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AN EXPERIMENTAL INVESTIGATION OF THE
SELF-MANAGEMENT THERAPIES; COVERANT CONTROL
AND COVERT SENSITIZATION

Steven Arthur Saunders

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ABSTRACT

The relative efficacies of the SM techniques of Coverant Control (CC) and Covert Sensitization (CS), when applied singly and in combination, are investigated. Rate of cigarette smoking is the dependent variable.

From an initial sample of 61 volunteers, smokers wishing to quit, 55 subjects (S's) maintained contact and comprised the study group. Eleven S's formed a non-treated control condition while the remaining 44 were distributed equally across 4 experimental conditions. These groups included a Placebo condition, CC, CS and CS + CC combined.

It was hypothesised that CS and CC would prove more effective than a Placebo condition which involved contact only. It was further hypothesised that CS + CC, administered as a combined package, would prove more effective in maintaining in-treatment gains at follow-up than when either of these treatments was administered singly.

The statistical analyses indicated no significant differences between the experimental groups receiving regular contact. All groups, except the non-treated controls, did reduce cigarette consumption while the programme lasted. However, on follow-up there was an almost uniform return toward baseline rates, with the SM treatment S's not differing from those in the Placebo group.

These data are discussed in terms of possible implications for the development of SM techniques that are clinically useful with cigarette smokers.

INTRODUCTION

1. Self-management: A Definition

In recent years treatment systems involving elements of self-management have gained increasing use (Bandura, 1969, 1971; Glynn, 1970; Glynn, Thomas and Shee, 1973; Goldiamond, 1965; Goldfried, 1972; Mahoney, 1971; Watson and Tharp, 1972).

The term self-management (SM) is taken to refer to any case of self-regulated behaviour change (Mahoney, 1972). Cautela (1969,p324) defined SM as 'a response of an organism made to control the probability of another response'.

In SM the patient plays an active role in both the collection of data and in the arrangement of optimal conditions for the change process (Kanfer, 1970a). Thus, SM systems differ markedly from those systems in which there is an exclusive reliance on externally observable and measurable data and which rely on the external control of environmental contingencies (Skinner, 1953). Token economies (Ayllon and Azrin, 1968) may be construed of as examples of the latter. While the efficacy of these externally operated systems has been established (O'Leary and Becker, 1967; Kazdin and Bootzin, 1972), the methodological requirements are such that these systems are commonly applied, but are limited to the change of observable target behaviours within institutional settings (nurseries, schools, hospitals etc) where external treatment agents (staff, teachers, parents etc) are readily and continuously available. SM systems, because they involve active patient participation in both the delineation of the behaviour to be changed and the treat-

ment process itself, are not restricted by the above conditions and, therefore, are potentially applicable to a wider range of clinical problems, including those in which continuous therapist involvement is neither feasible nor desirable (Kanfer, 1970a).

SM systems may often involve the presumed manipulation of covert or unobservable responses (Cautela, 1966, 1967, 1970; Homme, 1965, 1966; Johnson, 1971). Homme (1965) coined the term 'coverant' to describe these responses (e.g. thoughts, images etc.) and held that coverants obeyed the same laws as their overt counterparts. Kanfer (1971) has postulated that either covert or overt variables could control behaviour and that these different sources of control could exist interdependently. However, 'response status' of the covert variables has not been clearly established within SM. At best, these responses can be inferentially assumed to exist on the basis of overt behavioural measures.

Two conditions separate the aforementioned covert variables or coverants from traditional 'dynamic' covert variables. Firstly, the individual must be able to detect the occurrence or non-occurrence of the coverant (Homme, 1966). Secondly, an observing individual need only make a one-step direct inference from a person's overt behaviour to his covert response (Mahoney, 1970). 'Unconscious' processes are not considered important. Thirdly, within SM, covert responses are treated similarly to overt responses in the change process. Attempts are made to specify and objectify these covert processes in scientifically meaningful terms (cf Goldfried and Merbaum, 1973).

Therefore, the present definition of a covert response is clearly distinguishable from a 'dynamic' interpretation in which the existence of independent intrapsychic entities is assumed, and in which the need for interpretation of observable responses through multi-step inferential processes is emphasised (Mischel, 1968).

2. Methodological Problems Inherent in SM Systems

There are several special methodological problems posed by SM systems which deserve mention. These methodological problems as they relate to the present study are dealt with in greater detail in the 'discussion'.

Even when the end product of SM is observable by an experimenter one must rely on self-report data regarding the consistency and quality of self-imposed techniques. In these instances the overt response provides, at best, an indirect index of treatment effectiveness (Mahoney, 1972). Often, however, as with smoking research, it is well-nigh impossible for the experimenter to reliably check self-report data. Even where informants are used the possibility of collusion cannot be ruled out. The subject's SM efforts themselves are frequently dependent on clear imagery, instruction-following and often involve 'homework assignments'. However, these aspects of the SM process often cannot be reliably checked.

A second difficulty has to do with the problem of separating the effects of having the individual both attending to and regulating his own behaviour; attending alone may produce change (McFall, 1970; Simkins, 1971 a).

Thirdly, the subjects are unlikely to be naive. Mahoney (1972) notes, "... to prescribe a particular SM

technique for an individual is tantamount to asking for a given behaviour change" (p 58). Thus, in SM research the experimenter must account for subject expectancies and the demand characteristics engendered by these systems. While there are methodological problems in SM research it would appear that the obvious practical advantages of establishing behaviour control through SM far outweigh these obstacles. Some preliminary research to date (Mahoney, 1972; Thoreson and Mahoney, 1973) has indicated that many of the problems in SM research are surmountable. It is perhaps because of these methodological snags that research and development of SM techniques is somewhat piecemeal and radically incomplete (cf. Mahoney, 1972). In particular, research into the relative efficacy of the different SM techniques which have already been developed is lacking.

It is the purpose of the present research to examine the relative efficacy of two SM techniques, covert sensitization and covert control, with rate of cigarette smoking as the dependent variable.

Following a brief overview of the outcome studies involving SM, the SM techniques of interest and the target behaviour are discussed in detail.

3. Efficacy of SM Systems

Not all SM systems rely on the manipulation of covert events. Those SM studies in which the subject has participated in the self-determination of externally administered consequences for observable target behaviours (e.g. simple mechanical performance (Bandura and Perloff, 1967; Johnson, 1970), on-task behaviour in classrooms (Glynn, 1970; Glynn, Thomas and Shee, 1973), and

academic response rate. (Lovitt and Curtis, 1969)), have indicated the SM strategy to be about as efficacious as other externally imposed systems (Mahoney, 1972).

The concern here is, however, with those SM systems which employ covert responses. In these SM systems the covert responses may be target behaviours in themselves or they may function as symbolic consequences (Mahoney, 1972). These covert SM systems have been less intensively researched than their overt counterparts. However, some promising indications have resulted from the experimental and clinical applications of two therapeutic methods which rely on SM of covert responses.

The first of these, covert control (Homme, 1965, 1966), has been assessed with reference to both overt and covert target behaviours (Horan, 1971; Jackson, 1972; Keutzer, 1968; Lawson and May, 1970; Mahoney, 1971; Rutner, 1967; Tyler and Straughan, 1970; Tooley and Pratt, 1967). Because of methodological problems definitive conclusions have been difficult to reach (Mahoney, 1972).

The second treatment package, covert sensitization, has been developed largely through the work of Cautela (1966, 1967) and normally employs covert responses as symbolic consequences in a manner analogous to systematic desensitization (Wolpe, 1969). Covert sensitization has been used extensively as a counter-conditioning method in the treatment of behavioural excesses such as inappropriate sexual behaviours (Barlow, Leitenberg and Agras, 1969; Davison, 1968; Rutner, 1970; Saunders, 1972; Segal and Sims, 1972), alcoholism (Anant, 1967; Ashem and Donner, 1968), obesity (Cautela, 1967; Janda and

Rimm, 1972; Maletzky, 1973; Stuart, 1967), and smoking (Lawson and May, 1970; Sachs, Bean and Morrow, 1970; Wagner and Bragg, 1970). Again the results have generally indicated the promise for this method but as Mahoney (1972) points out - with reference to both covert control and covert sensitization - "...until further evidence is available, this area must be viewed with cautious optimism " (p. 56).

As treatment methods, both covert control and covert sensitization would seem to offer some potential advantages over externally administered treatments.

Firstly, covert representation of antecedent stimuli, target behaviours and consequent events (reinforcing or punishing) makes it possible to use a more comprehensive range of subject-relevant stimuli in the treatment paradigm than is frequently possible with externally applied systems. Covert SM treatments need not be hindered by practical considerations of time, event, or place; the subject is required only to imaginally self-present given stimuli. The practical advantages are obvious where there is a real difficulty in providing 'in vivo' conditions for treatment or where the target behaviour itself is essentially a covert behaviour (e.g. self-evaluative references, Mahoney, 1971).

Secondly, in aversive paradigms using covert SM, punishing stimuli need not be restricted to any given sensory modality, as is often the case where physically presented stimuli (e.g. emetics or electric shock) are relied upon. Thus the subject is able to use stimuli that to him are of maximal subjective aversiveness and are at the same time relevant to the target behaviour. Both Lazarus (1968)

and Wilson and Davison (1968) have emphasised the need for employing 'appropriate' noxious stimuli in aversive treatments. Further, the subject can, potentially, exercise careful control over the onset and duration of the punishing stimuli and is able to employ covert self-punishment whenever the target behaviour is encountered. The importance of precise control over the presentation, intensity and duration of punishing stimuli in aversive treatments has been illustrated elsewhere (Rachman and Teasdale, 1969). The SM procedures necessarily involve training of the subject in the optimal conditions for the self-presentation of punishment. One obvious disadvantage with self-administered punishment is that the subject may not in fact be willing to self-punish as directed (cf. Ferraro, 1973).

a) Coverant Control: (CC)

This SM strategy was first proposed by Homme (1965) as a technology for controlling the occurrence of private events (coverants). To Homme, detection of the occurrence of a coverant is a simple discrimination that he (the subject) can make with great reliability. Because of this Homme holds that insistence on external observation and/or verification of the occurrence of coverants need not impede the development of a technology for the control of coverants. Further, Homme considers that self-reinforcement of coverants is not difficult. Homme (1965, p.503) states:

"The sine qua non of a technology for the self control of coverants is the easy availability of a large number of self-reinforcers." Homme then calls on Premack's

differential probability hypothesis (Premack, 1965) to indicate that a reinforcer will always be available. The principal states:

"For any pair of responses, the more probable one will reinforce the less probable one." (Premack 1965).

Thus, Homme maintains that participation in any regularly occurring and clearly discriminable event in an individual's repertoire of freely available behaviours (e.g. drinking coffee) can be contingently employed as a high probability behaviour (H P B) to reinforce any given low probability behaviour (L P B)

The coverant control (CC) strategy then employs SM of contingencies for the modification of coverants. The CC approach relies largely on strengthening coverants which are incompatible with the response to be eliminated. Even where the target behaviour is observable (e.g. smoking) change is dependent on the modification of relevant coverants.

Homme recommends that a wide range of coverants be used in CC in order to avoid adaptation. The SM behaviour itself is reinforced by having the positive consequences of the SM enterprise (e.g. 'feeling better') intruded prior to the final reinforcing event. The sequence of self-managed behavioural events recommended when smoking stimuli are encountered is presented in Fig. 1(a). Mahoney (1970) has pointed to methodological problems inherent in Homme's strategy and has suggested some procedural changes in his method.

The first problem has to do with the stimuli which control the onset of the target behaviours (TB). Mahoney

observes that, by having the H P B occasioning the anti-TB-coverant, Homme may be adventitiously reminding the individual of the behaviour he is trying to suppress. Thus, for example, the individual may come to think of cigarettes (if smoking were the TB) as soon as engaging in some H P B (e.g. coffee drinking) without experiencing smoking-relevant stimulation. Such a criticism has its basis in the recent research in delay of gratification (Mischel, Ebbesen and Raskoff, 1973) in which it was found that thinking about a voluntarily delayed reinforcer seriously delimited the individual's ability to postpone reinforcement. Rather, Mahoney holds that the anti-TB coverant should be initiated by TB stimuli thereby permitting earlier termination to the response and this may prove helpful (Aronfreed, 1968; Bandura, 1969; Ferster, Nummerger and Levitt, 1962).

The second problem is encountered through the close proximal association of the aversive anti-TB coverant and the H P B which may lead to the neutralization of the aversive coverants. Mahoney, therefore, suggests that the SM strategy should entail weakening the maladaptive habits associated with the TB stimuli and the separate strengthening of pro-non-TB responses. Hence Homme's procedure would now be shown as two separate strategies, rather than a single sequence, with the break occurring between stages 2 and 3. Mahoney's reappraisal of the coverant control sequence is presented in fig. 1 (b).

"Thus in the smoking analogy, the individual would weaken his habitual response to the smoking stimult by emitting anti-smoking coverants (anti-TB LPBs) in their presence.

The corresponding reinforcement of pro-non-TB coverants might be illustrated by the individual's engaging in H P B being contingent on the prior emission of some adaptive response such as self-praise for non-smoking " (Mahoney, 1970; Pp 517-518).

Coverant Control as examined in the present study incorporated the procedural modifications indicated by Mahoney (1970).

b) Covert Sensitization: (CS)

Covert sensitization (CS), first used by Gold and Neufeld (1965) and later developed by Cautela (1966, 1967), is essentially a punishment procedure used to treat maladaptive approach behaviour (e.g. alcoholism, obesity, and homosexuality). In CS neither the undesirable response nor the punishing stimulus is actually presented; these stimuli are presented in imagination only. In this respect CS is similar to systematic desensitization (Wolpe, 1969) with the difference being that in CS the goal is decelerative rather than accelerative.

As with systematic desensitization, CS treatment initially involves routine behavioural assessment of the target for change (Cautela, 1968; Goldfried and Pomeranz, 1968; Kanfer and Saslow, 1969) and then training the subject in deep muscular relaxation (Wolpe and Lazarus, 1966).

Cautela holds that relaxation facilitates clear imagery and uses it largely for this reason. However,

Fig. 1(a)

The Coverant Control Sequence Recommended when Smoking
Stimuli are Encountered (Homme, 1965)

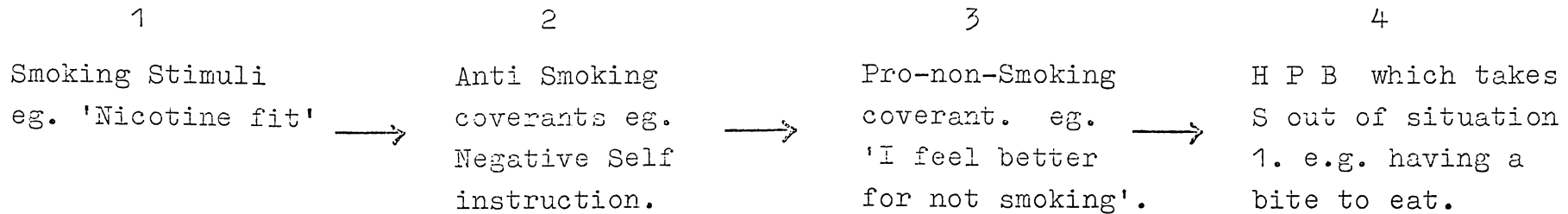
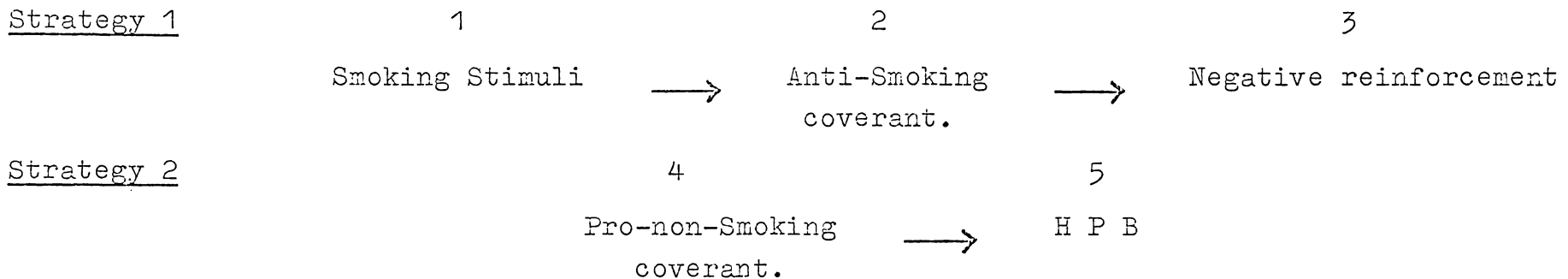


Fig. 1(b)

The Coverant Control Sequence Applied to Smoking as Reappraised
by Mahoney (1970)



the role of relaxation in CS, as in systematic desensitization, has not been experimentally established (Goldfried, 1971).

In CS the initial treatment emphasis is directed toward the punishment of the maladaptive response. The subject is first asked to visualize himself engaging in the target behaviour. Once he has indicated that he can clearly 'see' this the therapist verbally presents the punishing stimulus which may involve the subject having to visualize increasing nausea and vomiting contiguously with the imaginal target behaviour. The narrative is presented so that the subject becomes increasingly nauseous (punished) as he progresses further with the execution of the target behaviour. As treatment progresses a negative reinforcement procedure is combined with the imaginal punishment sequences. In these sequences the subject is required to imagine the punishment successively increasing with approach behaviours but as soon as he can visualize himself turning away from or ceasing to engage in the imaginal maladaptive behaviour he begins to 'feel better' and no longer nauseous. That is, alternative avoidance behaviours produce a cessation in the punishing stimulus.

To enhance resistance to extinction Cautela recommends that in the latter stages of treatment the punishing scenes should be presented intermittently.

A variety of clearly identified discriminative stimuli, elucidated in the behavioural assessment, are employed in the CS procedure in order to ensure generalization of the punishment procedure to as many real life contexts as possible.

Although images of nausea and vomiting are frequently used as punishing stimuli in the CS paradigm other stimuli (e.g. sores, scabs (Rutner, 1970) or persons in authority, (Gold and Neufeld, 1965)) may be employed. The principal requirement in choosing a punishing stimulus is that the subject himself finds the stimulus aversive.

As with covert control, CS treatment begins with the therapist playing an active role in the treatment sessions but over time the subject is taught more and more to make independent use of the skills he has learned. Thus, in CS the subject is required to attend to daily 'homework' practise sessions. Furthermore, he is required to imaginably invoke the punishing stimulus whenever the discriminative stimuli which control the target behaviour are encountered in real life. This may mean that the subject is instructed to think of 'nausea' or 'vomit' whenever he discerns the desire for a cigarette or drink where these are the responses to be eliminated.

4. Summary of Treatments

In accordance with the aforementioned definition, 'a response of an organism made to control the probability of another response', both CC and CS can be regarded as SM strategies.

Each of the treatments actually involves several forms of SM. The emphasis is, however, on developing independent subject utilization of the strategies. In

both CC and CS the experimenter must rely on self-report data regarding the quality, control, and implementation of the covert components of these treatments. Further, the treatments themselves are entirely dependent on the subject's efforts at SM of contingencies. The experimenters cannot fully control or manipulate the independent variables. In both CC and CS the punishing and reinforcing stimuli are subjectively and individually tailored.

An important difference between treatments exists in the manner in which the therapeutic goals are attained. In CC the procedural emphasis is on reinforcing responses which are incompatible with the target behaviour whereas in CS the target behaviour itself becomes the focus for self-administered punishment and avoidance training.

Another difference lies in the role of covert responses in the change process. In CC covert responses - coverants - are the target for change, even where some overt behaviour is involved (e.g. smcking). In CS however, covert responses generally function as symbolic consequences for given overt behaviours (e.g. imaginal smoking and 'nausea').

A third difference occurs with the reinforcement of the SM behaviours themselves. In CC, where a large number of naturally occurring HPB's may be employed to reinforce the low probability coverant, the discriminative stimuli for SM behaviours are liable to be more generic than is the case with CS. In CS SM behaviours are invoked either by instructions to attend to 'homework' assignments or

by the discriminative stimuli for target behaviour itself.

THE TARGET BEHAVIOUR

1. Previous Research

Cigarette smoking in many respects represents a useful target behaviour for outcome studies involving different therapies. Being maladaptive, if the medical evidence is accepted (Surgeon General's Advisory Committee, 1964), ubiquitous, and occurring in discrete and potentially observable units, cigarette smoking has already become the subject of numerous research endeavours. Recent reviews have been offered by Keutzer, Lichtenstein and Mees (1968) and by Bernstein (1969).

Despite the plethora of research in the area these authors note that the behavioural treatment of smoking has produced very few indications of treatment-specific effects; that there is generally marked resumption of smoking after treatment and that many of the investigations have been confounded by methodological problems.

Bernstein (1969) contends that social pressure, demand characteristics, suggestion and placebo effects, common to all smoking treatments, account for the majority of the treatment-period results. More recent data, presented by McFall and Hammen (1971), lend further weight to Bernstein's observations. These common factors, however, appear insufficient to sustain treatment period gains at follow-up. Following treatment, a pattern of rapid relapse is the rule.

It is noted that the majority of those studies reviewed by the aforementioned authors involved the assessment of treatments involving some form of externally administered aversive control (Keutzer et al., 1968;

Mausner, 1971). The treatments have included the following: electric shock (Berecz, 1972 a , 1972 b ; Chapman, Smith and Layden, 1971; Koenig and Masters, 1965; Mees, 1966; Ober, 1968; Powell and Azrin, 1968; and Whitman, 1969), stimulus satiation (Marrone, Merksamer and Salzberg, 1970; Resnick, 1968; Schmahl, Lichtenstein and Harris, 1972), hot, smoky air (Franks, Fried and Ashem 1966; Grimaldi and Lichtenstein 1969; Lublin and Joslyn, 1968; Wilde, 1964), contractual management (Tooley and Pratt, 1967), unpleasant tasting pills (Marston and McFall, 1971; Whitman, 1972), and breath-holding (Mees, 1966).

Because of the vast differences that exist between the above investigations with regard to subject variables, variations in the nature, administration and duration of treatments and follow-up intervals, it is not possible to draw any conclusions regarding the relative efficacies of the different modes of treatment. None of these aversive procedures has consistently been shown to be more effective than any other methods of treatment - even where a comparison with placebo attention conditions has been made. The actual 'aversiveness' of many of the procedures employed (e.g. breath-holding; hot, smoky air) has recently been questioned (Berecz, 1973). No differences have been reported in the relative effectiveness of therapist-administered and self-administered aversive control.

Other attempts at smoking control have included such methods as role playing (Janis and Mann, 1965; Lichtenstein, Keutzer and Himes, 1969; Mann and Janis, 1968), 'self-control' (Guttman and Marston, 1967; Nolan, 1968;

Ober, 1968; Roberts, 1969; Whitman, 1969), coverant control (Keutzer, 1968; Tooley and Pratt, 1967), desensitization (Morgastern and Ratliff, 1969), covert sensitization (Rutner, 1967; Sachs, Bean and Morrow, 1970), or some combination of these procedures (Gerson and Lanyon, 1972; Steffy, Best and Meichenbaum, 1970; Wagner and Bragg, 1970). Generally these studies have focused on the development of smoking treatments and have thus typically involved the comparison of one or more comprehensive treatments against non-treated or placebo groups. As with aversive procedures none of the above treatments has consistently proven superior to attention placebo conditions. It seems that any smoking programme, irrespective of the type of treatment used, will result in a short term reduction in smoking (Bernstein, 1970).

There have been very few attempts to systematically compare different behavioural treatments within the context of cigarette smoking behaviour. Exceptions include Keutzer (1968), Marston and McFall (1971), Ober (1968), Sachs et al. (1970), Tooley and Pratt (1967), and Wagner and Bragg (1970). Vast procedural and methodological differences between these studies preclude effective comparison. Only one of these studies (Tooley and Pratt) involved the two SM techniques, coverant control and covert sensitization. However, comparison of these treatments is difficult owing to the small number ($n=2$) of S's in the study and to a confounding of treatments.

In summary, smoking research has most frequently been directed toward a search for effective treatments involving

externally applied aversive controls. Assessment of procedures involving SM of covert behaviours has received scant attention.

That the externally applied aversive treatments have proven generally unsuccessful with smoking is in marked contrast to the reported use of these treatments where other target behaviours have been involved (e.g. building social behaviours with psychotic children, (Lovaas, Schaeffer and Simmons, 1965) and alcoholism (Sobell and Sobell, 1973)). Importantly, in these latter studies, application of the punishing stimuli was accompanied by procedures involving systematic reinforcement of alternative behaviours.

2. Smoking Behaviour: Toward a Functional Analysis

In sharp contrast to the intensive research into the demographic and/or personality characteristics of cigarette smokers themselves (Mausner, 1973; Mausner and Platt, 1971), all of which is of dubious utility to the problem of control (Ferraro, 1973; Hunt and Matarazzo, 1971), there have been very few attempts to undertake a thorough behavioural assessment (Bijou, Peterson and Ault, 1968; Goldfried and Pomeranz, 1968; Kanfer and Saslow, 1969) of smoking behaviour. As a consequence many of the smoking treatments have been applied where little account has been given to the target behaviour, or to those factors responsible for maintaining abstinence. Hence the diversity of treatments employing aversive control.

Some hypotheses can be derived from the following speculations. Hunt and Matarazzo (1971, 1973) and Logan (1971, 1973) have suggested that smoking behaviour, once

acquired, becomes habitual such that it is a self-reinforcing behaviour with each successive step in the response chain (e.g. drawing the cigarette, lighting the match etc.), both serving to reinforce the previous step while at the same time acting as a discriminative stimulus for the next step in the chain. These observations carry implications for methods of control of smoking in general and for self-control in particular.

Firstly, as a chain of antecedents may precede actual consumption of the cigarette, it would appear that self-controlling responses would more likely be effective were they to be presented early in the chain (Aronfreed, 1968), or at some weak link in that chain. Methods involving control over antecedents have already been described with other target behaviours (Ferster et al. 1962; Bergin, 1969; Watson and Tharp, 1972; Stuart, 1967) and have recently been suggested for smokers (Hunt and Matarazzo, 1973).

Secondly, it is suggested (Hunt and Matarazzo, 1971; Premack, 1971), that the long-term aversive consequences of smoking - health risks - may be sufficiently removed in time from the smoking act itself that in the face of the immediate gratifications available to the smoker, these long-term consequences may have little bearing on the smoking rate. Indirect support for that observation is provided by the short-lived nature of reduction in smoking rates found to follow widespread publication of research linking smoking and cancer (Premack 1971). Therefore, Hunt and Matarazzo (1971), Logan (1973) and Premack (1971), indicate that one way to control smoking might involve bridging the temporal gap by developing immediate verbal behaviours,

to be emitted concurrently with smoking stimuli, that are under the long-range aversive consequences of smoking. These aversive consequences may then apply equally in all possible smoking contexts. The smoker could not avoid these aversive contingencies by simply altering the physical context for smoking (Premack 1971) as might be possible where externally administered aversive controls are involved. However, Premack, Logan and Hunt and others do not specify the mechanism(s) that maintain the application of these aversive consequences.

Thirdly, one must consider the smoking act itself; an act which (being virtually a free operant) has become conditioned to almost every time and place in the individual's environment. But it is held (Premack 1971) that in the inveterate smoker, 'thinking about' or 'thoughts' of smoking are likely rare events conditioned to very little. Therefore, to control smoking one has to first condition 'thoughts' of smoking and then the corresponding self-instruction to those external events that have come to control the act of smoking. To facilitate the development of the self-instructional system Premack advocates that the smoker should interrupt the smoking sequence with a period of 'forced meditation' as soon as the desire to smoke is encountered. Premack does not indicate the optimal duration of such a pause nor does he clearly specify the content of the 'meditation'. However, it seems that Premack sees the role of the pause as being essential for the development of stimulus control in an otherwise habitual behavioural sequence.

Fourthly, attention must be directed to the development and maintenance of abstention. This must involve the reinforcement of alternative behaviours. In spite of the observation that punishment proves most effective when used simultaneously with positive reinforcement for alternative behaviours (Baer, 1970; Hallam and Rachman, 1972; Watson and Tharp, 1972) in smoking research scant attention has been directed toward the development of such alternative responses or behaviours which are incompatible with smoking. Hunt and Matarazzo (1971) have commented, "If abstention is viewed as a learned behaviour, the data on follow-up look very like an extinction curve" (p.76).

One possible solution to this problem is offered by Mausner (1971), "behaviour therapy might work if it created powerful internal contingencies in which positive reinforcements are linked to the act of refraining from smoking" (p.168).

Fifthly, Ferraro (1973) has suggested that because there is a wide variety of responses that have been reinforced for enabling smoking it is unlikely that extrinsic extinction or punishment procedures could be sufficiently comprehensive to be efficacious in maintaining reduced smoking frequency. Following on from these observations, a number of authors (Ferraro, 1973; Hunt and Matarazzo, 1973; Kanfer, 1971; Kanfer and Karoly, 1972; Premack, 1971; Premack and Anglin, 1973) have recently attempted to explain the recurrent failure of externally applied aversive controls with cigarette smokers

by suggesting that such an approach is, in this context, radically incomplete. Premack (1971) has speculated that other contingencies, which are referred to as 'internal mechanisms of self control', may be used to explain the numbers of smokers who have been observed to quit (Horn, 1969; referred to in Premack, 1971). Examples of these mechanisms included notions of being 'had' by the tobacco industry and of humiliation through 'needing' cigarettes. Premack then implies that smoking treatments might be made more effective through the development of internal contingencies of control.

The above suggestions tend to be speculative in nature and as yet have received little by way of experimental verification in the context of cigarette smoking. The failure of externally administered aversive controls might, however, be explained on the basis of the foregoing considerations.

It could be reasoned that smoking treatments which involve internal control and which cater for the development and maintenance of abstinence via positive reinforcement should prove more successful in modifying smoking behaviour. It is noted that CC and CS would each seem to offer some promise in this regard. Hence, the following predictions are offered.

Prediction 1 'that CC would prove more effective than CS in maintaining in-treatment gains at follow-up.' CC treatment involves reinforcement of behaviours (coverants) incompatible with the target behaviour (smoking). These incompatible behaviours, coverants pertaining to non-smoking, are systematically reinforced by the individual in a wide

variety of contexts. Further, the SM process itself, if properly managed, should prove reinforcing. CC treatment provides for the development of some of the elements of control viewed as being necessary by the aforementioned authors for the modification of smoking. For want of evidence it is not possible to speculate as to the punishing properties of CC.

Prediction 2 'That CS would produce favourable short-term results but poorer control at follow-up'. On the basis of the evidence it is not possible to predict which of CC and CS would prove the more effective during treatment. It is one of the aims of this work to establish the efficacy of each of these treatments.

CS relies largely on punishment and punishment has been shown to be a very effective behaviour-removing technique (Baer, 1970). However, if the additional goal of behaviour - building (i.e. alternative behaviours) is seen as being necessary for the successful control of smoking then CS alone does not fulfil that treatment requirement. The negatively reinforcing component in CS has not been examined sufficiently for any valid predictions to be made (cf Mahoney 1972).

Prediction 3 'That the sequential presentation of CS and CC in a combined treatment package would prove more efficacious during treatment and at follow-up than either of the treatments presented alone '. Premack (1971) noted that the long-term success of any self-instructional treatment of smoking would be highly dependent upon initial success in smoking for otherwise the smoker would

quickly habituate to the implied aversive nature of his actions. Similar views have been expressed by Hunt and Matarazzo (1973).

That CS is liable to produce initial success with smokers can be inferred both from the reported efficacy of punishment techniques in general and from the successful applications of CS in controlling other behaviours as previously noted. Further, the speculations of Premack and others are suggestive of a treatment strategy for smokers in which elements of control of internal contingencies for the maintenance of new behaviours is a feature. CC being a behaviour-building technique may then predictably serve to maintain the initial success which had first been obtained with the behaviour-removing technique of CS.

Prediction 4 'That both CC and CS would each prove more effective than a procedure which may capitalize on the effects of simply being 'in treatment''. Since placebo and non-specific treatments (Bernstein, 1970; McFall and Hammen, 1971) prove to be comparable in effectiveness to most other smoking 'treatments' it is considered that a demonstration of efficacy of either CC or CS would involve these treatments being shown to be superior to an equivalent placebo condition.

Prediction 5 'That there would be no differential outcome effects attributable to therapist factors '. This prediction is consistent with the finding that in the behavioural therapies, where therapists are provided with systematic and standardized procedures, as in the present research, therapist differences are minimal (cf. Ober, 1968).

METHOD

1. Subjects:

There were 61 subjects involved in the study. All subjects, smokers wishing to quit, volunteered as the result of news articles appearing in the local paper outlining the aims and requirements of the study. It was made clear that the study was being financially supported by the Waikato Branch of the New Zealand Cancer Society. Also emphasised was the very experimental nature of the study; that S's would serve as 'guinea pigs' for the evaluation of certain psychological procedures. It was stipulated that all participants would be required to leave a \$10.00 deposit which would be refunded only if 100% attendance to the 8 once-weekly thirty minute sessions was observed. Failure to attend automatically resulted in forfeiture of deposit, unless prior and alternative arrangements by S's had been effected. The study was conducted in rented premises on the ground floor of an office block in central Hamilton.

Initially, 72 persons from the Hamilton and surrounding areas responded to news articles but eleven of these were advised that they would not be required because of the size limitations of the experiment. The remaining 61, who left their names, addresses and preferred times for appointments with secretaries at the University of Waikato (Psychology Department) and at the Cancer Society Offices, were contacted by the author with the written request that they begin recording their smoking rates - on booklets provided - and that they attend the first appointment

at the stated time. These S's were also given the smoking history questionnaire (Appendix Ia) and asked to complete this and bring it to the first session. In a covering letter it was emphasised that until treatment began all S's were to smoke at their usual rates and to record this; that any attempts to cut down at this point would be premature and contrary to the interests of the study. This instruction was repeated at the orientation session where it was observed that some S's had recorded a reduction in their rates in the pre-contact period. The written instructions stated that S's were to carry the booklet inside the wrapper of their cigarette packs and were to record each cigarette prior to its being smoked and to similarly note all those cigarettes accepted from other people.

At the first session, lasting 15 minutes, S's were seen by the author and the aims of the study were explained in greater detail, the \$10.00 deposit and the smoking questionnaire were collected, with S's given further smoking record booklets and a smoking graph and the times of further weekly appointments set. It was explained to S's that because of the excessively large number of volunteers some might have to be (randomly) excluded but, that in this event, they would be advised prior to the next scheduled appointment and have their deposits refunded. It was further explained that treatment would be handled by two therapists and that allocation to therapists would be made on a random basis.

On the basis of S's responses to the questionnaire the following table (1) of characteristics was compiled.

Table 1

Distribution of Subjects by Treatment Conditions over
Smoking History Variables

		N T C	PL	CC	CS	CS + CC	TOTAL
SEX	Male	6	5	6	6	4	27
	Female	5	6	5	5	7	28
AGE	\bar{X}	39.9	36.2	42.5	40.1	39.3	39.5
	S.D.	9.7	11.0	12.7	10.5	10.5	/
SMOKING RATE Pre-contact estimate	\bar{X}	28.7	28.1	29.7	28.6	27.4	26.7
	S.D.	10.4	9.6	10.6	17.9	14.4	/
SMOKING RATE Pre-treatment Baseline	\bar{X}	24.0	26.3	26.4	26.9	25.2	26.7
	S.D.	9.2	7.9	10.1	14.2	14.5	/
NO. OF YEARS SMOKING	\bar{X}	21.2	18.5	23.1	21.6	22.6	21.2
	S.D.	9.9	9.9	15.2	11.6	10.0	/
MEAN NO OF PREVIOUS ATTEMPTS TO QUIT	\bar{X}	1.1	3.3	3.1	1.5	3.1	/

2. Experimental Design

The present research incorporated most of the design features recommended by Bernstein (1969) as being axiomatic to outcome studies. A summary of the experimental design utilized in the present study is presented in Table 2 following the descriptions of the procedures employed.

There were five experimental groups containing an approximately equal number of participants. From Table 1 it can be seen that these groups were balanced with regard to age, sex, years smoking, smoking rate, and number of previous attempts to quit. t-tests indicated no significant differences between the groups on the first four of these variables. Designation to groups was made on a purely random basis involving the shuffling and sorting of cards. An exception occurred with those married couples (5) who volunteered for the study. These couples were paired and then randomly assigned one couple to each group. It was considered best that each of these couples was given similar treatment throughout the study.

Employing a further random selection S's were allocated to one of two therapists in the study such that each therapist dealt with approximately half the number of S's in each group. An exception occurred with the non-treated control (NTC) which was seen only once by the author at the initial orientation session. All subsequent contact with this group was maintained by the author and involved written requests for copies of the smoking record booklets and/or telephone calls for verbal data on smoking rates.

The importance of controlling for therapist effects in outcome research has frequently been emphasised (Bernstein, 1969; Paul, 1967b, 1969). The therapists were of similar ages (23yrs), academic standing (both having honours degrees in psychology), and both having had similar amounts of clinical experience.

All groups (except NTC) were seen once weekly for a session of 30 minutes on an individual basis for seven weeks following the initial interview. Thus therapist contact time was kept equal across all conditions. In some cases, where it was not possible for S's to keep certain appointments, there were slight deviations from the once-weekly pattern of contacts. Further, statutory holidays, occurring over the fourth and fifth weeks meant that some S's were seen twice in one week. However, at the end of the eighth week all S's had had their requisite number of contacts.

Subjects were seen individually since it was considered important in this experimental study that the therapeutic techniques should be evaluated under conditions that approximate those found in their clinical application. It is noteworthy that some investigations have employed relatively few (3) and somewhat brief sessions in evaluating certain clinical treatments (e.g. Sachs, Bean and Morrow, 1970; Wagner and Bragg, 1970). Furthermore, with the regard to the treatments themselves, many of the stimuli employed were idiosyncratic and as such group application may have resulted in a loss of treatment effectiveness. This latter point has yet to be researched within the context of CS and CC. However, data relating

to desensitization have not indicated any marked reductions in efficacy due to group applications using standardized hierarchies (Paul 1968).

All S's were requested to keep a continuous daily record of their smoking rates beginning several days prior to the initial session through to one week following the final treatment. The follow-up probes comprised one weeks recording at points one week, one month, three months and six months following treatment. All S's were provided with a smoking record graph on which they were advised to plot their daily totals obtained from their smoking record booklets (refer Appendix Table II for a description of materials). It was stressed that S's should record the cigarettes as they drew them from the packet. The smoking record booklet was designed to fit inside the cover of cigarette packets in order to facilitate such recording. The importance of continuous recording of target behaviour in outcome research has been indicated by Sidman (1960).

In keeping with Premack's (1971) speculations, S's in all of the treated groups were requested to observe a 30 second pause between their first contemplating or initiating the act of smoking and actually beginning to smoke. Premack suggested that such 'forced meditation' with otherwise habitual behaviour, such as smoking, may be a necessary pre-condition for the success of any attempts at control via self-management. Thus, the subjects could discern the conditions which controlled the smoking act and simultaneously implement their SM techniques.

Self-recorded behavioural measures have been found to

be reactive (McFall, 1970) and the implications of this have been discussed elsewhere (Kanfer, 1970 a ; Nelson and McReynolds, 1971; Simkins, 1971 a , 1971 b ; Berecz, 1972). However, in the present study self-recording of target behaviour was a feature common to all groups and was, thus, controlled for.

3. Treatments

a) Minimal Contact Non-treated Controls: (NTC)

This group comprised 11 S's who were informed - in writing, subsequent to the orientation contact - that they had been randomly excluded from the study because of limitations imposed by the large number of volunteers. It was explained that owing to the bookkeeping involved there would be a little delay in their being refunded their deposits. In the meantime, however, these S's were asked to keep a daily record and graph of their smoking rates for the next eight weeks. S's received more of the record forms as well as a stamped self-addressed envelope provided for the return of those booklets already completed. S's were told that by returning their smoking data they would be of assistance to the study. Every two weeks for eight weeks, corresponding to the treatment period for the other groups, fresh lots of recording booklets and stamped self-addressed envelopes were sent to the NTC group . Those who had returned data were thanked. Those who failed to return the booklets by post were contacted by telephone and requested to do so. In some cases S's repeatedly ignored telephone requests to return data and were, therefore, simply asked to give a verbal estimate of their daily smoking rates. (Noticeable especially after the refund had

been effected). The NTC group was contacted again, by post, with further requests for data at intervals corresponding to the scheduled follow-up assessments for other groups. Again in some instances the data was based on verbal estimates only of the previous weeks daily rate.

(b) Placebo: (PL)

There were initially 12 S's in this condition but 11 attended for 7 weeks and returned data. At the start of the second session some time was devoted to discussing the questionnaires and the recording to date. The importance of accurate recording was again emphasised and it was added that now treatment had begun S's were no longer required to keep to their normal rates; they could cut down or quit if they wished.

S's were then asked several questions relating to their smoking behaviour. They were asked whether they obtained an equal amount of pleasure from each cigarette they smoked; if not how many (a % of their daily total) did they enjoy; and when and where did they smoke these 'enjoyable' cigarettes. S's were asked to describe the physical context, the time(s) of day, the accompanying physical cues and activities, the events immediately preceding consumption of these cigarettes, and to name the specifically pleasurable attributes of these cigarettes. The same questions were asked of those cigarettes designated by S's as the least enjoyable. S's answers were recorded.

The above questions occupied about half the second session and were common to all treatment conditions.

Each of the various treatments that follow was

introduced in the following manner:

"The treatment that you will receive is a recently developed method for increasing self-control. By carefully following the treatment instructions you will be able to learn how to change your smoking behaviour. In addition to attending the treatment sessions you will be required to undertake daily practice sessions on your own at home.

Already this approach to the development of self-control has been found effective with problems very similar to smoking, for example, obesity and alcoholism. We are wanting to see just how well this approach works with smokers. We are, therefore, not going to start by telling you to quit but you may do so at any time if you wish.

Because this is an experimental study, we want you to be careful to follow instructions and to accurately record and graph your smoking rates. If you feel the treatment is not working tell us so that we might adjust for your requirements. Do not try to 'please' us by saying that it is working if it is not."

"The first step in developing self-control will involve your developing a greater awareness of the smoking act itself. We want to break the habitual or automatic aspects of smoking so that you are able to use your self-control at the best possible time. From now on as soon as you notice that you want a cigarette, and before you take one from the packet, you are to pause and wait for 30 seconds and simply think why you want that cigarette. If at the end of that period you do not wish to have the cigarette replace it in the pack. If you still wish to

have it then go ahead. But most important, always pause before taking the cigarette in hand."

At the next session the pause was extended to one minute and thereafter to a two minute requirement.

From this point on differential treatment began.

Placebo S's were told that essentially the treatment involved their learning how to systematically use their own resources and self-control. It was explained that the therapist's role was to assist and encourage the smokers' efforts to quit. The therapist was available to suggest 'methods' for overcoming the habit aspects of smoking (e.g. poking holes in cigarettes, smoking different brands and/or with the opposite hand from normal.) Further the therapist was in a position to assist S's to develop greater awareness of the factors controlling the smoking habit and to discuss the 'reasons' for S's smoking and those reasons for quitting (financial, social, health, aesthetic etc). Frequently S's alluded to historical reasons or to their personality features as being responsible for their current smoking. The amount of time spent discussing the above, especially the reasons for smoking, depended largely on S's rate of consumption but in general at least four sessions were involved. Specific topics (e.g. smoking and lung cancer, heart disease and exemplar aspects of adult smoking) were discussed in the remaining sessions with those S's who were apparently unable to quit or substantially reduce their consumption during the seven weeks of treatment.

With those S's who had reduced during the treatment period the discussion was broadened to include ways of

maintaining the successes already attained (e.g. by avoiding smoking acquaintances). At all stages of the programme these placebo S's (as were all other S's) were frequently verbally encouraged for accurate reporting and graphing of their smoking rate and for any reductions, however slight, in smoking rate.

The placebo condition aimed at providing the type of information and support that is readily available to smokers in health booklets, from general medical opinion and from non-trained personnel.

Placebo S's spent 30 minutes per session with their therapist. This equalled the treatment time per session spent by S's in other groups. In the PL condition, as with each of the other treatments, therapists both worked from a standardized instruction list and held frequent discussions with each other throughout the whole of the treatment period to ensure standardization of treatment approach.

c) Coverant Control: (CC)

There were originally 12 S's assigned to this condition but 11 completed the treatment and returned data at the follow-up probes. The treatment rationale was explained to S's during the second part of the second session. S's were told that in order to be able to give up smoking they had to avoid 'automatic smoking' and learn to regularly attend to the adverse aspects of their habit. It was explained that the adverse consequences of smoking could best influence smoking behaviour if these consequences were brought to bear frequently and in close temporal

association with the act of smoking and that they were to be seen as being relevant (i.e. aversive) to the subject himself. It was further explained that frequently heavy smokers neither consciously attended to their behaviour nor did they regularly contemplate the possible serious consequences of their actions. Treatment was to involve a method for helping S's attend to the aversive aspects of smoking.

S's were asked to indicate what they considered to be aversive aspects of their smoking behaviour. Typically S's responses contained references to health hazards - lung cancer, emphysema, coronary malfunction, reduced fitness, hoarseness and coughing etc - to financial considerations and to aesthetic and social aspects of smoking.

A list of five anti-smoking coverants was compiled for each S and each of these coverants was listed on a separate card. The cards were to be carried by S's inside their cigarette packets. S's were instructed to take the top card and read it when they felt the 'urge' to smoke and before they commenced smoking the cigarette. The card was then to be replaced onto the bottom of the stack and the next one read prior to the following cigarette. It was explained to S's that if they regularly adopted the above procedure whenever they desired a cigarette - even if they didn't smoke that cigarette - then those situations which had come to create the desire to smoke would now occasion a negative self-instruction (anti-smoking coverant). Subjects were told that once the connection between desire to smoke and anti-smoking

coverant had been established they would be well on their way to quitting. S's were encouraged to desist from smoking following emission of the anti-smoking coverant but in the event of their being unable to do so they were told to attend to the anti-smoking coverant after they had observed the required self-imposed pause.

At the second treatment session S's were asked to identify and list two more anti-smoking coverants and to routinely employ these along with those from the previous week.

The second part of the coverant strategy was then initiated. S's were advised that the best way to sustain any reductions in smoking was to regularly attend to the beneficial aspects of such reductions. S's were then each asked to list what they considered to be four positive consequences of a reduction in smoking rate. This list comprised the pro-non-smoking coverants.

Both the anti-smoking coverants and the pro-non-smoking coverants are regarded as low probability behaviours (LPBs) in the case of the cigarette smoker. The coverant control strategy, then, attempts to strengthen these LPBs and thereby render the act or thoughts of smoking more punishing to the smoker and thoughts of not smoking more reinforcing. Responses included notions of generally 'feeling better', improved sense of smell, improved breathing, being happier, no longer being 'hooked' or 'had', being wealthier, fitter etc. The four pro-non-coverants were written onto cards and S's were instructed to carry these too, but separate from the anti-smoking coverants.

Therapists then sought to identify some regularly occurring and freely available behaviours in S's daily schedules (HPBs). Usually one or two HPBs were chosen with the criterion for regularity being the emission of at least 5 such HPBs per day. The range of HPBs varied greatly (e.g. looking at one's watch, answering the phone, going to the toilet, drinking coffee etc.), but in selecting HPBs the emphasis was placed on S's ability to identify and control the execution of the HPB, and on its regular occurrence. It was then explained to S's that because the HPBs occurred often they could be 'used' to help S's attend more often to the pro-non coverants and thereby strengthen their 'non-smoking' behaviour. S's were told, then, to take one of the pro-non coverant cards and read it before engaging in the HPB(s) and to rotate the list of pro-non coverants on each subsequent occasion. It was stressed that S's must not engage in the HPB without having first emitted the pro-non coverant and, wherever possible, they should leave reminders of the coverant requirement with their selected HPBs. For example, in one case where looking at his wrist watch was the HPB, S placed a piece of adhesive tape over the face of his watch. This was to ensure that this S would not engage in that HPB without first having emitted the pro-non smoking coverant.

On subsequent occasions treatment consisted of the identification of new anti-smoking coverants and pro-non-smoking coverants for addition to the existing cards and instruction in their use. The remaining time in each of

these sessions was spent discussing S's progress to date and in answering any queries S's may have relating to the procedure.

The amount of treatment time per session, 30 minutes, equalled that for other groups.

d) Covert Sensitization (CS)

There were originally 12 S's to this condition but 11 S's completed the sessions and returned smoking rate information at the follow-up probes.

Following the routine behavioural analysis S's were advised of the rationale of their treatment strategy. S's were told that they were unable to stop smoking because smoking was a strong, learned habit which gave them a great amount of pleasure. The way to overcome the desire to smoke is to associate smoking with an unpleasant stimulus. It was explained that the treatment would involve training the S's to develop the association between smoking and the unpleasant stimulus so that eventually, when outside of the (experimenters') office, S's would be able to use the procedure on their own whenever they encountered the 'urge' to smoke.

The actual procedure was then outlined to S's. S's were told that they would first be taught a way to become deeply relaxed. Following this, and while relaxed, S's were told that they would be asked to visualize the cigarette of their favourite brand very clearly and in one of the situations previously determined as being conducive to 'pleasurable smoking'. Having visualized the cigarette

they would be asked to signal by raising a forefinger. After signalling, S's were next told they would visualize themselves about to take the cigarette from the packet and then engaging in that sequence of behaviours leading up to putting the cigarette into their mouths and being about to light it. When this scene was clear S's were told they would imagine themselves starting to feel nauseous and to actually feel like vomiting. Then S's would be instructed to actually 'feel' themselves vomiting all over themselves, the cigarette, the ashtray and onto the floor. The narrative stressed that the longer S's engaged in the smoking act the more they vomited. S's would be asked to signal again when they could 'feel themselves' vomiting while proceeding to smoke the cigarette. S's were then told that a feeling of relief would be experienced when they visualized themselves stubbing the cigarette out or throwing it away. S's were told they would actually 'see' themselves rushing outside into the fresh air or home to a clean invigorating shower. In subsequent sessions, it was explained, S's would be able to terminate the nausea and avoid the imaginal vomiting by turning away from or refusing to take the cigarette.

The remainder of the second session was spent training S's in abbreviated relaxation (Wolpe and Lazarus, 1966). Once S's had indicated that they felt calm and relaxed - by raising a forefinger - two different scenes involving the sequence of imaginal smoking, increasing nausea to vomiting and their relief were narrated by the therapists. These scenes involved cigarette smoking in different situations or contexts. Each scene was narrated twice by the

therapists, giving a total of four sequences in all. Each step in the sequences was not initiated until S's had indicated their having clearly visualized the preceding step. The duration of each sequence was approximately 60 seconds with at least 20 seconds being devoted to the punishing narrative. The narrative continued 10 seconds beyond S's having indicated that they were experiencing the nausea. There was a 20 second pause between sequences and S's were instructed to concentrate on the relaxation only during this period.

The following is an example of the specific instructions given in the treatment sessions, being modelled on Cautela (1971 b).

"I am going to ask you to imagine as vividly as you can. I do not want you to imagine that you are seeing yourself in these situations. I want you to imagine that you're actually in these situations. Do not only try to visualize the scenes but try to feel, for example, the cigarette in your hand or the back of the chair in which you are sitting. Try to use all of your senses as though you are actually there. The scenes.....will be concerned with situations in which you are about to smoke. It is very important that you visualize the scenes as clearly as possible and try to actually feel yourself in the situation."

The following is a typical sequence.

"You are sitting in your lounge after work with a glass of sherry and a newspaper. There is a pack of your favourite brand of cigarettes (brand name given) and an ashtray on the small table next to you. You put the paper aside for a moment and start to reach for the packet of cigarettes."

(S's were then asked to signal when they could 'see' and 'feel' this clearly). "As your hand goes for the pack you notice a queasy feeling in your stomach. As your hand gets closer to the pack you notice that you are actually beginning to feel nauseous as if you are about to vomit. You touch the pack and the nausea increases. You taste some acid liquid in your throat and on the back of tongue. As you take a cigarette from the pack you feel worse; particles of food force their way into your mouth. Your stomach tightens and turns. You swallow but that doesn't help. As the cigarette is put into your mouth you feel worse and worse. More acid liquid and food comes into your mouth as you light the cigarette. You are now unable to control the nausea and as you taste the first smoke you start to vomit. Thick, warm, lumpy, green, evil smelling and sticky vomit runs down your chin. It covers your hand, the cigarette pack and ashtray. You vomit again and again until only thin, green, watery liquid comes up. Your nose is running and your eyes sting. Vomit is everywhere. You are choking. You are now standing in it. (S signals when images of vomiting are clear.) Now you throw away the soggy, vomit-covered cigarette and immediately you feel better. You no longer vomit. You can now breathe freely and as you get away from those cigarettes you feel better and better. You go to the bathroom and have a fresh invigorating shower and change of clothes and feel great when away from the vomit and cigarettes."

At the third session a total of six sequences involving

cigarette smoking in three different situations (scenes) were presented. With each of these scenes therapists first narrated the sequence as previously described, and then the S's were asked to complete the whole sequence entirely on their own without the narrative from the therapist. S's were asked simply to indicate their having reached each point in the sequence with therapists remarking 'good' 'well done' etc. at each signal. This was in keeping with the need for training S's in the SM of this strategy.

The number of sequences was increased to four and then five pairs over subsequent treatments as S's learned to apply the procedure more rapidly. Over the final 3 weeks of treatment 10 sequences were completed at each session with S's managing six of these on their own.

The actual scenes were varied over the treatment weeks so as to include as many different smoking situations as possible.

At the third week of treatment a differential punishment and negative reinforcement procedure was introduced. With approximately half of the total of the sequences S's were instructed to imagine themselves declining or otherwise refusing to take a cigarette and thereby producing immediate feelings of calm and relief. An example of negative reinforcement is as follows:
"You are having a cup of coffee after your lunch. There are cigarettes in your pocket and as you reach for the packet you notice a queasy feeling in your stomach. As your hand touches the packet you feel sick and nauseous.

You say, 'No I don't want that cigarette!' and draw your hand away from the packet. As soon as you decide not to smoke you feel calm and at ease again. All nausea goes and you feel relieved that you have not smoked the cigarette."

At the end of each treatment session S's were questioned about the clarity of imagery, the degree of relaxation attained, and the effect of the punishing stimulus. In some cases S's reported that images of nausea, increasing to vomiting, had little impact; they had difficulty in 'seeing' or 'feeling' themselves vomiting.⁽¹⁾ With these S's other punishing stimuli were sought. All of these S's found thoughts of burning sensations in their throat and mouth coupled with tightness in their lungs and continuous choking and coughing to be subjectively punishing. Phlegm and saliva were substituted for vomit with these S's. All of these S's were able to recall recent instances of coughing etc. which they had attributed to their smoking behaviour.

S's were instructed to practise the CS technique at least twice a day when on their own using at least as many sequences as undertaken at the previous treatment.

Further, S's were instructed to think of any cigarettes that they encountered or smoked as 'vomit', 'nausea', or 'bronchially constricting' cigarettes.

Footnote:

(1) Typically these S's indicated that they had vomited only rarely and the last occasion being some years ago. As such, the sensations associated with their real-life vomiting were difficult to recall.

A similar SM approach to the use of systematic desensitization has been suggested by Goldfried (1972).

Each subsequent treatment began with the therapist questioning S's about the number and nature of practice sessions accomplished since the previous treatment. S's were questioned specifically about the depth of relaxation attained and the nature of the nausea experienced. S's were asked to indicate if there were any difficulties encountered in practice. These S's spent 30 minutes in each treatment session with their therapists.

e) Covert Sensitization and Coverant Control: (CS & CC)

There were initially 14 S's assigned to this condition but there were three drop-outs midway in the treatment, leaving 11 S's completing and returning follow-up data.

This treatment condition represented an amalgam of the two previously described treatments. Thus, the reader is referred to the covert sensitization and coverant control procedural descriptions for an outline of this treatment.

Until the third treatment session S's were treated identically to those in the CS condition. From the fifth through to the seventh and final treatment the CS treatment continued but was complemented by the addition of the CC treatment giving a combined treatment package. The coverant control treatment involved the identification of and instruction in the use of four anti-smoking coverants and five pro-non-smoking coverants. This requirement corresponded with the final three weeks of the CC condition. Two new coverants were added to each class

with each session subsequent to the introduction of CC.

As with the CS treatment, S's in this condition were instructed to practise at home, using the CS component at least twice per day. S's were told to vary the sequences similarly to those presented in treatment so that some sequences involved self-punishment and others negative reinforcement. S's were likewise told to think of any cigarettes they encountered as 'vomit' or 'nausea' etc. cigarettes. Treatments lasted 30 minutes and equalled those of the other groups.

4. Reliability

In the present study assessment of the dependent variable - S's smoking rate - was reliant largely on S's self-report data. The nature of the target behaviour under study, coupled with the fact that S's were geographically dispersed, precluded the use of any systematic reliability checks by trained independent observers.

Data presented by Ober (1968) and Thompson and Wilson (1966) had suggested that in the natural environment self-report data relating to smoking rates is quite accurate. Using independent observers Ober (1968) reports a reliability coefficient of $+0.94$ between self-reports and observers' reports. While there has been some debate concerning Ober's data (Bernstein 1969) it would appear that the accuracy of self-report data is influenced by several factors: the S's commitment to change (Mausner, 1972), the expectancies implicit in the recording situation (McFall, 1971; Kanfer, 1970) and the specific instructions given (Simkins, 1971 b).

TABLE 2

Experimental Design

GROUP	BASELINE		TREATMENT							FOLLOW-UP			
			WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 1 MTH	3 MTH	6 MTH	
N T C	Contact by Mail Record	Orientation contact 15 mins Record	Excluded from treatment		Mailed ERBs	Refund Deposit	Mailed SRB		Mailed SRB	Record	Record	Record	Record
			No further personal contact with E. Record Only										
P L	Record	Orientation contact 15 mins Record	Behavioural analysis will-power	Discussion "Reasons for Stopping"	Selected topics cancer	Selected topics heart disease	Selected topics financial	Selected topics Social Aesthetic	Review of progress	"	"	"	"
C C	Record	Orientation contact 15 mins Record	Behavioural analysis Relaxation CC	CC	CC	CC	CC	CC	CC + Review	"	"	"	"
C S	Record	Orientation contact 15 mins Record	Behavioural analysis Relaxation CS	CS	CS	CS	CS	CS	CS + Review	"	"	"	"
C S + C C	Record	Orientation contact 15 mins Record	Behavioural analysis Relaxation CS	CS	CS	CS	CS + CC	CS + CC	CS + CC + Review	"	"	"	"

30sec nonstimulus pulse 2sig pulse

All "treatment" S's seen once weekly for 30 mins

Instructions

"No change"

Instructions "sit if you like"

Probes: All S's one weeks

recording at above intervals

All S's continuous follow-up for 6 months

10 days

Reliability checks

Reliability of format

48

Automatic recording devices have been used by some researchers (Azrin and Holz, 1968). The expense involved and the lack of any guarantee that S's would rely solely on these meant that such devices were not employed in the present study.

Other measures of smoking behaviour (e.g. 'smoking urges' (Lindsley, 1969)), while possibly more functionally related to the target behaviour than total number of cigarettes consumed, are also dependent on S's self-report data and were, therefore, not used. In view of the need for some measure of reliability of self-recorded data (Bernstein 1969, Simkins, 1971a; Simkins, 1971b), the following procedure was adopted.

At the initial interviews all S's were asked to give the name and address of the person who would be best able to observe their smoking behaviour. Those named included spouses, children, close friends and sometimes work associates.² Therapists then secured S's permission to contact the observers with view to obtaining an independent rating of S's smoking rates. The reasons for these checks were given as being 'scientific' and S's were told that their inclusion did not necessarily imply S's dishonesty or mistrust on the part of the therapists.

At the end of the fifth week of treatment the informants were contacted by mail with the request to observe and record for one week (on the smoking record booklets provided) the smoking behaviour of their partner.

Footnote:² In some cases where S's lived or worked alone, it was not even possible to secure a potentially useful observer-informant.

These informants were instructed to note in the appropriate time slot only those cigarettes that they could actually see their partners smoke. Then at the end of each day the informants were asked to give an estimate of the number of cigarettes they thought their partner would have smoked for the whole day. Informants were asked to put a line through those times of day that their smoking partner was not available for observation. It was emphasised that owing to the scientific nature of the study the informants must treat their records with utmost confidence, that they must avoid their partners becoming aware of their simultaneous recording and that any attempts at comparing records would prove unhelpful to the study. Informants were requested to mail their records in at the end of the week, using the stamped self-addressed envelope provided, and were thanked for their participation in the study.

Of the 39 potential informants to whom the requests for data were sent only 17 actually attempted to complete and return the record booklets. Ten of these informants returned data that provided no useful reliability estimates as their observations had not been effected until after their partners had completed their own continuous recording. Hence these data did not cover the same periods of time.

Seven informants returned data which included records of cigarettes that they could actually observe their partners smoking and six gave their estimates of their partners total consumption for the day.

Separate reliability coefficients were calculated

for each of these measures. The first of these coefficients was derived by the following equation:

$$\text{Reliability} = \frac{\text{Agreements}}{\text{Agreements} + \text{disagreements}} \times \frac{100}{1}$$

For an agreement to be recorded both S and the informant had to have noted the consumption of each cigarette within corresponding time intervals on the booklets (1 hr slots). Disagreements occurred when only one informant or S had recorded a cigarette smoked within the given time interval (i.e. for those times when informant indicated that S was available for observation). Separate reliabilities were calculated for each of the 7 S's and ranged from 56% to 100% with a mean overall reliability of observation of 82%. These reliability estimates were judged to be satisfactory for this method of observation (cf Watson and Tharp, 1972). Where S's were abstinent at the time of observation a reliability coefficient was not calculated in the above fashion as some informants simply entered 'nil' in the daily total without having separately indicated periods of observation. Moreover, these informants returned their data booklets after their partners had completed their own recording. However, 100% agreement was obtained in these instances involving three observers.

The coefficient for % agreement between S's totals and informants' estimates was arrived at in the following manner:

$$\text{Reliability} = \frac{\text{Smaller Estimate}}{\text{Greater Estimate}} \quad \times \quad \frac{100}{1}$$

The correspondence of estimated smoking rates ranged from 77% to 93% with a mean across subjects of 84%. Individually calculated coefficients and periods of observation are shown in Table 3.

With a further seven S's (quitters) verbal confirmation of their abstention was obtained by therapists contacting, by 'phone, the relevant informants. Commonly, where S's had quit, informants did not return the booklets. In all instances there was 100% agreement between this information and S's. Other anecdotal information was obtained from several informants personally known to therapists and in no case was there any substantial disagreement between S's records and informant's estimates of smoking rates.

Table 3

RELIABILITY DATA: Observers' (O's) reports and daily estimates and Subjects' (S's) reports of smoking rates over periods of concurrent recording.

	No. of days of Observation	Total hours of Observation	Reliability of recorded Observations	Reliability of O's estimates of S's daily totals
S _{*1} (Wife)	7	66	86%	N.A.
S ₂ (Son)	6	28	100%	83%
S ₃ (Husband)	7	53	89%	81%
S ₄ (Husband)	7	56	56%	93%
S ₅ (Husband)	7	51	88%	77%
S ₆ (Wife)	5	43	92%	93%
S ₇ (Wife)	3	15	61%	81%

*Denotes relationship of
Observers to Subjects.

Mean overall
reliability

82%	84%
-----	-----

RESULTS

Inspection of the individual data, shown as mean daily smoking rate for S over the baseline, treatment and follow-up weeks (refer Appendix TableIII) indicated a large degree of subject variability within each of the treatment conditions. It can be seen from Appendix TableIII that within each treatment condition the marked reductions in smoking rates reported by a few S's contributed to the majority of the observed reductions in group means. For example, in the CS + CC condition at the 6 month follow-up six of the eleven S's reported that their smoking rates were at about their pre-treatment levels. This group as a whole, however, exhibited a mean smoking rate that was only 53% of the baseline week. The reductions in mean smoking rates of five S's in that condition accounted for the overall change.

Figure 2 indicates the mean number of cigarettes smoked per day per week by each of the experimental groups over baseline, treatment and follow-up intervals. By inspection it is apparent that all of the treated groups (as distinct from NTC) displayed a tendency toward reduced smoking rates during the seven week treatment period but with the cessation of weekly contacts there was a uniform tendency to return to pre-treatment baseline rates.

However, at follow-up, particularly at the six month follow-up, the CS + CC condition evidenced a tendency to maintain treatment gains when compared with the other groups.

The NTC condition displayed a steady rate of cigarette consumption throughout all stages of the study. At no point did reported mean smoking rates for this condition diverge by more than 5% of baseline rates (refer Appendix Table IV).

The data were analysed using a two factor analysis of variance (Time x Treatment) design with repeated measures on one factor (Time). The first analysis was concerned with the baseline and six week treatment period and involved all experimental conditions. Both main effects of time ($F = 14.38$, $df = 6/350$, $p < .001$) and treatment ($F = 10.48$, $df = 4/350$, $p < .001$) attained statistical significance (Refer Table 4 (a)). These data indicate that over the treatment period some treatments were more effective than others and that within this period the treatments did produce significant changes in smoking rates. However, as will be shown in the later analysis, the significant effect due to treatments was largely attributable to the difference between the NTC group and the other groups.

The interaction of treatments over time did not attain significance ($F = .81$, $df = 24/350$, $p > .05$). This finding indicates that within the treatment period there were no significant differences due to the different treatment conditions having different effects over time.

Table 4 (a)

Analysis of Variance of Smoking Rates over Baseline and
Treatment Period

Source	df	MS	F
Time	6	1266	14.38 ***
Treatment	4	1130	10.48 ***
Time x Treatment	24	88	.81
Error	350	108	

*** $p < .001$

Data were included for all five experimental groups for this analysis and for analyses IV (b) & IV (c).

Table 4 (b)

Analysis of Variance of Smoking Rates over Baseline and
Follow-up Probes

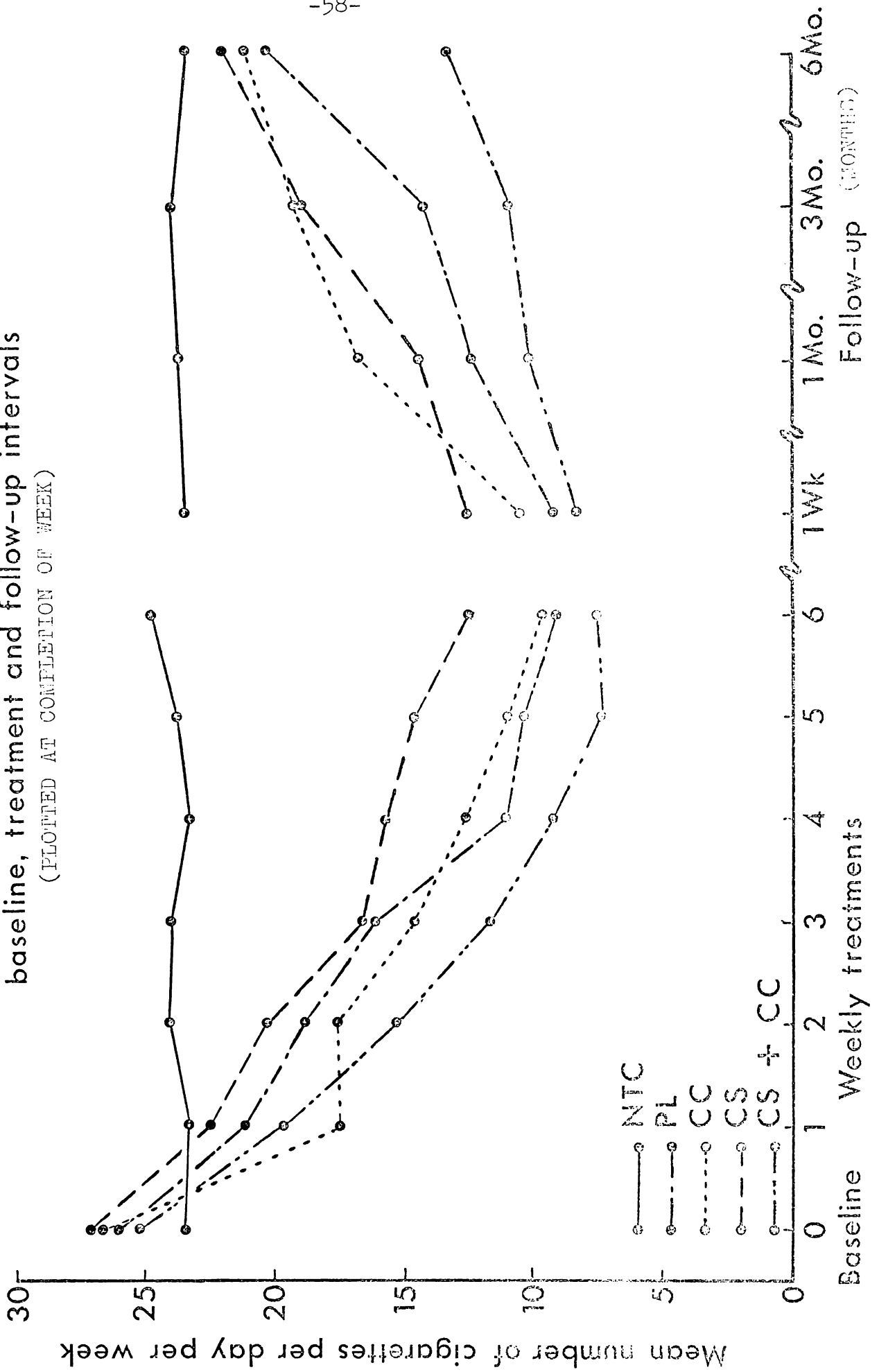
Source	df	MS	F
Time	4	1291	12.74 ***
Treatment	4	708	5.15 ***
Time x Treatment	16	101	.74
Error	250	137	

* * p < .001

figure 2

Mean daily cigarette consumption by five groups over baseline, treatment and follow-up intervals

(PLOTTED AT COMPLETION OF WEEK)



A second analysis, also involving all experimental conditions, examined the data over baseline and follow-up. Both main effects of time ($F = 12.74$, $df = 4/250$, $p < .001$) and treatment ($F = 5.15$, $df = 4/250$, $p < .001$) attained statistical significance. Thus, over baseline and follow-up some treatments were more effective than others and over the same period the treatment conditions produced significant changes in smoking rates (Refer Table 4 (b)).

The interaction of time treatment was not found significant ($F = .74$, $df = 16/250$, $p > .05$). These data indicate that over the baseline and follow-up intervals there were no significant effects due to different treatments having different effects over time.

Planned comparisons using t tests between means over treatments at each of the follow-ups indicated that at one week all treatments differed significantly from the NTC condition at the .05 significance level. The NTC condition, being stable over time, served as the reference condition against which treatment effectiveness could be gauged. At one month follow-up three treatments differed significantly from NTC (PL, CS and CS + CC) and at three months two treatments (PL and CS + CC) attained this criterion. At six months follow-up the comparisons indicated that none of the treatments differed significantly from the NTC condition.

A third analysis of variance was performed to evaluate therapist effects by treatments over the follow-up interval. The data were calculated using one mean for each of the treatment conditions taken over the four follow-up

intervals. Data for the NTC condition, for which there were no possible therapist effects, were not included in this analysis.

Neither of the main effects of time ($F = 3.75$, $df = 1/40$, $p > .05$) nor treatment ($F = 1.04$, $df = 3/40$, $p > .05$) attained statistical significance (Refer Table 4 (c)).

Similarly, the interaction of time x treatment failed to attain statistical significance ($F = 2.66$, $df = 3/40$, $p > .05$). These data show that the therapists did not differ significantly with respect to treatment effectiveness.

Some small differences in therapist effectiveness in terms of rate of change are evident when mean scores for each treatment condition are transformed to percentage change scores subsequent to baseline week. These data (refer Figure 3 and Appendix Table IV) are presented to allow for comparison of therapist effectiveness at all points of the study.

These transformed data allow a more useful comparison of therapist effects than total change scores as in some instances the mean baseline smoking rates differed markedly between therapists.

Two further analyses of variance were performed. The data were derived from the same intervals as in each of the first two analyses but excluded the data for the NTC condition. The NTC group was included as a control for the effects of volunteering for treatment and recording only, and, as such, may have masked some of the treatment effects when included in the earlier analyses of variance.

Table 4 (c)

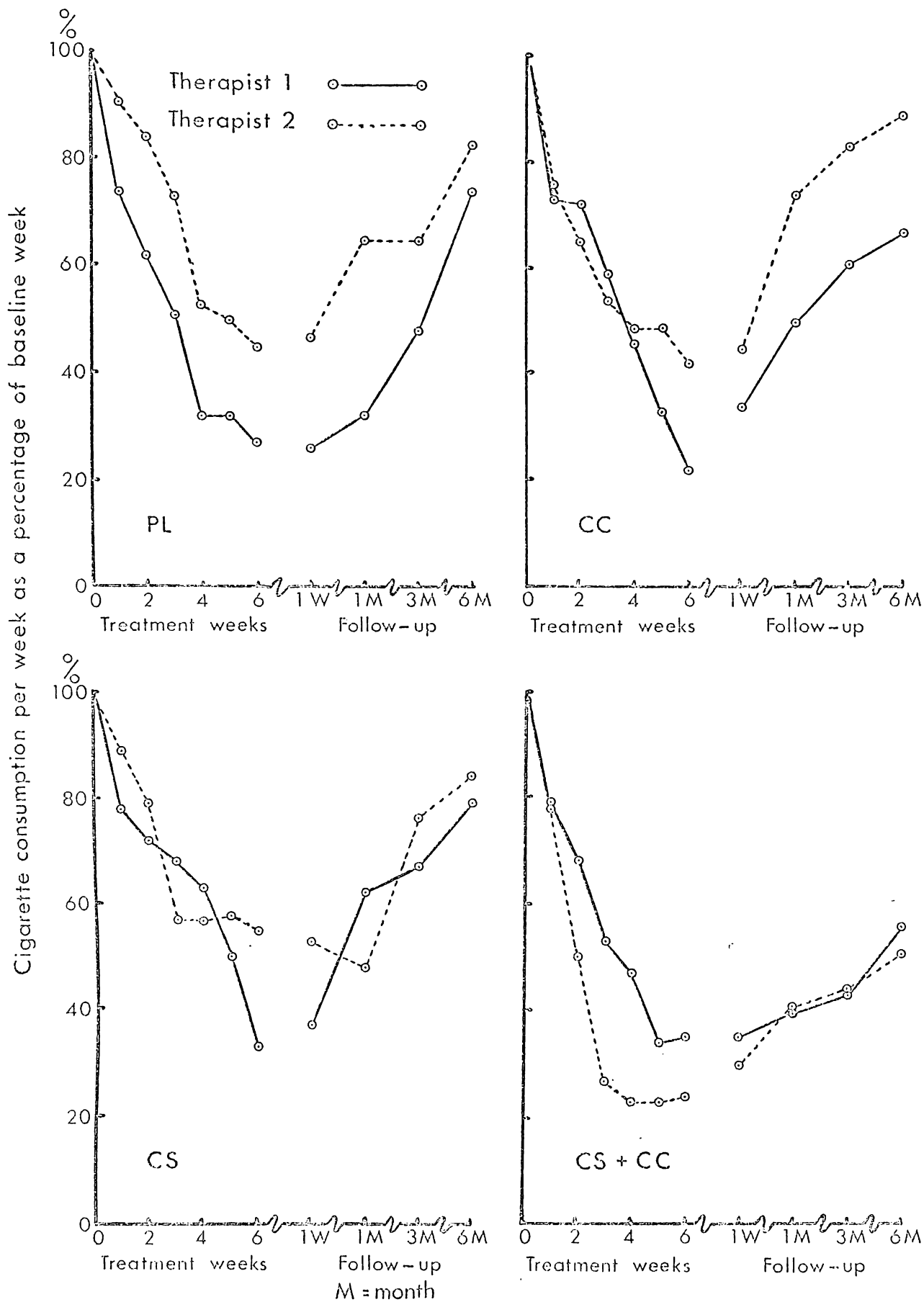
Analysis of Variance of Therapist Effects over the
Follow-up Period

Source	df	MS	F*
Therapist	1	336	3.75
Treatment	3	97	1.04
Therapist x Treatment	3	250	2.66
Error	40	94	

* No significant difference at $p < .05$ level.

figure 3

Comparison of therapist effects over treatment and follow-up intervals



The first analysis dealt with baseline and treatment period data for the four treatments. The results indicated a significant effect due to time ($F = 132.1$, $df = 6/280$, $p < .001$) but no significant treatment effects ($F = 2.5$, $df = 3/280$, $p > .05$). Similarly, the interaction, time x treatment, did not attain statistical significance ($F = .1$, $df = 18/280$, $p > .05$), (Refer Table 5 (a)). These data indicate that while all treatments resulted in significant changes over time they did not differ with respect to effectiveness. This finding reveals that the significant treatment effects found in the first two analyses were largely due to the effect of the NTC condition being different from the other treatments.

The second analysis was concerned with baseline and follow-up data for the four treatments. A significant main effect due to time was found ($F = 64.6$, $df = 4/200$, $p < .001$) but the treatment effects were not significant ($F = 2.4$, $df = 3/200$, $p > .05$). The interaction time x treatment, did not attain statistical significance ($F = .2$, $df = 12/200$, $p > .05$), (Refer Table 5 (b)).

These findings show that the treatments resulted in significant changes over time. However, the failure to find either significant treatment or time x treatment effects indicates that the treatments were not differentially effective at follow-up. Again the significant treatment effects found in the second analysis appear to be attributable to the inclusion of the NTC group within that analysis.

The effects of estimation and actual recording of smoking rates were examined. These data were presented

Table 5 (a)

Analysis of Variance of Smoking Rates over Baseline and
Treatment Period

Source	df	MS	F
Time	6	1582	132.1 ***
Treatment	3	284	2.5
Time x Treatment	18	12	.1
Error	280	113	

*** $p < .001$

Data were derived for the four treated contact groups for this and subsequent analysis. NTC Data were excluded.

Table 5 (b)

Analysis of Variance of Smoking Rates over Baseline and
Follow-up Probes

Source	df	MS	F
Time	4	1620	64.6 ***
Treatment	3	327	2.4
Time x Treatment	12	25	.2
Error	200	139	

*** $p < .001$

for each experimental condition in Table 1.

The results of \underline{t} -tests comparing pre-contact estimates and baseline records of smoking rates for all S's indicated that there was a significant reduction in smoking rates once recording began ($\underline{t} = 3.26$, $\underline{df} = 1/54$, $p = <.002$).

DISCUSSION

This section presents a critical appraisal of the component parts and some of the results of this research. First, the general results are discussed, then the sample groups are evaluated with reference to other smoking studies, the data collection is assessed, the experimental design is criticised, with two alternative designs being proposed, and finally, the treatments are examined in some detail.

The results of this study suggest that both CC and CS when used singly or in combination are ineffective in modifying smoking behaviour. Neither of these techniques proved to be any more useful in reducing rates of cigarette smoking than the PL condition, which was included only to control for the effects of being 'in treatment'. These findings compare closely with those of the majority of other smoking studies (Bernstein, 1969; McFall and Hammen, 1971). Apparently, most smoking treatments, irrespective of their nature, will result in a reduction in smoking rates (Bernstein, 1969, 1970).

While the PL, CC and CS treatments did not differ greatly from each other at any point in the study it is interesting that the CS + CC condition tended to show the greatest overall reduction in cigarette consumption during the treatment phase (Refer Fig. 2). Furthermore, the CS + CC condition, as predicted, tended to maintain treatment gains at follow-up to a more marked extent than the other treatments. It is also noteworthy that the CC + CS condition produced the greatest number of non-smokers at the six month follow-up (n = 3). The CS and CC conditions each produced one non-smoker at six month follow-up and the PL none. In this respect these

conditions did not differ greatly from the NTC condition (n = 1). The majority of S's in each condition had, at the six month follow-up, reverted to their pre-treatment smoking rates. For a few S's, however, the treatments did prove to be effective. Thus, the individual differences in responsiveness to treatments cannot be explained adequately in terms of the differences between these treatments. Various authors (e.g. Bernstein, 1969, 1970; McFall and Hammen, 1971) have attempted to explain the effects of most smoking treatments as being due to 'non-specific' factors' common to most treatments. It may be contended, however, that smoking reduction, or quitting, involves very specific behavioural changes and that these are likely to be brought about only by certain specific changes in the contingencies for smoking. The label 'non-specific' should be invoked only to indicate a current ignorance of those factors responsible for smoking behaviour change. Clearly research into those factors accounting for individual differences in responsiveness to smoking treatments will have to involve a close examination of individual smoking behaviour. (This point is discussed in the section, Recommendations for Further Research.)

The data suggest that some factors peculiar to the CS + CC condition were responsible for this condition displaying a slower return, than the other conditions, to baseline rates. It is tentatively suggested that the combined therapeutic package of CS + CC provided the individuals in that condition with more potent SM skills at follow-up than were offered in the other treatments.

This explanation is consistent with the speculations of Premack, Logan, Hunt and others. However, this explanation does not fully resolve the relapse issue. The long-term maintenance of treatment gains appears to be a major and, as yet, unresolved stumbling block in smoking research.

As predicted, no marked therapist differences in effectiveness were found when the data were examined over the follow-up intervals. In this respect these data are similar to those reported by Ober (1968). The standardized treatment protocol and the regular, detailed discussion between therapists probably minimised therapist effects. Some slight therapist differences were evident (Refer Fig. 3). For three of the experimental conditions therapist 1 (the writer) appears to produce a more rapid and substantial reduction in smoking during the treatment phase of the study. These gains tended to be maintained better at follow-up. In the fourth treatment (CC + CS) the therapists emerge as being approximately equal with respect to effectiveness.

The S's in the present study were likely to have been well motivated to quit smoking as none hesitated to pay the \$10.00 deposit and several S's (n = 11) had travelled long distances from other centres (up to 80 miles) to attend the sessions. The \$10.00 deposit and the published aims of the study may have served both to screen those who were only casually interested in participating and to reduce attrition (6/61).

Several authors have used contingencies for attendance with deposits of \$5.00 (Berecz, 1972, a), \$20.00 (Keutzer,

1968; Mees, 1966), \$25.00 (Marrone et al., 1970; Marston and McFall, 1970), and \$100.00 (Chapman et al., 1972).

The effects of these deposits in reducing subject attrition have been impressive and it is now an accepted, even recommended, practice to employ these contingencies in smoking research (Bernstein, 1969). In some cases, where deposits have not been employed, high drop-out rates have precluded any systematic assessment of treatment procedures (e.g. Guttman and Marston 1967). At the completion of this research 18 S's chose to donate their \$10.00 deposits to the Cancer Society. This suggests that threatened loss of money was not the sole factor in maintaining regular attendance.

S's were well-informed as to the requirements of the study prior to their first contact with the therapists. It was made clear that physical treatment methods, drugs, electric shock, or hypnosis would not be employed. In smoking research the nature and severity of the treatment may have a bearing on attrition rates (Powell and Azrin, 1968). The treatments were presented to S's as involving little time or effort on their part. Further, S's were not explicitly asked or told to quit smoking at any point in the programme. Thus, the demand characteristics (Orne, 1966) of the present study were probably relatively low. None of the S's who dropped out and forfeited their deposits evidenced any marked reductions in smoking rate while in treatment. The data for these S's were not included in the overall analysis and no contact was maintained with these S's at follow-up.

From the table 1 of subject characteristics it can

be seen that the S's smoked on average 27 cigarettes per day and had done so for a mean of 21 years. With a mean age of 39 years, and the frequent occurrence of histories of previous attempts to quit, the S's in the present study very closely resembled those S's in the Whitman (1969) study who were labelled 'chronic smokers'. Other smoking studies employing subjects comparable to those in the present study with regard to the aforementioned variables include Chapman et al., (1971), Grimaldi and Lichtenstein (1969), Keutzer, (1968) and Wagner and Bragg (1970). With the exception of the Wagner and Bragg study, in which significant reductions in smoking rates were evident until three months after treatment, none of the above researchers found any differential treatment effects or durable post-treatment reductions in smoking rates. It is noteworthy that many of the smoking studies have used university students as subjects (Azrin and Powell, 1968; Berecz, 1972 a, b; Bernstein, 1970; Koenig and Masters, 1965; Marston and McFall, 1971; Morgastern and Ratliff, 1969; Ober, 1968; Pyke et al., 1966; Resnick, 1968; Sachs et al., 1970; Schmahl et al., 1971; and Steffy et al., 1969). Typically these S's were more youthful, had smoked fewer cigarettes for fewer years and had experienced fewer unsuccessful attempts to quit than those employed in the present study. In terms of developing smoking treatments for general use this latter group of studies are seriously limited by their narrow selection of subjects.

These subject characteristics (youth, low smoking rate etc.,) may result in inflated estimates of efficacy where the concern is with applying the treatments to a sample of smokers representative of the general population (cf Mischel, 1968).

In the present study the collection of data was executed by the S's themselves. In SM it is difficult to envisage suitable or viable alternatives to the self-report. Two major methodological problems created through having S's continuously attending to and recording their behaviours.

First, self-reporting may be a reactive process (Lindsley, 1969; McFall, 1970; Mahoney, 1971; Simkins, 1971 a, b). With target behaviours other than smoking, some investigators have capitalized on the reactivity of systematic self-observation and reporting and have designed treatments which intentionally maximize this effect (Brodén, Hall and Mitts, 1972; Ernst, 1973; Ferster et al., 1962; Harris, 1969; Johnson and White, 1970; Kanfer 1970 a; Stuart, 1971; Tharp and Wetzell, 1969; Watson and Tharp, 1972). Brodén et al., (1972) found that by keeping their own records, 2 high school students were able to modify their class room attending and talking-out behaviours. When the self-recording was stopped the frequency of these behaviours returned to baseline levels.

In the present study the possible effects of reactivity of self-reports were largely controlled for by having this requirement common to all experimental groups. Although

the baseline week was the seven days immediately prior to S's first therapeutic contact some S's, because of differences in days of appointments, had recorded for up to 13 days prior to this contact. In standardizing baselines across S's it is not possible to assess the effects of the first few days of recording. The statistically significant differences between S's pre-contact estimates and their subsequent baseline records of smoking rates suggest that self-recording in the present study did result in an initial suppression of smoking rate. Similar differences in S's estimates and recorded behaviours have been noted by other investigators (Berecz, 1972 a; Keutzer, 1968; Marston and McFall, 1971; Wagner and Bragg, 1970). One implication of this finding is that over the follow-up probes, where S's were asked to record for only a week at a time, there may have been a similar reduction in smoking rates which might have spuriously suppressed the reported smoking rates at those points. Interestingly, the effects of self-reporting appeared to have stabilised as evidenced by the small range of variability (less than $\pm 5\%$) in reported rates of smoking in the NTC condition following baseline week.

One control for reactivity could have involved the use of an extended baseline (Sidman, 1960) with the requirement being that the baseline had stabilized to within a 5% range prior to any form of intervention. With cigarette smoking it is possible that such a baseline would involve several weeks of observation before a stable daily rate of consumption could be established. For example, cigarette consumption may be related to certain events

(e.g. social outings) which might occur on a weekly rather than a daily basis. The practical difficulties of having the volunteer S's wait until their baselines had stabilized prior to their receiving treatment contraindicated the use of extended baselines in the present study. It is noted that a large number of smoking researchers have employed arbitrarily chosen baselines of a shorter duration than that employed in the present research (e.g. Chapman et al., 1971; Marston and McFall, 1971; Morgastern and Ratliff, 1969; Schmahl et al., 1972). Others have relied on S's verbal estimates only or on occasional probes involving a few days recording at selected points in the treatment programme (e.g. Resnick, 1968).

A second problem in SM research is that one must establish the reliability of self-recorded behaviours (Simkins, 1971 b). These reliability estimates are useful in evaluating treatment effects, in assessing the veracity or quality of self-reports and in providing for unambiguous definitions of the observable and recorded behaviours. Few smoking researchers have attempted to assess systematically the concurrent validity and reliability of their S's self-report data. Exceptions include Azrin and Powell (1968), Ober (1968) and Chapman et al., (1971). The reliability estimates secured in the present study suggest that, with those S's for whom reliability estimates were obtained ($n = 7$), the accuracy of the self-report data was reasonably high. Where discrepancies in reports did occur the recording procedure itself may have led to error. For example, in some cases similar patterns of smoking over

a given day were presented in S's and observers' reports but differences occurred in the allocation of those cigarettes to the hourly time intervals during the day. Moreover, it is possible that S's could have smoked cigarettes unbeknown to the observers while ostensibly under their 'surveillance'. Since the observers were clearly related to their S's the possibility of collusion cannot be discounted. It would have been desirable to have obtained reliability estimates at several other points in the programme. However, the initial move to obtain such checks was made after the treatment phase had commenced and limitations of time precluded further checks. The poor response of observers in returning data during treatment did not encourage the use of such checks at follow-up. Possibly financial gains contingent upon the return of reliability data by observers, and follow-up data by S's themselves, could mitigate many of the problems associated with the return of these data. In the present study some S's repeatedly ignored the writer's telephone requests to return completed daily smoking records at follow-up after the \$10.00 deposits had been refunded.

The present study employed an experimental design which featured most of the design variables considered crucial for the comparative assessment of therapeutic efficacy (Bernstein, 1968; Eysenck, 1960; McNamara and McDonough, 1972). These include the following: control group, baseline, follow-up, systematic variation of treatment, unbiased observer, adequate sampling and assignment, and multiple treatment confounding. Had the present research

been conducted under closely controlled conditions, similar to those found in laboratory studies (e.g. Bandura and Perloff, 1967), certain methodological problems (e.g. reliability of self-reports) could have been more readily dealt with. The effects of having the writer participate in both the administration of the treatment and in the collection of data are difficult to assess. It is possible that certain experimenter biases (cf Rosenthal, 1966) may have had some bearing on the outcome although the finding that there were no significant therapist differences suggests that any biases were controlled for.

Two alternative experimental designs, involving reversals or multiple-baselines (Baer, Wolf and Risley, 1968), could have been utilized within the context of the present research. These designs can be employed in the assessment of treatments involving single subjects and do not necessarily rely on statistical analyses of data derived from group comparisons. Systematic variation of treatment contingencies involving reversals or return to baseline periods could have more clearly elucidated the separate contribution of treatment variables in the present study. Several other SM researchers have employed systematic variation of contingencies in their evaluations of given therapeutic packages (e.g. Barlow et al., 1969; Barlow, Agras, Leitenberg, Callahan and Moore, 1972; Glynn, 1970; Glynn et al., 1972). One problem of this design is that the experimental manipulations often require relatively lengthy periods of time for adequate assessment (cf Glynn, 1970) and this could prove inconvenient to S's. There are also certain ethical considerations posed through

introducing reversals where undesirable or potentially harmful behaviours are involved.

The second alternative design involves the use of multiple-baselines (Baer et al., 1968; Revusky, 1967; Sidman, 1960). This design has been used in a variety of settings, often where reversals are not desirable (Bijiou, 1970; Garcia, Baer and Firestone, 1971; Panyan, Boozer and Morris, 1970; Saunders, 1972). In terms of assessing the efficacies of CC and CS as in the present study, a multiple-baseline design could have involved the application of these treatments to smoking and one or more other behaviours (e.g. excessive eating or drinking). Separate baselines could have been simultaneously obtained for each of the behaviours while treatments would have been applied to one behaviour at a time in a sequential manner. The multiple-baseline design represents a viable alternative to, and has several advantages over, the factorial experimental design employed in the present study. A multiple-baseline design would have been considered for the present research had the writer been thoroughly familiar with this design at the planning stages of the study.

One problem emerges with the type of PL condition employed in the present research. While therapist behaviours within the PL condition might have been relatively well standardized^d it appears likely that there were certain differences in the therapists' behaviours between the PL and the other conditions. These differences stem from the emphasis on verbal discussion of health and other issues related to smoking in the PL condition to the emphasis

on treatment protocol and instruction-following characteristic of the other conditions. These possible differences raise the general problem of attempting to establish exactly what does constitute a 'placebo' condition. Some researchers have used 'insight controls', 'non-directive counselling' or 'information dissemination', as placebo conditions, (Koenig and Masters, 1965; Sachs et al., 1970; Steffy et al., 1970; Whitman, 1969). In many of these studies, however, as with the present study, the PL condition involves those S's receiving something that the S's in the other experimental conditions do not receive. Moreover, these labels do not adequately specify therapist behaviours. These considerations make it difficult to assume that the PL condition in the present study was entirely devoid of therapeutic elements (cf Sachs et al., 1970). Indeed, the data show that during the treatment phase of the present study the PL 'treatment' generally was as effective in reducing smoking as the other treatments. More appropriate placebo controls might involve the use of 'treatments' that are similar in all respects to the treatments of interest but lacking in some significant element (e.g. 'subliminal' electric shock, Grimaldi and Lichtenstein, 1969; Mees, 1966). One such placebo 'treatment' in the present study could have involved the non-contingent self-presentation of nausea in the CS condition.

The failure of both CC and CS as treatments might be attributed to the lack of control over several factors common to each of these techniques. These treatments involve the presumed modification of covert or unobservable processes. However, it is not possible to control for or

specify the part played by these processes in the overall change. The intensity, duration and quality of imagery, frequency of utilization of coverants or contingent nausea, and reliability of S's statements concerning their applications of the SM techniques are all aspects of the treatments that are beyond therapist control. While several authors have attempted to show experimentally that covert events have 'response status' and obey the same laws as overt events (Cautela, 1971 b; Davison and Wilson, 1973; Epstein and Peterson, 1973) their conclusions can only be established by inference (Mahoney 1972). The inaccessibility of covert 'responses' resulted in several methodological difficulties for the implementation and assessment of the SM treatments in the present study.

An initial difficulty was encountered in attempting to train the S's in their self-use of the therapeutic strategy. The therapists were not able to receive and independent feedback as to their effectiveness (Mahoney, 1972).

Another difficulty lies in training the S's to discriminate those conditions that call for the initiation of the SM sequence. The compulsory pause prior to smoking was intended to reduce the discrimination problem but it has yet to be established whether such a pause is, in itself, sufficient to allow for discrimination to occur.

A third, and major, problem is encountered in the assessment of CC and CS treatments; namely, the problem of contract fidelity. That is, did the S's do exactly as instructed? There is no clear answer to this question as many of the treatment requirements involved the self-manipulation of covert 'responses'. However, at least some

of the treatment requirements were observable and were therefore, potentially amenable to verification. The compulsory pause and the reading of the CC cards were two such observable components. Through acquaintances the writer was aware that not all S's were consistently adhering to their overt treatment requirements. Systematic checks of these behaviours were not implemented but might profitably be included in future research. SM treatment efficacy cannot adequately be gauged, without some estimate of the number of times that the treatment is employed.

One issue central to the 'contract' problem concerns the reinforcement available to S's for performing the SM behaviours. CC is supposedly made a self-reinforcing behavioural sequence through the contingent access to a (reinforcing) high probability behaviour. However, as Premack and Anglin (1973) note, for a reinforcement effect to occur there must be some reduction in the rate of consumption of the reinforcer. In CC, then, the subject is asked that in order to meet a criterion on a non-preferred event e.g. emission of anti-smoking and pro-non-smoking coverants) he must engage in a degree of self-denial or reduced access to reinforcing high probability events. It may be questionable whether the S finds participation in the CC strategy per se a reinforcing activity. It may be easier, and more reinforcing, for the S to circumvent the contingency requirement and continue with ad lib consumption of the reinforcer. CS requires that the S regularly self-administer some imaginably unpleasant stimulus whenever he encounters the reinforcing, but excessive, response. As with CC it may be that the S finds that engaging in

the CS sequence, involving regular self-punishment, is not an inherently reinforcing activity. Another issue in CS concerns the 'aversiveness' of the imaginal punishment. In the present study S's reported greatly varying estimates of the 'intensity' of the punishing stimuli. Optimal intensities of punishment or nausea are difficult to assess with CS. S's may habituate to the verbal descriptions of punishing scenes as treatment progresses. Attempts have been made to improve the 'quality' of the nausea in CS through intensive training in the use of imagery (McCullough and Powell, 1972) or with drugs (Maletzky, 1973). S's subjective ratings of nausea may have a bearing on the outcome of treatment, with the more intense punishment resulting in a greater suppressive effect (Azrin and Powell, 1968; Janda and Rimm, 1972). However, S's are less likely to self-administer punishment of greater intensities (Powell and Azrin, 1968). Thus, with CS there are the dual problems of habituation to and/or non-presentation of self-punishment. These issues have not been resolved in the present study. The general question remains; in what ways can SM behaviours involving self-denial and/or self-punishment be reinforced? This question has important implications for those wishing to utilize SM techniques in applied settings. Obviously for an SM technique to be of value one must identify and specify those conditions under which the technique will most likely be used.

CIGARETTE SMOKING AND SELF-MANAGEMENT

The failure of the SM treatments in the present study suggests that procedures which rely only on developing internal mechanisms of self-control may not be efficacious with smokers. With SM techniques it has been observed that self-punishment should only be used if it affords access to a wider range of positive reinforcers for the emission of alternative and/or competing responses (Watson and Tharp 1972). The SM techniques examined in the present study, similarly to most other smoking treatments, did not include methods for reinforcing responses or behaviours that were overtly incompatible with smoking. Perhaps one explanation for this is that there are very few behaviours with which smoking is incompatible. The health risks associated with smoking are only probabilistic, and are generally far removed in time from the twenty or so lots of gratifications that the smoker receives daily for the greater part of his life.

The general goal of most smoking treatments seems to be to achieve abstinence. Hunt and Matarazzo's (1971) comment that the data on abstinence resembles a typical extinction curve is unsurprising when it is considered that non-smoking is in effect a 'non-behaviour' and, as such, would present few opportunities for reinforcement. Since smoking does not appear incompatible with a great deal there would be few reinforcers the smoker could automatically come to expect for abstaining. If the former smoker remains in his usual environment he is still faced with a daily bombardment by the discriminative stimuli which previously cued his grossly overlearned smoking response.

Thus, where abstention is the treatment goal the smoker is asked to practise self-denial of a previously highly reinforcing activity while at the same time receiving few opportunities for additional reinforcement. Where physical 'withdrawal' symptoms are associated with quitting self-denial may be quite punishing. If the importance of additional reinforcement for alternative behaviours to smoking is accepted then certain implications for future smoking treatments involving SM techniques become evident.

Firstly, smoking treatments will need to cater specifically for the identification and systematic reinforcement of these alternative overt behaviours. Thus, a smoking treatment might be designed to provide the ex-smoker with entry into a social group - comprised only of ex-smokers - which would endorse a range of activities that would clearly reveal the advantages of quitting. One example might include physically arduous sports wherein high levels of physical fitness are important. Possibly the reinforcement available to the ex-smoker for his sporting activities and attainments might outweigh the potential sources of reinforcement for resuming smoking. Analogously Baer and Wolf (1971) describe the phenomenon of 'trapping' whereby the individual (in their study a pre-school child), through the attainment of certain selected and graduated behavioural goals, was able to interact with peers in a natural community of reinforcement. The subject, subsequent to gaining entry to that community, was able to develop a comprehensive repertoire of behaviours quite independently of therapist's intervention. Smoking treatments might well make provision for entry into a similar ex-smokers reinforcement community - similarly to Alcoholics Anonymous -

where a large range of 'natural' reinforcers are available.

Secondly, there is the problem of initially achieving abstinence with smokers. Premack (1971) emphasised the importance of early success in quitting smoking as a means of ensuring the likelihood that the internal contingencies of self-control would remain potent. Mahoney (1972) has pointed out that the clinical utility of SM techniques is evident when contract fidelity is assured. One method of ensuring initial early success in quitting smoking and possibly enhancing the likelihood of contract fidelity might involve the utilization of contractual arrangements of the kind reported by Tighe and Elliott (1967). These authors achieved short-term 100% abstinence with their smokers through the imposition of contingencies involving loss of money for the resumption of smoking.

It has been noted that the loss of existing reinforcers is a powerful method of punishment (Kazdin, 1972; Watson and Tharp, 1972). 'Response cost', a procedure involving the removal of conditioned reinforcers for therapeutic change, has been effectively applied in a variety of different settings (Kazdin, 1972) including Boy's Homes (Fixsen, Phillips and Wolf, 1972; Phillips, 1968), schools (McDonald, Gallimore and McDonald, 1970; McNamara, 1971), hospitals (Winkler, 1970) and in family homes (Tharp and Wetzel, 1969). The results of these studies have generally indicated that response cost is effective in rapidly reducing the incidence of undesired behaviours within the respective settings. Contractual arrangements involving response cost and weight loss have

been assessed (Harmatz and Lapuc, 1968; Hall, 1972; Harris and Bruner, 1971; Innes, 1972). These contracts have involved the S's depositing money or valued possessions with the experimenter and having these returned at various points over time contingent upon the attainment of previously agreed upon weight losses. Failure to attain the required weight loss would result in forfeiture of the money and/or possessions. Contingencies of this type have been found more effective in achieving weight loss than procedures involving training in SM (Hall, 1972; Harris and Bruner, 1971). There seems to be clear evidence that contingency contracting involving response cost is effective in bringing about rapid short-term behavioural suppression.

The implications of response cost for smoking control and SM are evident. Response cost represents one method by which initial success in quitting smoking might be achieved. It is suggested that contingencies of response cost might increase the likelihood of S's utilizing their particular SM technique by removing the competing reinforcement available to S's for continued (even if reduced) smoking. Thus, smoking treatments might initially involve the creation of contingencies involving the deposit of large sums of money or valued possessions with the therapist. These could be returned gradually over time at an agreed rate providing that the subject had not smoked within given intervals. The total time span would probably best exceed the 6 month post-treatment period within which the greatest rate of relapse has been found to occur (Hunt and Matarazzo, 1973). A resumption of smoking would involve the irrevocable loss of the money or possessions.

A contract could be drawn up in the manner of a legal document and supervised by acquaintances or peers of the subject. This alternative to continuous therapist involvement has already been examined in systems involving response cost in classroom settings (Bolstad and Johnson, 1972) and in institutions (Fixsen et al., 1972). The results of these studies have indicated that peer reporting of rule violations is within those settings, generally reliable.

With the contract established, S's might begin training in SM techniques in a manner similar to that described by Watson and Tharp (1972). Specific techniques could include covert sensitization and covert control. Regular SM training could be gradually faded over time as would the response cost contingency. The rate of fading of therapist involvement might be determined by the rate with which the S obtained alternative sources of reinforcement. The importance of this latter point is underscored by the observation that S's knowledge of methods of SM alone is insufficient to result in behavioural change (Hall, 1972; Harris, 1969; Harris and Bruner, 1971).

The above suggestions emphasise the importance of a combined and comprehensive treatment approach to the modification of cigarette smoking. Where SM procedures are involved it is considered that some form of external control involving reinforcement and/or punishment is necessary to facilitate the successful application of these procedures. The difficulties in finding readily available reinforcers for abstinence are, in part, overcome through the establishment of contractual arrangements involving financial contingencies.

It is interesting that various authors have stressed the significance of 'internal mechanisms' of self-control as regulatory mechanisms in human behaviour (e.g. Kanfer, 1970 b, 1971; Premack, 1971). However, the foregoing considerations suggest that external sources of reinforcement may be necessary to facilitate SM. Skinner (1953) and others (Ferraro, 1973; Logan, 1973) have proposed that internal SM processes, if they exist at all, are ultimately dependent on external controls.

RECOMMENDATIONS FOR FURTHER RESEARCH

The research issues and methodological problems in the SM area have recently been reviewed by Mahoney (1972). Some recommendations for further SM research are offered here.

a) Because of the obvious difficulties in measuring 'covert behaviours' experimental process studies of SM techniques such as CS and CC would seem premature. Problems of inference are difficult to overcome. These difficulties should not, however, preclude the assessment of the clinical utility of those SM techniques involving 'covert behaviour' modification (cf Mahoney 1972). As previously noted, the CS and CC treatments are in effect therapeutic packages involving several separate SM enterprises including, self-observation, self-recording, and self-reinforcement and/or punishment. Additionally, CS involves self-relaxation. At present little attention has been directed toward the assessment of the relative importance of each of these components to the whole treatments. In CS, for example, the role of relaxation or the effects of 'homework assignments' have not been established. Some experimental work has indicated the possible significance of specific therapeutic instructions within the CS treatment process (Barlow et al., 1972) but generally research of this nature is lacking.

It is suggested that SM treatment packages involving several separate components might be evaluated within an extended baseline and reversal or a multiple-baseline design. Research of this nature could conceivably result in

considerable refinement of and improvements in SM packages such as CC and CS which have already shown some clinical promise.

b) Studies of the nature of the present endeavour are faced with certain methodological difficulties created through the subjects being recruited from and treated in the community. Future experimental studies aimed at establishing the efficacies of given SM techniques might best be undertaken in closely controlled laboratory conditions (e.g. Bandura and Perloff, 1967; Kolb, Winter and Berlew, 1958).

c) Researchers in the smoking research area might well take a lead from the work of Mills, Sobell and Schaeffer (1971), Schaefer, Sobell and Mills (1971) and Sobell and Sobell (1973) with alcoholics. These authors assessed the drinking behaviour of their alcoholic subjects in terms of sip frequency, sip magnitude, ability to name and mix drinks, and overall rate of consumption. These observational data were compared with those obtained with 'normal' drinkers. Subsequent investigations indicated that training former alcoholics to exhibit socially appropriate methods of drinking proved more efficacious than procedures aimed at achieving total abstinence. It was noted (Sobell and Sobell, 1973) that a goal of abstinence might impose too many unrealistic and possibly undesirable social demands upon the former alcoholic.

Further research into smoking might involve systematic observational studies of actual smoking behaviour along comparable dimensions to those reported by Schaefer et al., (1971). Smoking treatments might then be directed toward

training smokers to smoke reduced amounts of cigarettes and to smoke these only in certain specifiable contexts. The total daily consumption could be within what appear to be relatively 'safe' limits as determined by current medical evidence. 'Social' or 'situation-specific' smoking might emerge as an attractive and viable alternative to abstinence for many smokers. In the present study, many S's reported that previous attempts at quitting had been aborted by the acceptance of free cigars or cigarettes at social gatherings such as Christmas parties. Once started a return to previous smoking rates quickly followed. Possibly if these S's were trained to regularly smoke at social gatherings and a few other specified places the temptation to resume regular and heavy cigarette consumption might not be as great. The impressive results of the work of Sobell et al., (1973) certainly suggests that similar investigations with cigarette smokers might be warranted.

d) Finally, research into SM techniques involving self-management of externally applied consequences for observable behaviours could be intensified (Watson and Tharp, 1972). Within the context of this type of SM many carefully controlled and therapeutically useful studies could take place (cf Glynn 1970).

SUMMARY OF CONCLUSIONS

The two covert self-management techniques of interest, when administered separately and also in combination resulted in a reduction in the target behaviour (smoking) that was not statistically different from the reduction for the placebo condition.

These results are interpreted as indicating that, within the context of cigarette smoking, SM treatments only involving the presumed manipulation of covert contingencies are not sufficiently comprehensive to be effective. The principal reason for the failure of these techniques in the present study is thought to be one of S's non-fulfilment of the implied treatment contract. It is suggested that the execution of covert SM behaviours is ultimately dependent on external sources of reinforcement. In the present study it is noted that the treatments examined did not provide for the development of behaviours which could lead to externally applied reinforcement. Abstention alone, which is a non-behaviour, is unlikely to become the target of additional reinforcement in the natural environment. Hence both non-smoking and the S's use of the SM techniques are thought to extinguish subsequent to therapist intervention. It is thought that the application of contrived external reinforcers (e.g. contingency contracting) may serve a useful role in ensuring sustained use of SM procedures until natural sources of reinforcement come to control these behaviours. These difficulties, however, should not halt research into what appear to be clinically valuable techniques of SM.

- (e) _____ I really have no strong and enduring preferences at all regarding the brand of cigarette I smoke.
- (f) _____ I have a general brand preference, but would smoke almost any other brand if someone offered it to me.
- (g) _____ I definitely would not smoke a non-filter brand of cigarettes.
- (h) _____ I definitely would not smoke a menthol brand of cigarettes.
- (i) _____ I definitely would not smoke a filtered brand of cigarettes.
- (j) _____ I would smoke an occasional non-filtered cigarette, but not on a regular basis.
- (k) _____ I would smoke an occasional menthol cigarette but not on a regular basis.
- (l) _____ I would smoke an occasional filtered cigarette, but not on a regular basis.
- (m) _____ The brand of cigarette I smoke makes almost no difference to me.
- (n) _____ None of the above are true of my brand preferences. (If you check this, then briefly describe what is true of your brand preferences.)

8. Give your reasons for wanting to quit smoking at this time.

9. What is your own analysis of why you smoke?

10. Rank in their order of importance the following attributes of smoking as they are related to your own smoking pattern: (Give a rank of 1 to the most important, 2 to the next, etc.)

- (a) _____ smoking is a way of relieving tension
- (b) _____ smoking is a way of being sociable
- (c) _____ smoking is a way of rewarding yourself for hard work.
- (d) _____ smoking is something that adds to the feelings of satisfaction after a good meal
- (e) _____ smoking is something that tastes good and is pleasurable when you are relaxed and alone.
- (f) _____ smoking is something to do to "kill time" and avoid boredom
- (g) _____ other (specify)

11. How do you normally buy your cigarettes (e.g., one pack at a time - one carton at a time?)

12. List all the members of your family, including yourself, in order of age, starting with your parents and then the oldest child etc. Give their name, age, sex, and smoking status.

<u>Name</u>	<u>Age</u>	<u>Sex</u>	<u>Now or ever a smoker</u>	<u>Amount</u>	<u>No. of years</u>
-------------	------------	------------	-----------------------------	---------------	---------------------

13. What attitudes toward smoking did your parents attempt to communicate to you while you were growing up and living at home?

14. Check those items listed below which you own and use regularly:

- (a) _____ pocket or purse lighter (give approximate cost: _____)
- (b) _____ desk or table lighter (estimated cost _____)
- (c) _____ cigarette case (estimated cost: _____)
- (d) _____ special ashtray (anything fancy or more than just functional, e.g. with wood trim, unusual shape, etc.)
- (e) _____ pipe (How often do you use this? _____)
- (f) _____ cigarette holder (How often do you use this? _____)
- (g) _____ other accessories (specify)

15. HEALTH STATEMENT Please read and sign as a condition of admission to the Smoking Clinic Programme.

"To the best of my knowledge, I have no health problem which would complicate my participation in this experiment on smoking. Should such physical problems develop while I am participating in this experiment, I will not hold anyone connected with the smoking clinic responsible."

Signature _____ Date _____

APPENDIX TABLE 1 (b)

Confidential:

For Research
Purposes Only

UNIVERSITY OF WAIKATO SMOKING CLINIC

Follow-up Questionnaire

Please fill out the following form and return it as soon as possible.

NAME:

DATE:

A. Smoking

1. How many cigarettes, on the average, do you estimate you currently smoke per day?

2. How strong is your current desire to smoke cigarettes as compared with your desire at the end of the smoking clinic (Check one.)

_____ very much stronger; _____ stronger,
_____ about the same; _____ less; _____ very much less.

3. Rank in their order of importance the following attributes of smoking as they are related to your own smoking pattern. Give a rank of 1 to the most important, 2 to the next etc. (If you do not now smoke, rank in terms of the degree to which you may feel tempted to smoke.)

- (a) _____ smoking is a way of relieving tension
- (b) _____ smoking is a way of being sociable
- (c) _____ smoking is a way of rewarding yourself for hard work.
- (d) _____ smoking is something that adds to the feelings of satisfaction after a good meal.
- (e) _____ smoking is something that tastes good and is pleasurable when you are relaxed and alone.
- (f) _____ smoking is something to do to "kill-time" and avoid boredom.
- (g) _____ other (specify)

B. Physical Condition

Check any and all of the following physical conditions which you now notice in yourself, and which represent changes that have occurred since you participated in the University of Waikato Smoking Clinic. (The change does not necessarily have to be a direct result of participating in the clinic.)

(a) _____ I have gained weight (How much? _____)

- (b) _____ I have lost weight (How much? _____)
- (c) _____ I have more physical energy.
- (d) _____ I have less physical energy.
- (e) _____ I have had more physical illnesses or discomforts. (Check which types.)
_____ gastrointestinal; _____ respiratory;
_____ muscular; _____ circulatory; _____
others (Specify)
- (f) _____ I have had fewer physical illnesses or discomforts.
- (g) _____ I have had more difficulty sleeping.
- (h) _____ I have had less difficulty sleeping.
- (i) _____ I have found it easier to concentrate.
- (j) _____ I have found it more difficult to concentrate.
- (k) _____ I have experienced greater enjoyment of stimuli (e.g., food, music, colour etc.)
(Specify)
- (l) _____ other (Specify)

C. Emotional Condition

Check any of the following items that represent emotional problems which have developed since you participated in the University of Waikato Smoking Clinic. For those you check, please give an explanation, using other side if needed.

- (a) _____ nervousness or tension
- (b) _____ depression
- (c) _____ irritability
- () _____ nervous habits (e.g. tics, fingernail biting, compulsive rituals, stammering etc.)
- (e) _____ lack of productivity.
- (f) _____ other (Specify)

D. Other

1. Have you experienced an increase or decrease in your consumption of alcoholic beverages? _____
If so, please explain:

2. Have you experienced an increase or decrease in your use (if any) of drugs? _____
If so, please explain:

3. Have you had any kind of change in your condition which could possibly be attributed to your attempt to stop smoking, and which is not covered above?
_____. If so, please explain:

4. Do you feel that your present rate of smoking will continue at the same level? Yes/No

If 'NO' then specify increase - decrease.

Footnote (1) I am indebted to B. Mausner for providing these questionnaires which I have only slightly modified.

Footnote (2) These questionnaires were deliberately utilized to provide more information concerning smoking than was required in the present study. The additional information was of service to the Cancer Society.

APPENDIX TABLE III

INDIVIDUAL MEAN CIGARETTES PER DAY PER WEEK BY TREATMENTS

<u>BASELINE</u>		<u>TREATMENT WEEKS</u>						<u>FOLLOW-UP</u>			
B		1	2	3	4	5	6	1w	1m	3m	6m
N T C	23	21	23	23	23	23	23	23	23	20	40
	45	46	45	45	45	45	45	45	45	45	45
	21	22	26	24	25	27	25	24	25	24	29
	33	32	32	33	33	31	33	31	36	37	38
	22	24	25	25	25	23	22	21	21	22	21
	29	29	28	29	28	27	29	31	27	28	0
	15	14	14	14	14	15	13	16	13	10	7
	17	17	18	17	17	17	17	17	18	17	19
	26	25	26	26	24	26	27	26	27	28	24
	14	13	11	12	11	11	9	9	10	15	14
	17	18	18	17	17	19	17	18	18	18	18
PL	21	17	16	15	16	16	16	16	16	18	20
	28	19	15	14	5	0	0	0	0	12	19
	24	17	14	9	2	11	5	5	10	5	11
	26	13	2	1	2	3	3	3	6	17	20
	21	14	15	15	15	16	17	15	12	19	22
	32	31	32	24	9	1	0	0	4	16	20
	47	42	40	37	34	35	34	32	33	34	40
	27	22	19	15	11	9	4	3	20	20	20
	18	18	18	11	9	8	3	12	13	15	20
	23	22	19	21	20	19	17	18	20	20	23
	22	22	19	16	0	0	0	0	4	1	11
CC	11	8	5	0	0	1	2	5	8	8	5
	19	16	11	10	5	0	1	3	10	12	16
	13	12	10	7	8	5	4	3	6	7	8
	29	24	25	20	18	18	18	20	0	0	0
	46	25	35	32	24	13	1	10	35	44	49
	21	18	14	16	17	18	18	21	22	26	27
	32	22	22	16	13	13	10	15	21	22	28
	20	14	13	10	10	9	6	4	9	10	13
	39	32	29	24	25	27	24	26	35	38	37
	34	20	15	8	0	0	0	0	20	20	21
	28	27	20	19	20	18	12	13	21	28	28

APPENDIX TABLE IV

THERAPIST EFFECTS OVER TREATMENTS AS
PERCENTAGE CHANGE FROM BASELINE

		<u>BASELINE</u>		<u>TREATMENT</u>						<u>FOLLOW-UP</u>			
			1	2	3	4	5	6	1w	1m	3m	6m	
PL	T1(n=6)	100	74	62	51	32	32	27	26	32	58	74	
	\bar{x}		25.3										
	T2(n=5)	100	91	84	73	53	50	45	47	65	65	83	
	\bar{x}		27.5										
CC	T1(n=5)	100	73	72	59	46	33	22	34	50	61	67	
	\bar{x}		23.5										
	T2(n=6)	100	76	65	54	49	49	42	45	74	83	89	
	\bar{x}		28.9										
CS	T1(n=6)	100	78	72	68	63	50	33	37	62	67	79	
	\bar{x}		18.3										
	T2(n=5)	100	89	79	57	57	58	55	53	48	76	84	
	\bar{x}		37.1										
CS + CC	T1(n=5)	100	78	68	53	47	34	35	35	40	43	56	
	\bar{x}		33.9										
	T2(n=6)	100	79	50	27	23	23	24	30	41	44	51	
	\bar{x}		18.0										
NTC	(n=11)	100	100	102	101	100	101	105	100	101	101	99	

APPENDIX TABLE V

DROP OUTS: TABLE OF SUBJECT CHARACTERISTICS AND ATTENDANCE AT TREATMENTS

	<u>Age</u>	<u>Sex</u>	<u>Estimated Rate</u>	<u>Baseline Record</u>	<u>Years Smoking</u>	<u>Previous Attempts</u>	<u>Number of Sessions</u>
1. Placebo	73	M	25	22	56	1	1*
2. N T. C.	60	M	27.5	26	39	1	1*
	47	M	35	36	30	0	1*
3. CC	31	M	30	31	9	2	1*
4. CS	34	M	23	23	18	3	5
5. CC + CS	38	M	20	21	23	10+	5
	21	F	20	21	7	1	4
	44	M	18	16	24	10+	5

* Orientation session only

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