absolute level of change which occurs between pre and post-treatment. The change which is measured should relate not only to change in rate of smoking but also to other relevant variables such as urge intensity, variability of urge and frequency of urge. Given knowledge of these variables we may find a direct relationship between change and the efficacy of maintenance -- maintenance opera-

tionalized as the slope of the relapse curve and relapse not only with respect to smoking rate but also to the parameters of the urge to smoke. We are suggesting that at least part of the mystery of relapse may be unravelled by more careful consideration of what we mean by change and maintenance; by examination of the process variables which are involved in each and by examining the interaction at the interface between quitting smoking and learning the skills of nonsmoking.

A fourth reason for recidivism may be that we have neglected some good maintenance procedures in favour of a self-management orientation. Both contingency management procedures such as the deposit system employed by Elliot and Tighe (1968) and prolonged clinic contact (Pomerlau and Ciccone, 1974) have been associated with effective programmes. However, self-management has a number of intrinsic advantages over approaches which rely on continued clinic involvement. Once acquired nonsmoking skills are universally available to the client; the client is more likely to attribute success to himself; and the superior cost effectiveness of self-management enhances its acceptability for delivery within a health system.

In conclusion, the main contribution of this study lies in the finding that a comprehensive treatment package tailored to the individual's reasons for smoking is more effective than less complex treatment strategies. The value of incorporating cognitive procedures into treatment has been demonstrated. The results support the enthusiasm of certain researchers about the potential role of cognitive procedures in the maintenance of nonsmoking (Berecz, 1974; Danaher, 1976). However, our results suggest that cognitive techniques are effective only

when added to a behavioural programme rather than on their own. It is apparent, however, that more research needs to be directed toward the maintenance of nonsmoking behaviour. Furthermore, researchers must begin to consider the nature of the complex processes and interactions which occur when an individual stops smoking and learns to become a nonsmoker.

## FOOTNOTES

- <sup>1</sup> One subject who had completed treatment was dropped for purposes of data analysis. This subject had been very sporadic in clinic attendance and was unreliable in recording information. Six subjects dropped out after having completed 1-3 sessions. Three of these expressed discouragement with their progress; one was transferred to a different city; one was preparing for examinations and decided that it was the wrong time to quit; one expressed dissatisfaction with the structure of the programme. Three subjects decided not to join the programme for idiosyncratic reasons: one was ideologically opposed to oversmoking; one did not believe that the oversmoking would help and a third preferred not to join the minimal treatment control condition.
- <sup>2</sup> This assignment restriction occurred an average of twice per condition. The range of occurrence across groups was one to three.
- <sup>3</sup> These tables are included because the results of smoking studies have often been reported as a percentage of operant smoking rates rather than as cigarettes per day.
- <sup>4</sup> No posttreatment data were collected for the minimal treatment control as there was no appropriate treatment termination time point for subjects in this condition.

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## APPENDIX A

### Preliminary and Posttreatment Questionnaires, Rating Scales and Consent Forms

## A-1 Background Information Questionnaire

Date: \_\_\_\_\_

1. Name (print) \_\_\_\_\_
2. Address \_\_\_\_\_  
\_\_\_\_\_
3. Do you expect to be at the above address for the next twelve months? \_\_\_\_\_
4. Phone: Home \_\_\_\_\_ Business \_\_\_\_\_
5. Age: \_\_\_\_\_ 6. Sex: \_\_\_\_\_ 7. Marital Status: \_\_\_\_\_
8. How much education have you had? (circle maximum level of schooling)

Elementary	1	2	3	4	5	6	7	8
High School	1	2	3	4	5			
Trade School	1	2	3	4				
Business School	1	2+						
University	1	2	3	4				
Graduate School	1	2	3+					

9. What is your occupation? \_\_\_\_\_
10. How many cigarettes do you smoke daily? \_\_\_\_\_
11. How long have you smoked? \_\_\_\_\_
12. What other kinds of tobacco do you use, if any?  
\_\_\_\_\_
13. What proportion of puffs per cigarette do you usually inhale?  
(circle answer)

1	2	3	4	5
Hardly any	Some	About Half	Most	Almost All

14. How deeply do you inhale? (circle answer)
- |             |      |            |      |             |
|-------------|------|------------|------|-------------|
| 1           | 2    | 3          | 4    | 5           |
| Very Little | Some | Moderately | Alot | Very Deeply |
15. About how many times have you made a fairly serious attempt to quit smoking entirely?  
\_\_\_\_\_  
\_\_\_\_\_

-- 2 --

16. Have you any medical problems, particularly heart or respiratory problems, which may be aggravated by smoking? Please Specify.

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17. Have you any other notable medical problems? Please Specify.

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## A-2 Awareness Engendering Questionnaire

Name: \_\_\_\_\_

Date: \_\_\_\_\_

## SMOKING MOTIVATION QUESTIONNAIRE

People smoke for a variety of reasons. Moreover, a person smokes some cigarettes for one reason and other cigarettes for a different reason. Below you will find descriptions of possible reasons for smoking. Consider them as they apply to your smoking.

1. Sometimes the cigarette acts as a stimulant, that is to make you more alert and attentive when you are performing a task such as driving a car or studying. In this same class you may smoke because you are bored or have nothing better to do.
2. Another reason why one may smoke is because the cigarette acts as a relaxant. You may be anxious or tense or upset and a cigarette would thus act to calm you down; it would help you get control of the situation and yourself.
3. Another reason why people may smoke is because they crave a cigarette. You may smoke a cigarette because you deeply want one. You may feel that your mouth is dry, you can't concentrate, you feel you need nicotine. You are aware of the fact that you are not smoking and you light up a cigarette to remove the discomfort of not smoking.
4. Another reason why people smoke is because it is the socially desirable thing to do. You light-up a cigarette because others are smoking, or someone has offered you a cigarette and you do not wish to refuse. For example, you may be at a party or with someone else and the "suave" thing to do is smoke.
5. Another reason why you may light up a cigarette is because of affect or mood state you are in. You may light up a cigarette to cheer yourself up, or because you're melancholy, or aggravated.
6. Another reason why you may smoke is because of habit. You light-up a cigarette for no particular reason other than the fact you usually smoke a cigarette in this situation. For example, a cigarette may usually accompany a coffee break, or arriving at work, or with a drink. Be sure when you use this reason that the other reasons are not applicable.

- 2 -

7. Another reason why people may smoke is for the purpose of self-rewards. Sometimes you give yourself a cigarette because of a job well done. You deserve some small treat for an accomplishment, so you take a cigarette or a cigarette "break".
8. Finally you may decide that the reason you smoke is for some other reason than what we have covered. For example, you light-up a cigarette because you don't want to eat, or because you have to do something with your hands, etc.

Beside each of these reasons, as summarized below, place an estimate of the number of cigarettes you smoke each day for that reason. Place an estimate (zero is permissible) beside each of the reasons so that when the cigarettes per reason are added up, the sum is equal to your estimate of the average total number of cigarettes smoked daily. If you do use the "other" category, specify the reasons you have in mind.

Estimate the average total number of cigarettes smoked daily.

Relaxant	_____	Stimulant	_____
Affect	_____	Habit	_____
Craving	_____	Reward	_____
Desirability	_____	Other	_____



## SMOKING OCCASIONS QUESTIONNAIRE

People smoke for a variety of reasons in many different situations. One way of describing your smoking pattern is to look at how strong your urge to smoke is in each circumstance. Consider each of the following situations and rate the usual strength of your urge to smoke in that situation. Think of how strong your urge is on the average when you smoke and use that average urge as the basis for your ratings. Circle the strength which most closely describes your ~~urge in each~~ situation.

1. When you are feeling irritated.

no craving	very slight	less than average	average	more than average	very strong	severe
-3	-2	-1	0	1	2	3

2. When you want to avoid doing something or want to put something off for a while.

no craving	very slight	less than average	average	more than average	very strong	severe
-3	-2	-1	0	1	2	3

3. When you want to sit back and enjoy a cigarette.

no craving	very slight	less than average	average	more than average	very strong	severe
-3	-2	-1	0	1	2	3

4. When you want to taste a cigarette.

no craving	very slight	less than average	average	more than average	very strong	severe
-3	-2	-1	0	1	2	3

5. When you feel anxious.

no craving	very slight	less than average	average	more than average	very strong	severe
-3	-2	-1	0	1	2	3

6. When you feel really happy.

no craving	very slight	less than average	average	more than average	very strong	severe
-3	-2	-1	0	1	2	3

- 2 -

7. When you have a dry mouth.

no craving	very slight	less than average	average	more than average	very strong	severe
-3	-2	-1	0	1	2	3

8. When you want something to do with your hands.

no craving	very slight	less than average	average	more than average	very strong	severe
-3	-2	-1	0	1	2	3

9. When you simply become aware of the fact that you are not smoking.

no craving	very slight	less than average	average	more than average	very strong	severe
-3	-2	-1	0	1	2	3

10. When you want to reward yourself for something you've done or tell yourself that you can have a cigarette if you complete some task.

no craving	very slight	less than average	average	more than average	very strong	severe
-3	-2	-1	0	1	2	3

11. When you find a cigarette in your mouth and don't remember having lit it.

no craving	very slight	less than average	average	more than average	very strong	severe
-3	-2	-1	0	1	2	3

12. When you are resting.

no craving	very slight	less than average	average	more than average	very strong	severe
-3	-2	-1	0	1	2	3

13. When you feel depressed.

no craving	very slight	less than average	average	more than average	very strong	severe
-3	-2	-1	0	1	2	3

- 3 -

14. When you want to feel smoke in your lungs.

no craving	very slight	less than average	average	more than average	very strong	severe
-3	-2	-1	0	1	2	3

15. When you want to cheer up.

no craving	very slight	less than average	average	more than average	very strong	severe
-3	-2	-1	0	1	2	3

16. When you take a break from work or some other activity.

no craving	very slight	less than average	average	more than average	very strong	severe
-3	-2	-1	0	1	2	3

17. When you want to feel more mature and sophisticated.

no craving	very slight	less than average	average	more than average	very strong	severe
-3	-2	-1	0	1	2	3

18. When you light up a cigarette to go along with some activity you are doing (for example, while fixing a bicycle, writing a letter, doing housework).

no craving	very slight	less than average	average	more than average	very strong	severe
-3	-2	-1	0	1	2	3

19. When you realize you are lighting a cigarette even though you just put one out.

no craving	very slight	less than average	average	more than average	very strong	severe
-3	-2	-1	0	1	2	3

20. When you feel tense.

no craving	very slight	less than average	average	more than average	very strong	severe
-3	-2	-1	0	1	2	3

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21. When you feel embarrassed.

no craving	very slight	less than average	average	more than average	very strong	severe
-3	-2	-1	0	1	2	3

22. When you realize that you won't be able to smoke for a while.

no craving	very slight	less than average	average	more than average	very strong	severe
-3	-2	-1	0	1	2	3

23. When you are worried.

no craving	very slight	less than average	average	more than average	very strong	severe
-3	-2	-1	0	1	2	3

24. When you are waiting for someone or something.

no craving	very slight	less than average	average	more than average	very strong	severe
-3	-2	-1	0	1	2	3

25. When you feel nervous.

no craving	very slight	less than average	average	more than average	very strong	severe
-3	-2	-1	0	1	2	3

26. When you want to increase your self-confidence.

no craving	very slight	less than average	average	more than average	very strong	severe
-3	-2	-1	0	1	2	3

27. When you feel impatient.

no craving	very slight	less than average	average	more than average	very strong	severe
-3	-2	-1	0	1	2	3

-5-

28. When you are in a situation in which you normally smoke (for example you may smoke before you go to bed, or when you are getting ready to go out).

no craving	very slight	less than average	average	more than average	very strong	severe
-3	-2	-1	0	1	2	3

29. When you want to keep yourself busy.

no craving	very slight	less than average	average	more than average	very strong	severe
-3	-2	-1	0	1	2	3

30. When you feel bored.

no craving	very slight	less than average	average	more than average	very strong	severe
-3	-2	-1	0	1	2	3

31. When you are drinking coffee or tea.

no craving	very slight	less than average	average	more than average	very strong	severe
-3	-2	-1	0	1	2	3

32. When you realize you have run out of cigarettes.

no craving	very slight	less than average	average	more than average	very strong	severe
-3	-2	-1	0	1	2	3

33. When you want to have time to think in a conversation.

no craving	very slight	less than average	average	more than average	very strong	severe
-3	-2	-1	0	1	2	3

34. When you feel uncomfortable.

no craving	very slight	less than average	average	more than average	very strong	severe
-3	-2	-1	0	1	2	3

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35. When you are angry with yourself.

no craving	very slight	less than average	average	more than average	very strong	severe
-3	-2	-1	0	1	2	3

36. When you feel you need more energy.

no craving	very slight	less than average	average	more than average	very strong	severe
-3	-2	-1	0	1	2	3

37. When you want to flick cigarette ashes.

no craving	very slight	less than average	average	more than average	very strong	severe
-3	-2	-1	0	1	2	3

38. When you are feeling hungry.

no craving	very slight	less than average	average	more than average	very strong	severe
-3	-2	-1	0	1	2	3

39. When you want to keep from slowing down.

no craving	very slight	less than average	average	more than average	very strong	severe
-3	-2	-1	0	1	2	3

40. When you want to concentrate.

no craving	very slight	less than average	average	more than average	very strong	severe
-3	-2	-1	0	1	2	3

41. When you want to fill a pause in a conversation.

no craving	very slight	less than average	average	more than average	very strong	severe
-3	-2	-1	0	1	2	3

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42. When you are annoyed with nonsmokers and smoke just to spite them.

no craving	very slight	less than average	average	more than average	very strong	severe
-3	-2	-1	0	1	2	3

43. When you want to relax.

no craving	very slight	less than average	average	more than average	very strong	severe
-3	-2	-1	0	1	2	3

44. When you want to keep slim.

no craving	very slight	less than average	average	more than average	very strong	severe
-3	-2	-1	0	1	2	3

45. When you are trying to pass time.

no craving	very slight	less than average	average	more than average	very strong	severe
-3	-2	-1	0	1	2	3

46. When you feel angry.

no craving	very slight	less than average	average	more than average	very strong	severe
-3	-2	-1	0	1	2	3

47. When you want something in your mouth.

no craving	very slight	less than average	average	more than average	very strong	severe
-3	-2	-1	0	1	2	3

48. When you feel annoyed.

no craving	very slight	less than average	average	more than average	very strong	severe
-3	-2	-1	0	1	2	3

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49. When you want to feel more attractive.

no craving	very slight	less than average	average	more than average	very strong	severe
-3	-2	-1	0	1	2	3

50. When you feel tired.

no craving	very slight	less than average	average	more than average	very strong	severe
-3	-2	-1	0	1	2	3

51. When you are drinking an alcoholic beverage.

no craving	very slight	less than average	average	more than average	very strong	severe
-3	-2	-1	0	1	2	3

52. When you feel frustrated

no craving	very slight	less than average	average	more than average	very strong	severe
-3	-2	-1	0	1	2	3

53. When you want to smell a cigarette burning.

no craving	very slight	less than average	average	more than average	very strong	severe
-3	-2	-1	0	1	2	3

54. When someone offers you a cigarette.

no craving	very slight	less than average	average	more than average	very strong	severe
-3	-2	-1	0	1	2	3

55. When you feel restless.

no craving	very slight	less than average	average	more than average	very strong	severe
-3	-2	-1	0	1	2	3



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56. When you have finished a meal or snack.

no craving	very slight	less than average	average	more than average	very strong	severe
-3	-2	-1	0	1	2	3

57. When you feel upset.

no craving	very slight	less than average	average	more than average	very strong	severe
-3	-2	-1	0	1	2	3

58. When you see others smoking.

no craving	very slight	less than average	average	more than average	very strong	severe
-3	-2	-1	0	1	2	3

59. When you are overly excited.

no craving	very slight	less than average	average	more than average	very strong	severe
-3	-2	-1	0	1	2	3

60. When you are in a situation in which you feel smoking is a part of your self image.

no craving	very slight	less than average	average	more than average	very strong	severe
-3	-2	-1	0	1	2	3

61. When you want to avoid eating sweets.

no craving	very slight	less than average	average	more than average	very strong	severe
-3	-2	-1	0	1	2	3

62. When you feel oversensitive.

no craving	very slight	less than average	average	more than average	very strong	severe
-3	-2	-1	0	1	2	3

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63. When you want to watch a cigarette burning.

no craving	very slight	less than average	average	more than average	very strong	severe
-3	-2	-1	0	1	2	3

# ITEMS ON THE IMAGERY SCALE\*

Instructions: I am going to present you with a number of scenes one at a time. After I've presented a scene to you I'd like you to spend about 20 seconds trying to imagine it as clearly as you can and then to give a rating of how vividly and clearly you were able to imagine that item. Here goes:

1. Think of seeing the sun sinking below the horizon and consider carefully the image which comes to the mind's eye (visual).
2. Think of a group of people drinking at a pub and consider the image which it brings (social).
3. Think of hearing the sound of escaping steam and consider carefully the image which comes to the mind's ear (auditory).
4. Think of your frustration as you struggle to thread cotton through the eye of a needle and consider the image which comes to mind (frustration).
5. Think of feeling the prick of a pin and consider carefully the image which comes to mind (tactile).
6. Think of yourself relaxing after dinner in an easy chair with a coffee in your hand and consider the image it evokes (relaxation).
7. Think of your movements as you run upstairs and consider the image which it evokes (kinaesthetic).
8. Think of your feelings as you come out of your boss's office after he has informed you of a promotion and consider carefully the image it evokes (elation).
9. Think of the taste of an orange and consider carefully the image it brings to mind (gustatory/taste).
10. Think of yourself as you wait on a street corner for someone who is already 15 minutes late and consider carefully the image that comes to mind (anger).
11. Think of the smell of cooking cabbage and consider carefully the image which comes to the mind's nose (olfactory/smell).
12. Think of yourself trying to sit down and study or read from a really boring book and consider the image it evokes (concentration).

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\* Subjects rated the vividness after each image on a 5 point scale.

13. Think of feeling drowsy and consider the image it evokes (orgasmic).
14. Think of yourself waiting up at 2 AM for your child who is 2 hours late and consider the image it evokes (anxiety).

### A-3 Personality Measures

# HEALTH ATTITUDE SCALE

The following questions are about your attitudes to health. Answer each question by putting an "X" in the rating box which best expresses your reactions to the questions.

	Strongly Disagree	Moderately Disagree	Mildly Disagree	Mildly Agree	Moderately Agree	Strongly Agree
1. If I take care of myself, I can avoid illness.						
2. Whenever I get sick it is because of something I've done or not done.						
3. Good health is largely a matter of good fortune.						
4. No matter what I do, if I am going to get sick I will get sick.						
5. Most people do not realize the extent to which their illnesses are controlled by accidental happenings.						
6. I can only do what my doctor tells me to do.						
7. There are so many strange diseases around that you can never know how or when you might pick one up.						
8. When I feel ill, I know it is because I have not been getting the proper exercise or eating right.						
9. People who never get sick are just plain lucky.						
10. People's ill health results from their own carelessness.						
11. I am directly responsible for my health.						

## PERSONAL REACTION INVENTORY

The statements below concern your personal reactions to a number of different situations. No two statements are exactly alike, so consider each statement carefully before answering. It is important that you answer each question as frankly and as honestly as you can. Answer all questions by indicating true or false on the attached answer sheet.

1. I find it hard to imitate the behaviour of other people.
2. My behaviour is usually an expression of my true inner feelings, attitudes and beliefs.
3. At parties and social gatherings, I do not attempt to do or say things that others will like.
4. I can only argue for ideas which I already believe.
5. I can make impromptu speeches even on topics about which I have almost no information.
6. I guess I put on a show to impress or entertain people.
7. When I am uncertain how to act in a social situation, I look to the behavior of others for cues.
8. I would probably make a good actor.
9. I rarely need the advice of my friends to choose movies, books, or music.
10. I sometimes appear to others to be experiencing deeper emotions than I actually am.
11. I laugh more when I watch a comedy with others than when alone.
12. In a group of people I am rarely the centre of attention.
13. In different situations and with different people, I often act like very different persons.
14. I am not particularly good at making other people like me.
15. Even if I am not enjoying myself, I often pretend to be having a good time.
16. I'm not always the person I appear to be.

17. I would not change my opinions (or the way I do things) in order to please someone else or win their favour.
18. I have considered being an entertainer.
19. In order to get along and be liked, I tend to be what people expect me to be rather than anything else.
20. I have never been good at games like charades or improvisational acting.
21. I have trouble changing my behaviour to suit different people and different situations.
22. At a party I let others keep the jokes and stories going.
23. I feel a bit awkward in company and do not show up quite so well as I should.
24. I can look anyone in the eye and tell a lie with a straight face (if for a right end).
25. I may deceive people by being friendly when I really dislike them.



ANSWER SHEET  
PERSONAL REACTION INVENTORY

Name: \_\_\_\_\_  
(please print)

Date: \_\_\_\_\_

- |     |            |             |     |            |             |
|-----|------------|-------------|-----|------------|-------------|
| 1.  | _____ True | _____ False | 20. | _____ True | _____ False |
| 2.  | _____ True | _____ False | 21. | _____ True | _____ False |
| 3.  | _____ True | _____ False | 22. | _____ True | _____ False |
| 4.  | _____ True | _____ False | 23. | _____ True | _____ False |
| 5.  | _____ True | _____ False | 24. | _____ True | _____ False |
| 6.  | _____ True | _____ False | 25. | _____ True | _____ False |
| 7.  | _____ True | _____ False |     |            |             |
| 8.  | _____ True | _____ False |     |            |             |
| 9.  | _____ True | _____ False |     |            |             |
| 10. | _____ True | _____ False |     |            |             |
| 11. | _____ True | _____ False |     |            |             |
| 12. | _____ True | _____ False |     |            |             |
| 13. | _____ True | _____ False |     |            |             |
| 14. | _____ True | _____ False |     |            |             |
| 15. | _____ True | _____ False |     |            |             |
| 16. | _____ True | _____ False |     |            |             |
| 17. | _____ True | _____ False |     |            |             |
| 18. | _____ True | _____ False |     |            |             |
| 19. | _____ True | _____ False |     |            |             |

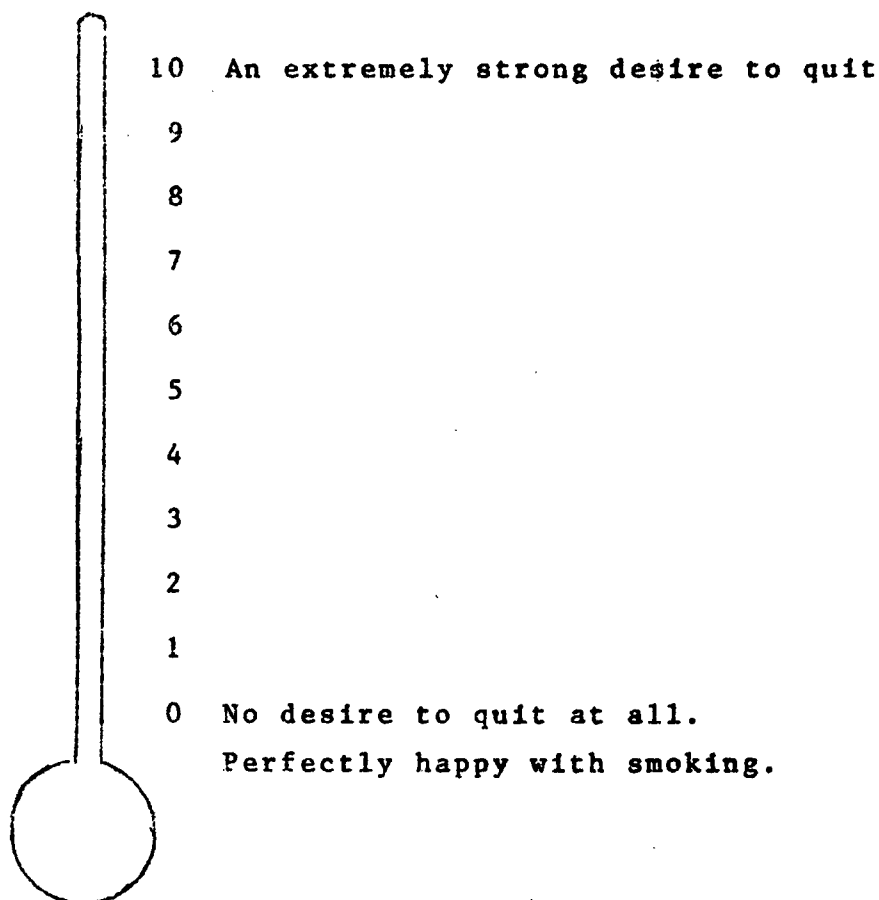
#### A-4 Motivation Thermometers

Name: \_\_\_\_\_

Date: \_\_\_\_\_

## MOTIVATION THERMOMETER

We need an idea of just how strongly you'd like to give up smoking. Would you please indicate on the "motivation thermometer" below how strong you feel your motivation to quit is. Mark the thermometer with a line at the level which your motivation reaches. Make sure you rate your current motivation to quit.



Name: \_\_\_\_\_

Date: \_\_\_\_\_

## DESIRE THERMOMETER

In a similar way, we'd like to know how much you like the idea of smoking. How strong is your desire to smoke in terms of things you like about smoking? When thinking of your desire do not consider physical cravings you may have from time to time. Rather, tell us how much do you like smoking.

10 Very strong love for cigarettes.  
(Want to smoke more than anything else,  
and can't imagine not being able to).

9

8

7

6

5

4

3

2

1

0 Never want a cigarette. No desire at all.

## A-5 Agreements and Approvals

## DATA DEPOSIT AGREEMENT

You and the Smoking Clinic both provide important services to each other. The clinic operates as a public service, helping you quit smoking and guaranteeing support in staying off cigarettes. In return for this service, we ask you to help us with our research. Full co-operation and complete information about you and your smoking are absolutely essential to our research.

Remember too, that the aim of this research is to develop a standard procedure which can be used by other public health professionals. We need to follow that standard procedure with all of you, so again, your co-operation is essential.

People tend to be more conscientious when they have a commitment to a project. We ask all clients to make a commitment to our research by providing a data deposit of \$25.00. The deposit guarantees your active co-operation with the research. It is returned at a three-month follow-up of the clinic if you have:

1. Attended all scheduled sessions.
2. Submitted complete records of your smoking during and after the clinic.
3. Completed and returned all questionnaires related to the research.

Please realize that we must be quite strict in requiring this co-operation -- keeping appointments, completing records, and returning follow-ups. If you can't make this commitment, say so now.

Note that while you of course expect not to be smoking three months after the clinic, if you were, you'd still get your deposit back. The deposit is not tied in any way to your smoking, simply to your co-operation.

Your deposit will be in the form of a cheque, for \$25.00, made payable to the B.C. Tuberculosis Society. The cheque will be returned uncashed at the three-month follow-up, providing you have met all the conditions above. Forfeited deposits will be donated to the B.C. Tuberculosis Society.

I, \_\_\_\_\_, agree to co-operate with the research requirements of the Smoking Clinic. My data deposit of \$25.00 may be forfeited at the Clinic's discretion, and donated to the B.C. Tuberculosis Society, in the event that I fail to attend sessions and/or provide necessary information.

Date: \_\_\_\_\_

Signature \_\_\_\_\_

Research Participation Consent Form

I agree to participate in this research project. The procedures have been described to me and it has been made clear that I can withdraw from participation in the project at any time or decline to undergo a specific procedure. I understand that I may be asked to undergo aversive procedures involving excessive exposure to cigarette smoke. These procedures may involve considerable discomfort including nausea, dizziness, a sore throat and cough, headaches, and lack of energy. More serious side effects are theoretically possible but I understand they have never been documented and the risk appears minimal.

---

(Signature)

---

(Clinic Personnel)

Subject's Name: \_\_\_\_\_

Subject's Number: \_\_\_\_\_

Date: \_\_\_\_\_

Dear Doctor:

\_\_\_\_\_ has applied for our Smoking Clinic, a research/public service programme sponsored by Health and Welfare Canada. The programme employs only validated procedures and, based on our previous evaluations, there is a very good chance we can help your patient stop smoking. One of the stages in the clinic, however, may involve a small degree of risk, and in this regard we have asked that you be consulted and your approval secured.

The most effective means, discovered to date, for helping smokers become abstinent are aversive oversmoking procedures. We use two variations. The first, "satiation", calls for increasing the normal smoking rate significantly, usually to about double, for three days just prior to stopping smoking. The second, "rapid smoking", asks the smoker to smoke rapidly (a drag every six seconds) until he/she can't bear to take another puff. Typically, between two and five cigarettes might be rapid smoked before reaching the tolerance limit. Following a rest, the smoker may repeat the procedure, again until the person's individual tolerance level is reached. Participants in the programme will be trained in the rapid smoking procedure at the clinic and thereafter perform the technique at home, at first once a day and then gradually less frequently. Over the first two weeks of stopping smoking, rapid smoking may occur up to seven times but never more than once a day.

Both procedures have been shown effective in achieving cessation. Our research programme aims to improve success by adding training to help the client cope with problematic occasions for smoking and thus remain abstinent permanently. The research also aims to develop manuals and training programmes so that interested health professionals can offer the service in their practice. The oversmoking procedures have been extensively used over the past five years by us and other researchers. Many hundreds have participated successfully without any known ill effects. On the other hand, oversmoking like normal smoking does lead to considerable nicotine intake which will stress the cardiovascular system. Therefore, we wish to exclude anyone with a history of heart disease, cardiovascular disease, or with diabetes.

About 90% of the nicotine in tobacco is absorbed into the body when smoking. There is an immediate rise in heartbeats per minute and arterial blood pressure. The production of epinephrine and norepinephrine is stimulated as is the production of free fatty acids. These findings on human subjects are summarized in a chapter entitled "Tobacco and the Cardiovascular System" in The Heart, J. Willis Hurst, M.D. (Ed.), McGraw-Hill, 1974. This source also notes that in animals the inhalation of cigarette smoke is followed by a "significant and prolonged reduction of the threshold for ventricular fibrillation". There are no reported episodes of regular smoking or the clinical use of oversmoking producing acute cardiac or vascular symptoms in humans.

We have enclosed a recent article summarizing the research on physiological effects of rapid smoking. In our opinion, the demonstrated benefit of the procedure's use justifies the small degree of risk providing there are no medical considerations which contraindicate oversmoking. We ask that you review your information on the patient, conduct any further examination you may think necessary, and then indicate if your patient ought not participate in oversmoking procedures. If there are medical reasons to rule out oversmoking, our project will still provide a programme to offer what assistance we can. We are trying to develop alternatives to oversmoking procedures but to date research suggests that they remain the most reliable methods



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for stopping smoking. We welcome your interest in our Clinic and hope you will contact us if you have any questions. If you would like an independent medical opinion, contact Dr. Bass at the address given below.

J. Allan Best, Ph.D.  
Assistant Professor  
Director, Smoking Clinic

Medical Consultant: Dr. F. Bass, M.D., D.Sc.  
Consultant in Preventive Medicine  
Vancouver Health Department  
1060 West 8th Avenue  
VANCOUVER, B.C.

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To my knowledge there are no medical contraindications to this patient's undergoing oversmoking procedures.

Date: \_\_\_\_\_, M.D.  
(Signature)

Would you please return the signed consent promptly so that your patient can begin the programme as soon as possible.

Use the enclosed envelope to send the form to:

Smoking Clinic  
Department of Psychology  
University of British Columbia  
VANCOUVER, B.C.  
V6T 1W5

## A-6 Confederate Tallying

Name: \_\_\_\_\_ Date: \_\_\_\_\_

### CONFEDERATE FOR TALLYING

Our research requires that we obtain as complete and accurate a description and record of your smoking as possible. We have found in the past that two heads are better than one and ask that you acquire the help of a close friend or relative to work with you on your tallying record. The two of you will discuss your reasons for smoking and check to make sure that all your cigarettes are accounted for. We will contact your confederate during the course of the clinic to discuss his or her perceptions of your tallying progress over the past period.

Will you please provide us with the following information about your confederate.

Name: \_\_\_\_\_

(please print)

Age: \_\_\_\_\_ Relationship to you: \_\_\_\_\_

Home Address: \_\_\_\_\_

Telephone: Home: \_\_\_\_\_ Business: \_\_\_\_\_

Does your confederate smoke? \_\_\_\_\_

If so, is he or she trying to quit at this time? \_\_\_\_\_

A-7 Posttreatment Forms for the Evaluation  
of Clinic Impact

COMBINED  
TREATMENT EVALUATION

COMBCL

Name: \_\_\_\_\_ Date: \_\_\_\_\_

1. What parts of the clinic did you find most useful? Place a "1" next to the most important part, a "2" next to the second most important, and continue right down to the least important factor. Note that all factors should be rated.

Tallying	_____
Discussing and Analysing Reasons	_____
Satiation	_____
Rapid Smoking	_____
Alternatives to Smoking	_____
Self Statements	_____
Relaxation	_____
Reward Program	_____
Support from Therapist and Group	_____
Other (please specify)	_____

2. How difficult was it for you to quit? (circle one)
- no effort    slight    moderate    difficult    very difficult
3. How confident do you feel that you will be able to stay off cigarettes? (circle one)
- 0%      20%      40%      60%      80%      100%
4. What advice can you give us as to how we might improve our procedures?

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BEHAVIOURAL  
TREATMENT EVALUATION

BEMC2

Name: \_\_\_\_\_ Date: \_\_\_\_\_

1. What parts of the clinic did you find most useful? Place a "1" next to the most important part, a "2" next to the second most important and continue right down to the least important factor. Note that all factors should be rated.

Tallying	_____
Discussing and Analysing Reasons	_____
Satiation	_____
Rapid Smoking	_____
Alternatives to Smoking	_____
Relaxation	_____
Reward Program	_____
Support from Therapist and Group	_____
Other (please specify)	_____

2. How difficult was it for you to quit? (circle one)  
no effort    slight    moderate    difficult    very difficult
3. How confident do you feel that you will be able to stay off cigarettes? (circle one)  
0%    20%    40%    60%    80%    100%
4. What advice can you give us as to how we might improve our procedures?

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COGNITIVE  
TREATMENT EVALUATION

COGC3

Name: \_\_\_\_\_ Date: \_\_\_\_\_

1. What parts of the clinic did you find most useful? Place a "1" next to the most important part, a "2" next to the second most important and continue right down to the least important factor. Note that all factors should be rated.

Tallying	_____
Discussing and Analysing Reasons	_____
Satiation	_____
Rapid Smoking	_____
Alternatives to Smoking	_____
Self Statements	_____
Support from the Therapist and Group	_____
Other (please specify)	_____

2. How difficult was it for you to quit? (circle one)  
no effort      slight      moderate      difficult      very difficult
3. How confident do you feel that you will be able to stay off  
cigarettes? (circle one)  
0%      20%      40%      60%      80%      100%
4. What advice can you give us as to how we might improve our  
procedures?

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## OVERSMOKING

OSCA

## TREATMENT EVALUATION

Name: \_\_\_\_\_

Date: \_\_\_\_\_

1. What parts of the clinic did you find most useful? Place a "1" next to the most important part, a "2" next to the second most important, and continue right down to the least important factor: Note that all factors should be rated.

Tallying	_____
Discussing and Analysing Reasons	_____
Satiation	_____
Rapid Smoking	_____
Support from the Therapist And Group	_____
Other (Please Specify)	_____

2. How difficult was it for you to quit? (circle one)  
no effort      slight      moderate      difficult      very difficult
3. How confident do you feel that you will be able to stay off cigarettes? (circle one)  
0%      20%      40%      60%      80%      100%
4. What advice can you give us as to how we might improve our procedures?

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## APPENDIX B

Handouts and Rating Scales Given to Subjects During  
the Course of the Clinic

B-1 Handouts and Rating Scales Given to All  
Subjects in the Treatment Condition

## TALLY SYSTEM

Throughout the clinic, you are going to be keeping a detailed record of your cigarette smoking in the Tally Book provided. There are three reasons for recording now:

- (a) it is essential that you and we really thoroughly understand your smoking habit,
- (b) tallying makes you more aware of your smoking. You come to know more about your smoking, and as a result, you are in a much better position to start changing the smoking habit, and
- (c) for our research purposes we must have as exhaustive and accurate picture of your smoking as possible. This is why we asked you to nominate a confederate to work with you on this tallying.

Detailed guidelines for tallying follow:

- 1. You should begin recording immediately and continue for the remainder of the clinic.
- 2. For each and every cigarette you smoke, write down the
  - (a) time
  - (b) place: where you are at the moment  
e.g. in living room at home, in the car,  
walking down street, etc.
  - (c) activity: what you are doing at that moment  
e.g. shovelling snow, drinking, studying,  
cleaning house, just finishing a meal, etc.
  - (d) reason: the reason you think you are smoking the cigarette. e.g. to relax, with coffee, because you're bored, your mouth is dry, etc.

For each cigarette please write time, place, and activity on one line, and the reason on the line below.

- 3. Use a separate page(s) for each day writing the day and the date at the top of each page. Count the day as extending from when you wake up until when you wake the following morning. Don't cramp

- 2 -

yourself by trying to get all of one day on a single page but do start a new page every morning. Towards the end of each day, sit down with your confederate and discuss the day's tallying. Write the total number of cigarettes smoked at the top of the page. When you are both confident that the tally is accurate and complete, you should both sign the day's tally at the bottom to signify that the record has been checked.

4. Record the time you open a pack of cigarettes and the time you throw it away. This serves as a check for you on your tallying accuracy. You know you have 20 (or 25) cigarettes to account for in between and if the total isn't right you may be able to figure out where you lost one. It would help to note any cigarettes you either accept from others or give away so that you can get the total to check.

5. It is extremely important that you try to smoke exactly as you normally would if not recording. There is a strong tendency for people to change their smoking habits and pattern when they have to keep a record. We need to understand your normal smoking; it cannot be stressed too strongly that you must try not to let the recording interfere.

6. If you have any questions or if anything about the procedure is unclear, no matter how small a detail, please phone 228-6255.

7. Always bring your tallies to the next session.

8. At the end of this first week, summarize your reasons for smoking on the questionnaire provided and bring the summary to the next session.

## TALLY SUMMARY

Name: \_\_\_\_\_

Date: \_\_\_\_\_

Before your next session make sure you have completed the tally summary for each day of tallying. Total the number of cigarettes you smoked for various reasons each day and enter it under the respective category. Then, first get an overall total by adding up the cigarettes for each day (i.e. add up the totals at the bottom of each column). Second, calculate the overall total again as a check by adding the totals for each different reason (i.e. the totals for different rows). These two numbers should be the same.

<u>Dates</u>							
(month)	_____	_____	_____	_____	_____	_____	_____
<u>Reasons</u>							<u>Totals</u>
Relaxant	_____	_____	_____	_____	_____	_____	_____
Affect	_____	_____	_____	_____	_____	_____	_____
Craving	_____	_____	_____	_____	_____	_____	_____
Desirability	_____	_____	_____	_____	_____	_____	_____
Stimulant	_____	_____	_____	_____	_____	_____	_____
Habit	_____	_____	_____	_____	_____	_____	_____
Reward	_____	_____	_____	_____	_____	_____	_____
Other	_____	_____	_____	_____	_____	_____	_____
Totals	=====	=====	=====	=====	=====	=====	=====

Below you will find descriptions of possible reasons for smoking. Consider them as they apply to your smoking.

1. Sometimes the cigarette acts as a stimulant, that is to make you more alert and attentive when you are performing a task such as driving a car or studying. In this same class you may smoke because you are bored or have nothing better to do.
2. Another reason why one may smoke is because the cigarette acts as a relaxant. You may be anxious or tense or upset and a cigarette would thus act to calm you down; it would help you get control of the situation and yourself.
3. Another reason why people may smoke is because they crave a cigarette. You may smoke a cigarette because you deeply want one. You may feel that your mouth is dry, you can't concentrate and you feel you need nicotine. You are aware of the fact that you are not smoking and you light up a cigarette to remove the discomfort of not smoking.

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4. Another reason why people smoke is because it is the socially desirable thing to do. You light-up a cigarette because others are smoking, or someone has offered you a cigarette and you do not wish to refuse. For example, you may be at a party or with someone else and the "suave" thing to do is smoke.
5. Another reason why you may light up a cigarette is because of affect or mood state you are in. You may light up a cigarette to cheer yourself up, or because you're melancholy, or aggravated.
6. Another reason why you may smoke is because of habit. You light-up a cigarette for no particular reason other than the fact you usually smoke a cigarette in this situation. For example, a cigarette may usually accompany a coffee break, or arriving at work, or with a drink. Be sure when you use this reason that the other reasons are not applicable.
7. Another reason why people may smoke is for the purpose of self-rewards. Sometimes you give yourself a cigarette because of a job well done. You deserve some small treat for an accomplishment so you take a cigarette or a cigarette "break".
8. Finally you may decide that the reason you smoke is for some other reason than what we have covered. For example, you light-up a cigarette because you don't want to eat, or because you have to do something with your hands, etc.

## Satiation

Satiation involves greatly increasing your daily smoking for a brief period of time just prior to quitting. The important points to remember are these:

1. A rough guideline to help you decide how much to smoke when satiating is that most people find they roughly double their normal rate.
2. The real test for whether you are satiating well enough is a check on how you feel. You should be increasing your smoking as much as you possibly can, until you cannot tolerate anymore. Whatever it takes to reach that point is what you must do -- some people increase their smoking as much as 5 times their normal rate. By the end of each day, you should feel that you simply could not smoke another cigarette.
3. Remember that the harder you work at the satiation now, the stronger the conditioning of negative reactions to smoking, and the easier you will find it in the long run.
4. In the evening before each satiation day, sit down and plan your satiation for the following day using an hour by hour quota system. Take the total number of cigarettes you plan to smoke during the day, based on an estimate of double your normal rate. Let us say, for example, that you normally smoke 25 cigarettes per day. You will be trying to smoke 50 cigarettes the first day of satiation. Take that double-normal smoking figure and divide it by the number of hours that you expect to be awake on the first day of satiation. For example, if you expect to be awake 16 hours your smoking quota will require you to smoke just over 3 cigarettes every hour. Now, assign the 50 cigarettes to the different hours of the day counting on about 3 per hour. If there is a period during the day when you cannot smoke as many as 3, take the leftover cigarettes and assign them to the hour immediately preceding and/or following the period in question. For example, if you knew you were going to be in a meeting between 11:00 a.m. and 12:00 a.m. when you would not be able to smoke at all, you might take 2 of the cigarettes and assign

them to the 10:00 - 11:00 quota, bringing it up to 5 and the 1 cigarette to the 12:00 - 1:00 quota, bringing it to a total of 4. As you go through the day smoking these cigarettes, simply put a tick mark in the tally column as you smoke each cigarette.

5. At the end of the first day, total up the cigarettes you actually smoked and put the total in the space on the quota sheet. On it, we have listed all the reactions which people normally report to satiation. Consider each reaction separately, deciding whether you experienced that symptom to some extent. Rate the severity of each symptom on a 5-point scale as described on the rating form. Now, consider carefully whether you should increase your quota for the following day. If you feel you could, then you should as much as you possibly can. Follow the same procedure at the end of day two, increasing your quota if necessary. You may well find that your quota does increase over the 3-day period.
6. Bring your satiation quota sheet and the Symptom Rating Form to the next session so that we have a record of your satiation experience.



## SATIATION QUOTA AND TALLY SYSTEM

Name: \_\_\_\_\_

Date:	DAY 1		DAY 2		DAY 3	
	Quota	Tally	Quota	Tally	Quota	Tally
6:00 - 6:59 a.m.						
7:00 - 7:59 a.m.						
8:00 - 8:59 a.m.						
9:00 - 9:59 a.m.						
10:00 - 10:59 a.m.						
11:00 - 11:59 a.m.						
12:00 - 12:59 p.m.						
1:00 - 1:59 p.m.						
2:00 - 2:59 p.m.						
3:00 - 3:59 p.m.						
4:00 - 4:59 p.m.						
5:00 - 5:59 p.m.						
6:00 - 6:59 p.m.						
7:00 - 7:59 p.m.						
8:00 - 8:59 p.m.						
9:00 - 9:59 p.m.						
10:00 - 10:59 p.m.						
11:00 - 11:59 p.m.						
12:00 - 12:59 a.m.						
1:00 - 1:59 a.m.						
2:00 - 2:59 a.m.						
3:00 - 3:59 a.m.						
TOTAL						

## SYMPTOM RATING SCALE

Name: \_\_\_\_\_

Date: \_\_\_\_\_

Time rapid smoking session began: \_\_\_\_\_

Cigarettes rapid smoked:      Trial 1 \_\_\_\_\_  
   Trial 2 \_\_\_\_\_  
   Trial 3 \_\_\_\_\_

Describe your reactions to this rapid smoking session by circling the appropriate number for each possible symptom.

		Did not Experience	Slight	Moderate	Strong	Severe
_____	1. Nausea	1	2	3	4	5
_____	2. Headache	1	2	3	4	5
_____	3. coughing	1	2	3	4	5
_____	4. bad taste	1	2	3	4	5
_____	5. fuzziness	1	2	3	4	5
_____	6. mouth watering	1	2	3	4	5
_____	7. heart rate increase	1	2	3	4	5
_____	8. raspy breathing	1	2	3	4	5
_____	9. hand tremour	1	2	3	4	5
_____	10. cold	1	2	3	4	5
_____	11. shortness of breath	1	2	3	4	5
_____	12. feeling of sedation	1	2	3	4	5
_____	13. unpleasant smell	1	2	3	4	5
_____	14. sore throat	1	2	3	4	5
_____	15. watering or stinging itchy eyes	1	2	3	4	5
_____	16. nose tingley	1	2	3	4	5
_____	17. weak knees	1	2	3	4	5
_____	18. dry mouth	1	2	3	4	5
_____	19. dizzy	1	2	3	4	5
_____	20. tingling of hands & legs	1	2	3	4	5
_____	21. feeling faint	1	2	3	4	5
_____	22. nose running	1	2	3	4	5
_____	23. tingling or sore lips	1	2	3	4	5
_____	24. hot	1	2	3	4	5

Now, place a "1" just to the left of the symptom which bothered you most, a "2" next to the symptom which bothered you second most, and a "3" next to the third most bothersome symptom.

## PROCEDURE FOR RAPID SMOKING

One of your major tasks over the next couple of weeks is to build up as powerful a set of negative associations to smoking as possible. Rapid smoking is the way to do that. Rapid smoking is of course unpleasant, and because of that, it is hard to push yourself to rapid smoke as much as you should. Remember though, that the harder you can work at rapid smoking now, the easier it will be for you to stay off smoking in the long run.

For the next three days you should rapid smoke once a day. Then rapid smoke every second day; then rapid smoke every third day. If you consider as day one the day of your rapid smoking at the clinic, then you will be rapid smoking once a day on days 1, 2, 3, 5, 7, 10, and 13. You should make a note of your rapid smoking days on a calendar at home.

Each time you rapid smoke, it is important to remember that you should continue every trial for as long as you possibly can, and take as many trials as you possibly can. You should pick a time and place where things are fairly quiet and you will not be disturbed. Then, sit down at a table with a lit candle and follow these steps.

1. Set out on the table as many cigarettes as you expect you will need for the first trial. Leave the package open on the table so you can get more if you need them.
2. Be sure you have some way of pacing your puffs at one every 5 or 6 seconds. A watch or clock with a sweep second hand, on the wall in front of you or on the table, is best.
3. Light your first cigarette and begin taking puffs every 5 or 6 seconds.
4. When you finish a cigarette, light a new one from the candle without pausing and continue to rapid smoke.
5. When you cannot tolerate any more, butt out your cigarette in an ashtray. As you do so, say out loud a phrase which will emphasize for you the unpleasantness of rapid smoking eg. "this cigarette tastes terrible", I don't want to smoke anymore".

- 2 -

Now focus your attention on your strongest reaction to the rapid smoking and try to form a vivid awareness of this symptom and to hold that attention for 10 - 15 seconds. Then focus on the second most noticeable reaction for 10 - 15 seconds, then the third, etc.

6. Make a record of how many cigarettes you smoked, estimating to the nearest  $1/4$  cigarette. Example:  $6\frac{1}{4}$ ,  $4\frac{1}{2}$ , etc.
7. As soon as you feel able, go on with another trial in exactly the same manner as the first. After each trial focus your attention on your reactions, and record the number of cigarettes smoked, and go on to another trial as soon as you are able.
8. When you feel you are unable to go on to another trial, complete the Symptom Rating Scale and then you are done.

## SYMPTOM RATING SCALE

Name: \_\_\_\_\_

Date: \_\_\_\_\_

Time rapid smoking session began: \_\_\_\_\_

Cigarettes rapid smoked: Trial 1 \_\_\_\_\_  
Trial 2 \_\_\_\_\_  
Trial 3 \_\_\_\_\_

Describe your reactions to this rapid smoking session by circling the appropriate number for each possible symptom.

		Did not Experience	Slight	Moderate	Strong	Severe
_____	1. Nausea	1	2	3	4	5
_____	2. Headache	1	2	3	4	5
_____	3. coughing	1	2	3	4	5
_____	4. bad taste	1	2	3	4	5
_____	5. fuzziness	1	2	3	4	5
_____	6. mouth watering	1	2	3	4	5
_____	7. heart rate increase	1	2	3	4	5
_____	8. raspy breathing	1	2	3	4	5
_____	9. hand tremour	1	2	3	4	5
_____	10. cold	1	2	3	4	5
_____	11. shortness of breath	1	2	3	4	5
_____	12. feeling of sedation	1	2	3	4	5
_____	13. unpleasant smell	1	2	3	4	5
_____	14. sore throat	1	2	3	4	5
_____	15. watering or stinging itchy eyes	1	2	3	4	5
_____	16. nose tingley	1	2	3	4	5
_____	17. weak knees	1	2	3	4	5
_____	18. dry mouth	1	2	3	4	5
_____	19. dizzy	1	2	3	4	5
_____	20. tingling of hands & legs	1	2	3	4	5
_____	21. feeling faint	1	2	3	4	5
_____	22. nose running	1	2	3	4	5
_____	23. tingling or sore lips	1	2	3	4	5
_____	24. hot	1	2	3	4	5

Now, place a "1" just to the left of the symptom which bothered you most, a "2" next to the symptom which bothered you second most, and a "3" next to the third most bothersome symptom.

B-2 Handouts for the Subjects in the Combined Condition

## REWARD PROGRAMME

Smoking is often seen by smokers as enjoyable, a real source of pleasure. Even if you have stopped enjoying cigarettes and find the habit distasteful, giving it up can still prove stressful.

It is critical that we do what we can to make not-smoking as satisfying as possible. Learning how to be a nonsmoker requires active effort and you should be rewarded for those efforts.

You can think of not smoking as a set of skills you learn -- making a decision not to have a cigarette, saying no to an offered one and finding alternative ways of coping. People learn better when they are rewarded for doing it right. This is the principle of reinforcement: those things we do which prove successful or give satisfaction, we tend to do again, finding them easier to do the next time around. If not smoking proves stressful, unsatisfying, or unpleasant, it's harder to become a confirmed non-smoker.

This is the reason for a reward programme, to provide reward for not smoking and to strengthen non-smoking skills. It's a very important part of any plan for quitting. In the next session, we'll discuss how you can design a reward programme for yourself. Between now and then, you need to plan some rewards or reinforcers.

A reinforcer is something positive which you can make happen for not smoking. It can be something you give yourself, something you like to do, being with someone whose company you enjoy, or saying something pleasant to yourself or simply imagining something pleasurable. For example, it is likely that at least some of the things in the following list are reinforcing for you.

- going out to dinner
- movies or plays
- a drink before dinner
- a walk after supper
- buying records
- spending money
- reading

- making decisions about how the family will spend the weekend
- telling yourself "well done, I've coped"
- telling yourself "I can be proud of myself"
- sitting alone and imagining anything pleasant
- using your imagination

Reinforcement is a very individual thing. Your reinforcers have to be rewarding for you. During the coming week, think of good reinforcers and write them down. List as many reinforcers as you can, the more the better. We can pick a combination of the best ones until next week. When you are trying to decide on reinforcers to list, ask yourself these questions:

What do you enjoy that you never get enough of?

If you had a whole afternoon free, how would you spend it?  
Who would you spend it with?

What makes you feel good?

What do you really hate doing and wish you could get out of more often?

Are there things you consider luxuries and normally don't allow yourself to buy?

What do you do to get away from it all?

How do you like to spend time alone?

Who do you most like to be with?

What do you do for fun?

What would I like to be able to say to myself that would make me feel good?

What is rewarding just to imagine it?

By now, you may have thought of quite a few reinforcers. A good reinforcer has several important properties. First, as we've said, it's pleasurable for you. The more pleasurable or rewarding, the better. Second, you must be able to count on it when you don't smoke. Going to the movie Friday night with your wife is fine, but only if she's agreed to go. Getting your kids to do the dishes is rewarding, but will only be a good reinforcer if they promise to do them if you don't smoke and stick to their promise. A thousand dollars at the end of each week you don't smoke would be reinforcing, but it's no good if you can't afford it. The third property a good reinforcer has is that it comes fairly soon. A piece of pie after dinner may be a better reinforcer than Christmas in Hawaii because it's more immediate. Having your children tell you at lunch how pleased they are you haven't smoked all morning may be a better reinforcer than a long weekend next month.

So, have fun listing some possible reinforcers and look forward to next week when you'll start getting some of them.

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## RELAXATION

Many people find practising relaxation useful. Learning to relax is crucial in learning to become a nonsmoker.

There are two major reasons why smoking quitters should improve their relaxation skills. Firstly, almost all smokers report that they use cigarettes as a means of relaxation. By learning to relax effectively, you can use this skill as an alternative to cigarettes which you can use to relax.

Secondly, a number of the other skills which you will be practising work better under relaxation.

There are two main components to the approach to relaxation which we present. Firstly, you learn to relax by concentrating on the difference between tension and relaxation in muscle groups and secondly, by using relaxing thoughts which include words such as calm, and tranquil and scenes such as relaxing in a hammock.

Learning to relax involves a certain amount of practise. At first you may feel awkward doing it but fairly soon by pushing yourself beyond the first stages of frustration, you will experience the satisfaction of deep relaxation.

In the beginning the relaxation periods should take about 20 minutes but you will be able to reduce this time until eventually by learning to focus on tense areas of the body or by using some of the relaxing thoughts you have practised, you can relax in as little as 30 seconds. So this can become a very powerful technique which can be used virtually anywhere, anytime.

The following is a summary of the muscle groups you should concentrate on and of the kind of relaxation thoughts demonstrated in the session.

### A. MUSCLE GROUPS

- |                                     |                 |
|-------------------------------------|-----------------|
| 1. Right hand and forearm           | 11. Right thigh |
| 2. Right biceps                     | 12. Right calf  |
| 3. Left hand and forearm            | 13. Right foot  |
| 4. Left biceps                      | 14. Left thigh  |
| 5. Forehead                         | 15. Left calf   |
| 6. Upper cheeks and nose            | 16. Left foot   |
| 7. Lower cheeks and jaw             |                 |
| 8. Neck and throat                  |                 |
| 9. Chest, shoulders, and upper back |                 |
| 10. Stomach region                  |                 |

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You should tense each muscle group for about 7 seconds and then relax. Focus all the time on the difference between tension and relaxation and become familiar with the good feelings of relaxation.

#### B. RELAXATION THOUGHTS

As you relax, think of relaxing words and scenes. You should use words and scenes which you find relaxing. Examples are words such as calm, tranquility, serenity. Scenes may be of any sort which you find relaxing - just lying back, or other more active events such as hiking or jogging. Many people find sexual scenes relaxing while others find playing sports relaxing. It is important to find the thoughts which work for you.

Finally, like learning any skill, the more you practise the quicker and better you will learn it. You should practise relaxation at least once every day and if possible twice.

## URGE MANAGEMENT

Changing how you think about smoking, and strengthening your ability to make the decision to not smoke, are important steps in learning how to remain off cigarettes. You can change "thinking habits" just as you can change actual smoking behaviour. The rule is simple: you systematically follow a thought you want to weaken with negative consequences and systematically follow the thinking you want to strengthen with positive consequences. It works like this:

Each time you get an urge to smoke, you should immediately think about negative consequences of smoking. That will serve to weaken the smoking urge, so that it will be less intense and less of a problem in the future. Then, you make the decision to not have a cigarette. That is a response you want to strengthen, so you should immediately think about the positive benefits of not smoking. So, there are four steps in changing your thinking about smoking. First comes the urge, then the thought of negative associations, then the decision to not smoke, and then finally the thought of some rewards for not smoking.

What you need to do now is to plan good negative and positive thoughts to use. Sit down and draw up two lists, writing down as many possible positive and negative associations to smoking as you can. For example in the negative list might go things like thinking of the reactions you get to oversmoking, picturing yourself with emphysema or lung cancer, fantasizing your children crying themselves to sleep because they worry about your smoking, thinking about how unpleasant smokers' breath is for other people, or about how much you dislike being dependent upon the "weed".

Positive associations might be things like the clean taste you have in your mouth when you don't smoke, the pleasure you get from having licked the habit, how much better able you are to participate in sports, or the money you save towards other things you want to buy.

- 2 -

Both positive and negative associations can be of different kinds. One kind of association to use is a vivid mental picture of how things look, taste, smell, or feel. For example, you might picture yourself climbing stairs, having to stop every second step, weezing, and out of breath. Or, you might imagine yourself eating your favourite food and really tasting how good it is; like you never did when you smoked. Associations can also take the form of saying something to yourself. You may not want to say it out loud, but you can say things to yourself like "smoking is a really disgusting habit" or "good, that's great. I've really got this licked now".

Once you've made a complete list of all the possible positive and negative associations for yourself, you should go through these lists and pick out between five and ten associations, for each positive and negative, which are the strongest or best ones for you. Write these on the Urge Management Association List which you are going to return to the next session. Then start systematically using these positive and negative associations to strengthen your decision to not smoke and to weaken the smoking urge. Each time you do follow the urge with negative associations and follow the decision with positive associations, you will find it is just a little bit easier to not smoke the next time.

Name: \_\_\_\_\_ Date: \_\_\_\_\_

### URGE MANAGEMENT ASSOCIATION LIST

List, in order of how powerful they are for you or how well you think they will work, the positive and negative associations you are using in urge management. Please return this list to the next session.

#### Positive Associations

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#### Negative Associations

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We talked previously about the different kinds of things people say or think to themselves which affect their smoking behaviour or rather which tend to increase the probability of smoking. We called this talking or thinking to yourself "self-statements".

Here are the different kinds of self-statements we talked about, some examples of them and some ideas of what to do with them:

1) Self-statements which define the situation.

Examples: 1) I smoke in the car.  
2) I smoke after dinner.  
3) I smoke at parties.

Ideas: 1) Redefine the situation. Practice saying to yourself that you don't smoke in the car.  
2) Practice saying things to yourself which are about how to cope in the situation. "If I set my mind to it I can do without smoking in the car".  
"The car is a place in which I like to drive, talk, and listen to the radio and that is all."  
3) Use "functional imagery". Imagine yourself - the situation and see yourself coping without smoking. Practice the imagery when you are practicing the relaxation procedure.

2. Self-statements about what will happen if you don't smoke.

Examples: 1) If I don't smoke I can't concentrate.  
2) If I don't smoke the guys won't like me.  
3) If I don't smoke I won't be able to relax.

Ideas: 1) Think about the rationality of which you are saying to yourself. i.e. How reasonable is it to think that it is the cigarette which helps you to concentrate or to be liked by other people.  
2) Think through the consequences of not smoking and see just how bad they are. For example, "so if the guys don't like me that's not the end of the world and in any case if they like me because I smoke well that's not very strong?" Or think about what will happen if you can't concentrate and what the consequences will be.  
3) Where appropriate use functional imagery. Imagine yourself working and concentrating without a cigarette or relaxing and coping with a situation you find tense. Again, practice the imagery when you are practicing the relaxation procedures.

- 4) Practice saying things to yourself which are about coping and remind you of the irrationality of your previous self-statements. For example, by using the relaxation procedures I can manage to relax and in any case if I'm tense on occasion without a cigarette so what.

3. Self-statements about what will happen if you do smoke.

- Examples:
- 1) If I smoke I will look sexy.
  - 2) If I smoke I will be able to control my hands.
  - 3) If I smoke I won't be lonely.

Ideas: These are similar to (2) above and the same ideas apply.

- 1) Think about how rational, how much sense the self-statements make.
- 2) Think about their consequences through.
- 3) Use functional imagery.
- 4) Using coping self-statements.

4. Self-statements about your self-control.

- Examples:
- 1) I can't quit because I've got no willpower.
  - 2) I lack discipline in my smoking.
  - 3) I failed quitting last time and am likely to do the same this time.

- Ideas:
- 1) Think positively. Thinking optimistically about your chances of success in your present efforts directly increases your chances of success. While thinking pessimistically has the opposite affect.
  - 2) Use 'functional imagery' and imagine yourself as a successful non-smoker.
  - 3) Thought stopping -- stop the self-defeating thoughts by shouting "stop" to yourself and then replacing the stopped thoughts with optimistic thoughts.

Finally, remember that what you are trying to do is replace your habitual negative self-statements with new positive ones. To do so means practicing the new ones so that they can be in the forefront. If you want to control your own thoughts it does require practicing the new thoughts: a good time to do so is when you are practicing relaxation.

B-3 Handouts for Subjects in the Cognitive Only Condition

(Subjects in this condition also received "Self-Statements"

cf B-2)



## REWARD PROGRAMME

Smoking is often seen by smokers as enjoyable, a real source of pleasure. Even if you have stopped enjoying cigarettes and find the habit distasteful, giving it up can still prove stressful.

It is critical that we do what we can to make not-smoking as satisfying as possible. Learning how to be a nonsmoker requires active effort and you should be rewarded for those efforts.

You can think of not smoking as a set of skills you learn -- making a decision not to have a cigarette, saying no to an offered one, and finding alternative ways of coping. People learn better when they are rewarded for doing it right. This is the principle of reinforcement: those things we do which prove successful or give satisfaction, we tend to do again, finding them easier to do the next time around. If not smoking proves stressful, unsatisfying, or unpleasant, it's harder to become a confirmed non-smoker.

This is the reason for a reward programme, to provide reward for not smoking and to strengthen non-smoking skills. It's a very important part of any plan for quitting. In the next session, we'll discuss how you can design a reward programme for yourself. Between now and then, you need to plan some rewards or reinforcers.

In our programme we are going to use imaginal scenes and self-statements as reinforcers. By using that kind of reinforcer you are increasing the range of reinforcers available to you as your imagination may take you anywhere and you may say what you choose to yourself. Also, you are increasing the portability of your reinforcers -- they can be used anywhere, anytime.

A reinforcer is anything positive you can imagine or say to yourself for not smoking. You may imagine any scene which gives you pleasure, it can be pure fantasy or else you may imagine yourself doing something you enjoy doing, seeing someone special, being close to someone special, being in a foreign country, eating a gourmet meal, conducting the Vancouver Symphony Orchestra, or being elected Prime Minister of Canada, winner of a lottery, or heir to the Rothschild fortunes by some distant family link. You may say reinforcing things to yourself like reminding yourself of your positive qualities, or your family's qualities, or how effective your coping behavior has been and praise yourself for your good behaviour.

Reinforcement is a very individual thing. Your reinforcers have to be rewarding for you. During the coming week think of good reinforcers and write them down. We can pick a combination of the best ones next week.

- 2 -

As you consider some reinforcers, remember a good reinforcer has several important qualities. First, it must be pleasurable for you. Secondly, you should be able to count on it when you want it (an advantage of imaginal reinforcers) and thirdly, it should occur close in time to the behaviour which is being rewarded.

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### RELAXATION

Many people find learning to relax beneficial and as part of a quit smoking program it has been found to be crucial if you are to succeed. Given the stresses and strains - the pace of modern life it is not surprising that most smokers report that they smoke at least some of their cigarettes to relax. Furthermore, it is often under tension that it is most difficult to resist the urge to make.

Another thing that we have found is that many of the other strategies which we will suggest to you work better when you are relaxed. A relaxed mind is far freer to use its imagined power and to exert control over thought processes.

So far at least, two major reasons it is important that you learn to relax:

- 1) because the skill of relaxation can be used as an alternative to the cigarette, you would otherwise have had to relax and
- 2) because a relaxed person is generally able to use and control his mental processes better.

Learning to relax, like learning any other skill, may at first feel awkward but if you see the first stages of frustration through, you will soon feel the benefits of good relaxation. At first a practise session should take 15 - 20 minutes but soon you will be able to reduce that time and eventually you will be able to relax in as little as 30 seconds. So you see this technique can become very powerful and can be used almost anywhere, anytime.

As you become more skilled, you should practise saying a relaxing word or imagining a relaxing scene and simply the association will serve as a stimulus to relaxation. Of course like any skill, the more you practise the better you will become. You should practise at least once a day and if possible twice.

The following is a summary of the things you should be using:

- a) Make yourself as comfortable as possible
- b) Relax and let go
- c) Use relaxing imagery eg. living on the beach and tanning; or sexual imagery which many people find effective; or any other imagery which you find relaxing.
- d) Coping statements - as you feel relaxed say things to yourself which are relaxing such as that you can cope with all situations (name them) and that nothing is so important etc.

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- e) Say relaxing words to yourself such as calm, tranquility, peace, serenity
- f) Focus your attention on an image and relax - it is the counting sheep phenomenon.

You can use anything, eg. changing numbers on a blackboard i.e. first use the "1" then the "2" and so on.

In all then, it is important to be aware all the time of the deeper relaxation and become familiar with the feelings.

#### B-4 Handouts for Subjects in the Behavioural Only Condition

## REWARD PROGRAMME

Smoking is often seen by smokers as enjoyable, a real source of pleasure. Even if you have stopped enjoying cigarettes and find the habit distasteful, giving it up can still prove stressful.

It is critical that we do what we can to make not-smoking as satisfying as possible. Learning how to be a nonsmoker requires active effort and you should be rewarded for those efforts.

You can think of not smoking as a set of skills you learn -- making a decision not to have a cigarette, saying no to an offered one, and finding alternative ways of coping. People learn better when they are rewarded for doing it right. This is the principle of reinforcement: those things we do which prove successful or give satisfaction, we tend to do again, finding them easier to do the next time around. If not smoking proves stressful, unsatisfying, or unpleasant, it's harder to become a confirmed non-smoker.

This is the reason for a reward programme, to provide reward for not smoking and to strengthen non-smoking skills. It's a very important part of any plan for quitting. In the next session, we'll discuss how you can design a reward programme for yourself. Between now and then, you need to plan some rewards or reinforcers.

In our programme we are going to use imaginal scenes and self-statements as reinforcers. By using that kind of reinforcer you are increasing the range of reinforcers available to you as your imagination may take you anywhere and you may say what you choose to yourself. Also, you are increasing the portability of your reinforcers -- they can be used anywhere, anytime.

A reinforcer is anything positive you can imagine or say to yourself for not smoking. You may imagine any scene which gives you pleasure, it can be pure fantasy or else you may imagine yourself doing something you enjoy doing, seeing someone special, being close to someone special, being in a foreign country, eating a gourmet meal, conducting the Vancouver Symphony Orchestra, or being elected Prime Minister of Canada, winner of a lottery, or heir to the Rothschild fortunes by some distant family link. You may say reinforcing things to yourself like reminding yourself of your positive qualities, or your family's qualities, or how effective your coping behavior has been and praise yourself for your good behaviour.

Reinforcement is a very individual thing. Your reinforcers have to be rewarding for you. During the coming week think of good reinforcers and write them down. We can pick a combination of the best ones next week.

- 2 -

As you consider some reinforcers, remember a good reinforcer has several important qualities. First, it must be pleasurable for you. Secondly, you should be able to count on it when you want it (an advantage of imaginal reinforcers) and thirdly, it should occur close in time to the behaviour which is being rewarded.

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### RELAXATION

It is not surprising, considering the stresses and strains of everyday life that most smokers report that they smoke at least some of their cigarettes to relax. Furthermore, it is often under tension that the smoker finds it most difficult to muster the courage to say "no". Many people find learning to relax beneficial and as part of a quit smoking program, it has been found to be crucial if you are to succeed.

Learning to relax like learning any other skill requires practise. It is like learning to ski, or to ride a bicycle. At first it feels awkward and clumsy but eventually it, with practise, comes. And of course, the people who practise most learn it quickest. Anyway, pretty soon you will feel the beneficial effects of the relaxation program.

Our approach uses deep muscular relaxation. We emphasize the following components in learning the skill.

- 1) concentrate on the difference between the feelings of tension and feelings of relaxation in the muscle groups
- 2) pay attention to your breathing. Set your breathing, set the beat for your total rhythm. By controlling your breathing, you can control your relaxation.

You should practise as often as possible. At least once a day and if possible twice. At first a relaxation session should take you about 20 minutes but with practise you can learn to eventually concentrate on the tense areas of your body and relax them in as little as 30 seconds. So it can become a very powerful technique to be used anywhere, anytime.

The following are the muscle groups you should concentrate on and in that order. You should tense the muscles, hold it for about 7 seconds and then relax. You may want to do each group twice before going on to the next. But that is not essential.

#### MUSCLE GROUPS

Right hand and forearm	Chest, shoulders and upper back
Dominant biceps	Abdominal or stomach region
Nondominant hand and forearm	Right thigh
Nondominant biceps	Right calf
Forehead	Right foot
Upper cheeks and nose	Left thigh
Lower cheeks and jaws	Left calf
Neck and throat	Left foot

If at the end of session you find certain muscle groups to be tense then go back to them and practise further on relaxing them.



APPENDIX C  
Data Analyses

Table C-1

Analysis of Variance for Pre-estimated Smoking Rates -

All Conditions

Source	<u>df</u>	<u>SS</u>	<u>MS</u>	<u>F</u>	<u>p</u>
All Conditions	4	60.383	15.096	0.128	>.75
Subjects	60	7067.03	117.78		

Table C-2

Analysis of Variance for Recorded Operant Smoking Rates -  
Four Treatment Conditions

Source	<u>df</u>	<u>SS</u>	<u>MS</u>	<u>p</u>
Treatment Conditions	3	62.47	20.82	>.75
Subjects	48	3980.05	82.92	

Table C-3

Repeated Measures Analysis of Variance on Posttreatment and Follow-up  
Smoking Rates as Percentage Preestimated Over Time - All Conditions

Source	<u>df</u>	<u>SS</u>	<u>MS</u>	<u>F</u>	<u>p</u>
All Conditions (A)	4	76466.56	19116.64	4.89	<.005
Subjects (A)	60	234315.5	3905.26		
Time (T)	2	3135.79	1567.9	4.05	<.05
A x T	8	2264.42	283.05	0.73	>.50
Subjects (T)	120	46446.37	387.05		

Table C-4

Repeated Measures Analysis of Variance on Posttreatment and  
 Follow-up Smoking Rates as Percentage Operant  
 Over Time - Four Treatment Conditions

Source	<u>df</u>	<u>SS</u>	<u>MS</u>	<u>F</u>	<u>p</u>
Treatment Conditions (A)	3	50244.81	1674.83	2.63	>.05
Subjects (A)	47	299127.06	6354.4		
Time (T)	3	43717.41	14752.47	15.96	<.001
A x T	9	8153.3	905.92		>.25
Subjects (A x T)	141	128741.63	913.06		

Table C-5

## Pearson Product-Moment Correlations for Posttreatment

## Smoking Behaviour for Individual, Treatment

## Process and Evaluation Variables

	Posttreatment	1 month	2 months	3 months
<u>Demographic</u>				
Age	-0.2921 <sup>*</sup>	0.0537	0.0303	0.0436
Sex	-0.0524	-0.0234	-0.0093	0.1533
Education	-0.0942	-0.0055	-0.0124	-0.0292
Occupation	0.1077	0.0324	0.0834	0.0308
<u>Motivation</u>				
Motivation Thermometer	-0.2358 <sup>*</sup>	-0.0372	-0.1713	-0.1225
Desire Thermometer	0.0081	0.1724	0.0763	0.1044
<u>Personality</u>				
HLOC	0.1145 <sup>**</sup>	0.0576 <sup>*</sup>	-0.0199	0.0769
Self-Monitoring (PRI)	0.3406 <sup>**</sup>	0.2374 <sup>*</sup>	0.1387	0.0512
<u>Smoking History</u>				
How Long	-0.2051	0.0153 <sup>***</sup>	-0.0160 <sup>***</sup>	-0.0042 <sup>***</sup>
Pre-estimated Rate	0.0707	0.4864 <sup>***</sup>	0.5996 <sup>***</sup>	0.5264 <sup>***</sup>
Proportion Inhaled	0.0674	0.1371	0.1956	0.1996
Depth Inhaled	0.1456 <sup>*</sup>	0.0515 <sup>*</sup>	0.1154	0.0863 <sup>*</sup>
No. Quit Attempts	-0.2655 <sup>*</sup>	-0.2137 <sup>***</sup>	-0.1637 <sup>***</sup>	-0.3181 <sup>***</sup>
Operant	0.0862	0.5326 <sup>***</sup>	0.5739 <sup>***</sup>	0.5549 <sup>***</sup>
<u>Reasons for Smoking</u>				
Relaxation	-0.0153	-0.0712	-0.1280	-0.1359
Affect	0.0896	0.0326	0.0057 <sup>*</sup>	-0.0137
Craving	0.0107	-0.0683	-0.2371 <sup>*</sup>	-0.0869
Desirability	-0.1479	-0.1102	-0.0652	-0.0109
Stimulant	0.0894	0.0358	-0.0738 <sup>*</sup>	-0.1166
Habit	-0.0394	0.1205	0.2862 <sup>*</sup>	0.1274
Reward	0.0992	-0.0184	-0.0273	-0.0212
<u>Core Process Variables</u>				
Sessions Attended	-0.0697 <sup>***</sup>	0.1014 <sup>***</sup>	0.1256 <sup>***</sup>	0.0910 <sup>***</sup>
No Cigs. in Treatment	0.6028 <sup>***</sup>	0.5142 <sup>***</sup>	0.4557 <sup>***</sup>	0.4420 <sup>***</sup>

... continued

Table C-5 continued

	Posttreatment	1 month	2 months	3 months
Mean/Satiation	0.2218	0.0663	0.2987*	0.2251
Satiation as \$ Operant	0.0071	-0.0466	0.0135	-0.0730
Satiation Reactions	-0.1680	-0.0154	0.0791	-0.0158
Satiation Discomfort	0.0467	-0.0965	-0.1375	-0.1812
Total Rapid Smoking Sessions	0.2706*	-0.2336	-0.2236	-0.1355
Mean Trials per Session	0.1018	0.1201	0.1707	0.2344
Mean cigs/trial	-0.0182	-0.0327	0.1770	0.0680
Mean RS Reactions	0.0678	-0.0456	0.0682	-0.1195
RS Discomfort	0.0844	0.0090	0.0879	-0.0697
<u>Posttreatment Evaluation</u>				
Tallying	-0.1547*	-0.1589*	-0.1565*	-0.0968
Discussion	-0.2550	-0.2497	-0.2355*	-0.1196
Satiation	0.0574	0.1659	0.1540	0.1538
Rapid Smoking	0.0399	-0.0817	-0.0457	-0.1140
Alternatives	0.1789	0.0104	-0.0479	-0.0911
Self-Statements	0.0678	0.0462	-0.0899*	-0.1628*
Relaxation	0.1966	-0.2228	-0.3442	-0.3504*
Reward Programme	0.0390	0.0539	0.0819	0.1078
Therapist	-0.0625**	-0.0062**	-0.0817*	0.0542***
Difficulty	0.3978***	0.3582***	0.3352***	0.4550***
Confident	-0.5867	-0.5054	-0.4324	-0.5205

\*  
p < .05

\*\*  
p < .01

\*\*\*  
p < .001

## APPENDIX D

Means and Standard Deviations for Variables Descriptive  
of the Course of Treatment



Table D  
Means and Standard Deviations for Variables Descriptive  
of the Course of Treatment

	$\bar{X}$	SD
Total number of sessions attended	4.77	0.43
Average number of cigarettes per day	3.95	5.81
Average number of cigarettes per satiation day	43.19	15.18
Satiation as percentage operant	202.14	49.80
Mean total satiation reactions	21.00	27.02
Mean rating satiation discomfort*	1.82	1.54
Total rapid smoking sessions	5.85	1.38
Mean trials per session	1.97	0.65
Mean cigarettes per trial	1.97	0.93
Mean total rapid smoking reactions	15.64	4.15
Mean rating rapid smoking discomfort*	2.24	0.70

\* 5 point scale