

SATIATION COMBINED WITH A "RITUALIZED" ALTERNATE RESPONSE  
IN THE REDUCTION OF CIGARETTE SMOKING:  
A COMPARATIVE STUDY

Zeev Rosberger

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## Abstract

Zeev Rosberger

### Satiation Combined With a "Ritualized" Alternate Response in the Reduction of Cigarette Smoking: A Comparative Study

Two techniques for reducing smoking were studied either alone or in combination. A satiation procedure was used which required the subject to smoke rapidly in order to produce nausea. It was hypothesized that this technique, which had the advantage of pairing the smoking act and the smoke itself with nausea, combined with teaching the subject to use an alternate response (a "ritualized" relaxation procedure) would prove to be an effective method for reducing smoking. In this study, 45 subjects were placed in one of four groups: combined Relaxation-Satiation (R-S); Satiation (S); Relaxation (R); or Minimal-Treatment Minimal-Contact Control. A fifth group of nine subjects, unaware of the above study, recorded daily cigarette intake only. The R-S Group showed greater smoking reduction than the other four groups. The R and S groups showed significant smoking decrement compared to controls. However, at three-month follow-up, there was no significant difference between groups. The failure of subjects to treat extra-therapy cigarettes as experimental (i.e., smoke them rapidly), as well as their need to clarify their commitments to smoking reduction were the main reasons for poor long term results.

## Acknowledgements

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## Introduction

In recent years, an intensive and multi-faceted research program has been initiated into the area of cigarette smoking and health. Reports published have included epidemiological, clinical, experimental, and theoretical approaches. All of these reports have contributed to the vast amount of knowledge presently known about smoking and have elevated public concern over the dangers of smoking to a great degree.

Epidemiological studies in the 1950's have demonstrated the relationship between chronic use of tobacco products and the incidence of mortality due to severe disease (Surgeon General's Report, 1964). This report indicates that chronic smokers are almost eleven times more likely to acquire lung cancer or, twice as likely to contract coronary disease, as compared to non-smokers. The desirability of research directed toward effective cigarette smoking cessation methods, is evidenced by the fact that these diseases account for eighty-five percent of the higher death rate among smokers. The Surgeon General's Report also demonstrates that the frequency of these diseases rises with the increased individual consumption of cigarettes. Low levels of cigarette use (less than 10-12 cigarettes per day) are not as highly related to the incidence of disease as higher levels of intake, indicating that maintenance of a low level of consumption may be advantageous for the individual smoker. Because of this relationship, maintenance of lowered smoking frequency



Other lines of research have attempted to demonstrate that smoking is related to certain personality characteristics. A review of research on personality variables in smokers by Smith (1970), summarizes those characteristics which distinguish smokers from non-smokers. Smith's general conclusions, (in reviewing relevant studies which utilized psychological tests, questionnaires, and interviews), were that smokers were more extroverted, more anti-social, impulsive, and more externally controlled, i.e., more likely to attribute what happens to them as fate, luck, etc., rather than to what they themselves do. He also suggests that smokers tend to exhibit poorer "mental health", a vague concept for which no adequate definition is offered. These correlations, although significant in many cases, have failed to be predictive of successful therapeutic outcome (Keutzer, 1963; Lichtenstein and Keutzer, 1969; Best and Steffy, 1971). Large-scale studies, correlating different personality variables, with diverse, successful therapeutic modes, need to be carried out to discover whether these variables can be utilized in a useful predictive manner.

#### Treatment Programs

Although extensive medical research continues into the nature of the relationship between cigarette smoking and disease, and new techniques of curing these diseases, other research has delved extensively into the prevention and treatment of smoking. Preventative measures have been instituted in schools, down to the early elementary grades, with the





Other approaches have involved the treatment of smoking behaviour itself in an attempt to discover and change the variables which may initiate and those which may maintain the behaviour. Many different methods have been attempted in the drive to discover these variables and eliminate them. These have included public smoking clinics, offering both drug (e.g., Ejrup, 1964), and non-drug (e.g., Lawton, 1962) therapies; group therapies (e.g., Tamerin, 1972); hypnosis (Johnstone and Donoghue, 1971); use of nicotine substitutes (Lernstein, 1969); education and information dissemination, (e.g., O'Keefe, 1971); and behavioural therapies, (e.g., Koenig and Masters, 1965). All of these approaches have indicated success to one degree or another, but few have demonstrated successful abstinence which is perhaps the most important criterion for a treatment program. One uniform aspect of most of these studies lies in their poor experimental design. Outcome is of reduced significance, if active treatment variables cannot be accurately related to a sound theory of cigarette smoking maintenance, so that replication and productive clinical use can be achieved.

Early examples of treatment approaches were strictly clinical in design and scope. One of the best examples of the "clinic" approach was the multi-faceted treatment of Ejrup (1964). Although he showed dramatic improvements--as high as eighty-eight percent abstinence--his results are not easily attributable to any specific treatment variables. This occurred because at any given point in the study, a combination of any or all of the following were employed; informa-





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shortcomings by creating paradigms in which the punishing stimuli used to suppress the smoking act were more closely related to the smoking act itself. Thus, blasts of hot, smoky air were used in several experiments as an aversive stimulus (Wilde, 1964; Franks, Fried, and Ashem, 1966; Grimaldi and Lichtenstein, 1969). The best controlled of these studies (Grimaldi and Lichtenstein, 1969) has shown that this technique is of limited value in that groups receiving both contingent and non-contingent blasts of air did not differ from each other or a control group.

Another approach to the elimination of maladaptive behaviour, was developed by Allyon and Michael (1958). Using a satiation technique, they eliminated magazine hoarding behaviour in a mentally defective patient by filling his room so that it overflowed with magazines. The positively reinforcing value of the hoarding response became aversive, so that the patient began to actively remove magazines from his room. Social reinforcement (attention) was given for the emitting of non-hoarding behaviour. Allyon (1963) used a similar method in successfully eliminating towel hoarding behaviour.

Resnick (1968) applied this idea to the development of an aversion to smoking. One group of subjects was instructed to increase their smoking rate to three times the base rate, while another increased their rate to twice the normal. The treatment period was one week. Both groups showed highly significant smoking decrements at a four-month follow-up, with 63% having remained abstinent. Both were significant-



three active treatment groups maintained a smoking level at between 20-30% baseline at a six-month follow-up, whereas the attention-placebo group returned to approximately 70% of baseline cigarette intake.

The development of a conditioned aversion to cigarette smoking has shown varied results. The relative degree of success may be, for the most part, attributed to the utilization of an aversive stimulus, which has progressively possessed properties more closely related to those effective in the maintenance of the actual smoking act itself. Thus the strongest aversions have been created when the smoking act has been manipulated in order for it to produce aversive properties rather than positively reinforcing properties (i.e., through the use of rapid smoking or satiation).

However, it has been noted that although punishment may adequately suppress behaviour, the behaviour is not, in reality, extinguished. Cigarette smoking is more than simply the inhaling of smoke, as it has been shown that nicotine plays a relatively minor role in reinforcing smoking behaviour (Jarvik, 1970). Smoking has been characterized as a habit or "ritual", as "something else to do in a social situation"; for example, when there is a lull in a conversation (Hunt and Vatarazzo, 1970). The chain of behaviours involved in smoking (i.e., taking out the pack, opening it, taking out a cigarette, lighting a match, etc.) make up this "ritual". In a sense, this then becomes a social "crutch". When smoking behaviour is suppressed through punishment or conditioned aversion, a large gap occurs in the

behavioural repertoire of a chronic cigarette smoker. Wagner and Bragg (1968) overcame this problem by dealing with both the positive aspects of smoking and the negative aspects of smoking cessation. Covert sensitization was used to suppress smoking, whereas systematic desensitization taught the subjects to relax in situations where they imagined they wanted a cigarette. One control group was taught relaxation as an alternate response to smoking with little comparative success. Resnick (1968) instructed his subjects to chew gum if they felt that they still wanted a cigarette after the treatment period. Sushinsky (1972) has suggested that the use of an alternate response may have accounted in part for Resnick's significant findings. Chapman, Smith, and Layden (1971) made tea or coffee drinking an unpunished alternate response to the extinguishing of a cigarette in their paradigm. Further evidence includes that of Katz (1973) who demonstrated that in a concurrent response situation, the greatest suppression of one response (due to an aversive stimulus; in this case, white noise) occurred when the relative reinforcement rate for the alternate behaviour was equal to that of the punished behaviour. No suppression was obtained when the alternate response was not reinforced at all. The necessity of a highly reinforced alternate response in a punishment paradigm, in order to maintain behaviour change, is certainly manifest.

It has been demonstrated that two major considerations must be made in order to maintain long term smoking

abstinence. First, suppression of the smoking act can be attained through an aversion paradigm where the smoking act itself acquires aversive properties, thus creating maximum suppression. Second, once the smoking act is extinguished, another highly reinforcing behaviour or series of behaviours must be discovered which will adequately fill in the "space" left in the subject's behavioural repertoire, due to the absence of the smoking act.

It is hypothesized here that a combination of a conditioned suppression, obtained through the use of the satiation technique, in combination with a positively reinforced alternate response, (in this case, a "ritualized" relaxation procedure) will bring about the greatest reduction in cigarette intake and the best long term maintenance of this reduction. Nausea, produced by sufficient doses of cigarette smoke was the punishing stimulus in the satiation paradigm. A ritualized, shortened version of the relaxation procedure was used as an alternate response to fulfill several criteria; it is highly positively reinforcing in itself; it is non-satiating; and it is simple, expedient, and inconspicuous.

Five groups were run to adequately test this hypothesis. Four of these were selected from a population who had been solicited through a publicity program to join a stop-smoking clinic and thus were motivated to change. One group received both relaxation and satiation treatment; the second received satiation only; the third received relaxa-

tion alone, in a paradi, where exposure to treatment sessions was equalized across the groups. The fourth group was a minimal-contact control who were instructed to essentially stop on their own, but were given several techniques to help the subjects try and cut down. This group controlled for extraneous variables such as motivation and effort and partials out the effect of essentially having a subject stop on his own, variables which may confound the outcome of the active treatment groups (Bernstein, 1969).

The fifth treatment group was an unsolicited or non-motivated group. Subjects were selected from a group of known smokers and told that the experimenters were interested in discovering how smoking rates varied over time. Thus, they were asked simply to record their daily cigarette intake for the same period of time as the subjects in the other groups. None of the subjects in this group were aware that the experimenter was involved in a stop-smoking research program. The purpose of this group was to account for the reactive effects of inobtrusive recording in a non-motivated group (Bernstein, 1969; McFall, 1970).

It was expected that the three treatment groups would achieve significantly lower rates of smoking than the two control groups; that the combined relaxation-satiation group would demonstrate significantly lower smoking frequency than either the relaxation or satiation group alone, and also would maintain this decrease at follow-up. No difference was expected between the two control groups.

## Method

### Subjects

Volunteer subjects were recruited through advertisements placed in the local newspapers as well as by posters which were exhibited in strategic areas around several universities in Montreal, stating that smokers who wished to "kick the habit" were invited to join a study conducted by the Centre for Research on Drug Dependence at Sir George Williams University. Subjects who contacted the centre were then telephoned and asked to one of the several introductory sessions. Subjects for one of the control groups were selected from a different population. Since non-motivated subjects were desired for this group, (i.e., subjects who had not expressed any desire to quit smoking) these were chosen from a group of people who were known to smoke, but had no knowledge whatsoever of the smoking cessation study.

Approximately 60 people answered the advertisements for the smoking study. Of these, 49 were able to actually participate in the study. Twenty-seven of this group were females and 22 were males. Of these people, approximately 50% were students, and 50% of the subjects had no relation to the university. Nine subjects were solicited from the non-motivated subject population, six females and three males.

### Procedure

During the introductory session for the volunteer



subjects a short talk is given on the rationale for the study. Subjects were told that the experimenters were interested in comparing a number of different smoking cessation procedures, which had all proved to be effective in the past, so that the relative efficacies of these procedures might be ascertained. Subjects were also informed that they would be required to keep daily records of their cigarette consumption for a period of nine weeks (1 week baseline, 6 weeks treatment and two weeks of follow-up); submit urine samples periodically (for analysis of nicotine content); and have their weight recorded. In addition, to control for the high rate of attrition so frequently encountered in similar studies a \$25.00 deposit was required of each subject. This sum was refunded to each subject at the end of the nine-week period, provided that all sessions were attended and all data submitted. It was explained that the money had no relation to whether the subject quit smoking or not.

A smoking history questionnaire (See Appendix B) and the Eysenck Personality Inventory-Form A (Eysenck and Eysenck, 1963) was administered to each subject. The Eysenck was used to screen out any highly neurotic individuals from the study.

Subjects from the pool of volunteers were randomly assigned to each of the three active treatment groups and the minimal treatment-contact group.

Subjects for the non-motivated control group were

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invited to a separate introductory session. They were asked to fill out the Eysenck Personality Inventory as well as the smoking history questionnaire and told that the reason they had been asked to participate was that the experimenters were interested in how smoking rates changed over time and wished them to record their cigarette intake over a short period of time. (Details to be given below.)

### Relaxation Group (R)

Subjects in this group were given training in progressive relaxation (Jacobson, 1938). This was done in half-hour sessions, twice weekly for three weeks. (Sessions were never held on consecutive days.) The sessions were carried out in small, dimly lit rooms. Subjects reclined in a comfortable lounge chair for the training sessions. Approximately 20 minutes of each session was spent in the practice of the relaxation technique. The other ten minutes were used for collecting data sheets, urine samples and weighing in. Beginning at the second session, the subjects were taught a shortened version of the relaxation procedure or "ritual". This continued for five sessions. The subjects were asked to practice the entire relaxation procedure and the "ritual" in the following ways: whenever they felt like having a cigarette, they were asked to wait a minute or two, and then perform the practiced "ritual", instead of reaching for a cigarette. This "ritual" then was to cue the heightened state of relaxation achieved during the relaxation sessions. The subject was then seen once a week for three weeks in order to collect data,

urine samples and weight. They were then asked to record daily consumption for two weeks, at which point they were seen for the last time. At this session, deposits were refunded, if all subject requirements were filled. They were also told that they would be contacted for follow-up reports in the near future. (See Appendix C.)

### Satiation Group (S)

Subjects in this group were seen according to the same schedule as those in the Relaxation Group. Treatment sessions took place during twice-weekly sessions, each session lasting one half-hour, for the first three weeks. At the beginning of each session, the subject was required to smoke a cigarette (his own brand) at a quick rate; one complete inhalation every four seconds, until the cigarette was completed. The rate was maintained by the beat of a metronome which sounded a "click" every second. Every fourth "click" was accompanied by the sound of a bell. This cued the onset of a new inhalation. The subject was encouraged to complete at least one cigarette. When this was completed, the remainder of the cigarette was extinguished and the subject began a 15-minute rest period. After this period, the subject was instructed to light another cigarette in a manner similar to the previous one. The subject was instructed to treat any cigarette that he smoked on the outside as an "experimental" cigarette, i.e., he was to smoke it as quickly as possible, approximating the frequency used in the laboratory. The subject was told not to talk, eat or engage in any

activity while smoking a cigarette in this manner.

The following three weeks and two-week follow-up were carried out in exactly the same manner as in the Relaxation Group.

#### Relaxation-Satiation Group (R-S)

During the first three weeks of treatment, subjects in this group were trained in the relaxation procedure and given the same instructions as the Relaxation Group. During the next three weeks, each subject received the satiation treatment in exactly the same manner as described previously. However, the instructions as to extra-treatment procedures were different at this point. At the initial satiation session, the subject was told that from that point on, whenever he felt like having a cigarette, he should use the relaxation "ritual" as an alternate response, instead of reaching for a cigarette. If he still wanted to have a cigarette, then the subject was instructed to smoke in the same way as previously described for the Satiation Group. The two-week follow-up was the same as for the aforementioned groups.

#### Minimal-Treatment Minimal-Contact Control Group (M-T)

As stated previously, subjects in this group came from the same subject pool as the above three groups and attended the same introductory sessions. These subjects were told that smoking, for most smokers, had become an "automatic" act and that by recording their daily cigarette consumption and thus becoming aware of their smoking habits, that they would be able to reduce their cigarette consump-

tion frequency. Subjects were contacted by phone each week (mailed reports were negated due to a threatened mail strike) and asked for their previous week's details. This group was designed particularly to control for individual "effort" plus recording as possible confounding effects in treatment.

Non-Motivated Recording Only-Control Group (R-G)

In this group, the subjects came from a second pool of subjects, as previously described. At the end of their initial session, they were told that the experimenters were interested in the variability in individual smoking rate over time and relating them to certain characteristics of each subject as obtained from questionnaires. They were instructed not to change their smoking habits, but to record as carefully as possible their daily cigarette consumption for a period of nine weeks (corresponding to the amount of time the subjects in other groups had to record). This group was designed to control for the reactive effects of record-keeping alone in a non-motivated group of subjects.

## Results

The variable used for analysis was the mean daily number of cigarettes smoked per week, which was computed from the record sheets handed in weekly by the subjects. This mean was computed for baseline, the six treatment weeks, and the two-week continuous recording follow-up. (Only the second week of the two-week follow-up was used for analysis.) The mean daily consumption data for the six-week and three-month follow-up was collected in a slightly different manner. Subjects were contacted by phone or mail, and asked to report their current daily consumption. Because these data were obtained through self-report, they were analyzed separately from the rest. Mean percent change from baseline smoking rate was also calculated for each period.

Since the subjects were randomly assigned to the treatment groups, a one-way analysis of variance was performed across groups over baseline to discover whether any differences existed between the groups at this point. The five treatment groups: Relaxation-Satiation (R-S), Satiation (S), Relaxation (R), Minimal-Treatment Minimal-Contact Control (M-T), and Non-Motivated Recording-Only Control (R-C), contained n's of 14, 13, 10, 8, and 9, respectively. Four subjects dropped out during the course of the study; one from the R-S Group, two from the S Group; and one from the M-T Group. The analysis demonstrated no significant differences between groups at baseline ( $F=0.976$ ,  $df=4/49$ ,  $p>.05$ ). (See Appendix A, Table 1.)

An overall two-way analysis of variance with repeated measures on one variable (time) was performed on the data (excluding the six-week and three-month follow-up, as previously explained). (See Appendix A, Table 2.) This analysis yielded a significant group effect ( $F=30.892$ ,  $df=7/34$ ),  $p<.00001$ ), and a significant groups by trials interaction ( $F=6.8323$ ,  $df=28/34$ ),  $p<.00001$ ). This differential effect of groups over time can easily be seen from Figure 1; and the percentage change over time can be viewed more dramatically in Figure 2. The Tukey (a) Test (Winer, 1971), utilizing the modification suggested by Cicchetti (1972), was applied to make post hoc comparisons between pairs of cell means, both between and within groups. The R-S and R groups showed significant reductions ( $p<.05$ ) in smoking frequency from baseline (20.6% and 59.32% of baseline respectively) at the end of the six-week treatment. Surprisingly, although the S Group did show a decrease to 69.06% of baseline, this did not reach significance ( $p>.05$ ). (The percentage figures given here refer to the percent consumption of baseline cigarette intake.) Neither control group showed any change (N-T=77.16%, R-C=101.02%). However, the R-S and S groups were significantly better than both controls, with the R-S Group better than either the R or S groups in reducing smoking frequency ( $p<.05$ ). These differences were maintained at two-week follow-up, with percentages rising to 23.56% for the R-S Group, 23.24% for the S Group, and down, for the R Group, to 57.10%. The controls remained the same.

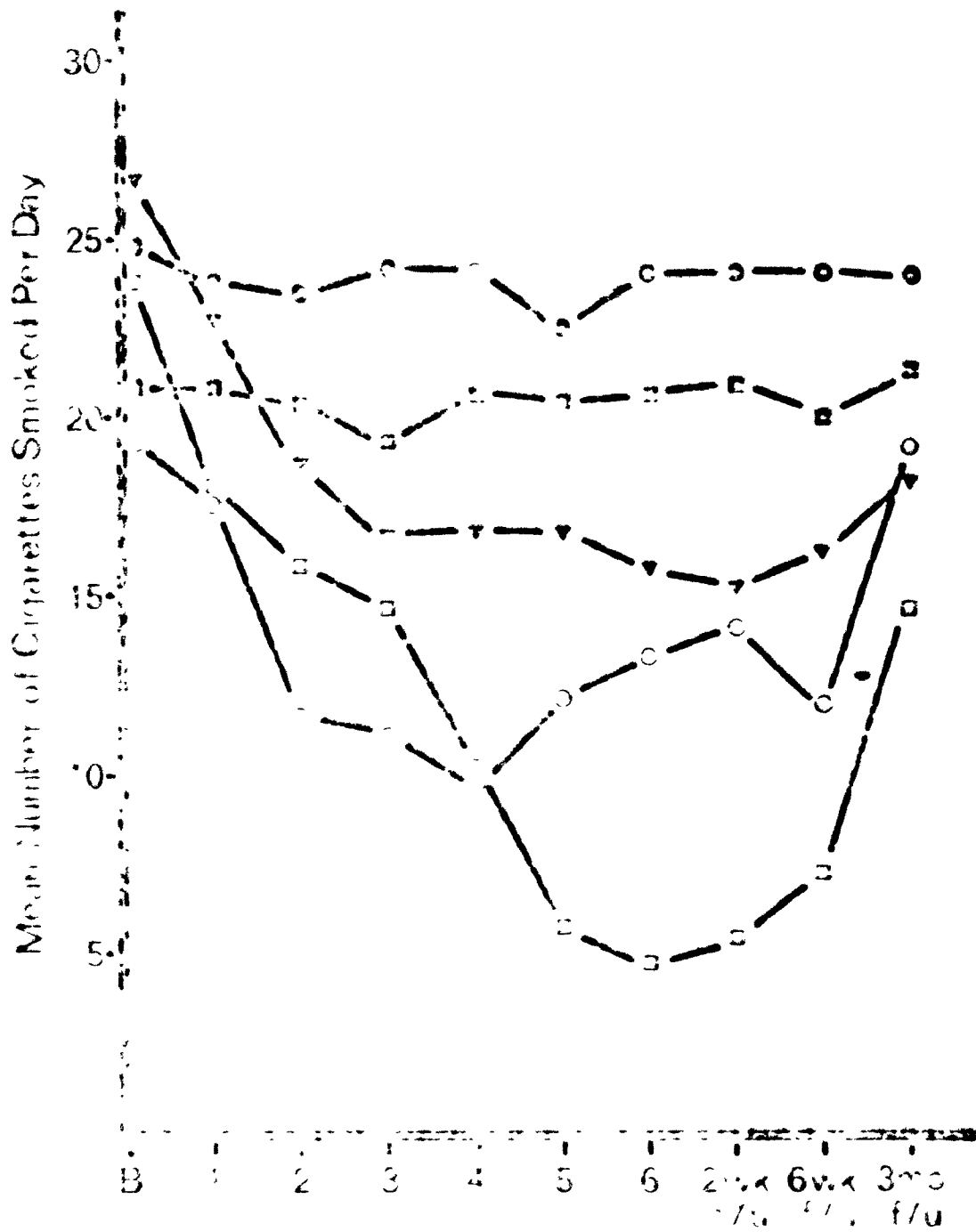


Fig. 1. Mean Number of Cigarettes Smoked Per Day for all Groups During Baseline, Treatment, and Follow-up. (Legend: Open Squares=Relaxation-Satiation Group; Open Circles=Satiation Group; Closed Triangles=Relaxation Group; Closed Squares=Recording-Only Control Group; Closed Circles=Minimal-Treatment Minimal-Contact Control Group.)



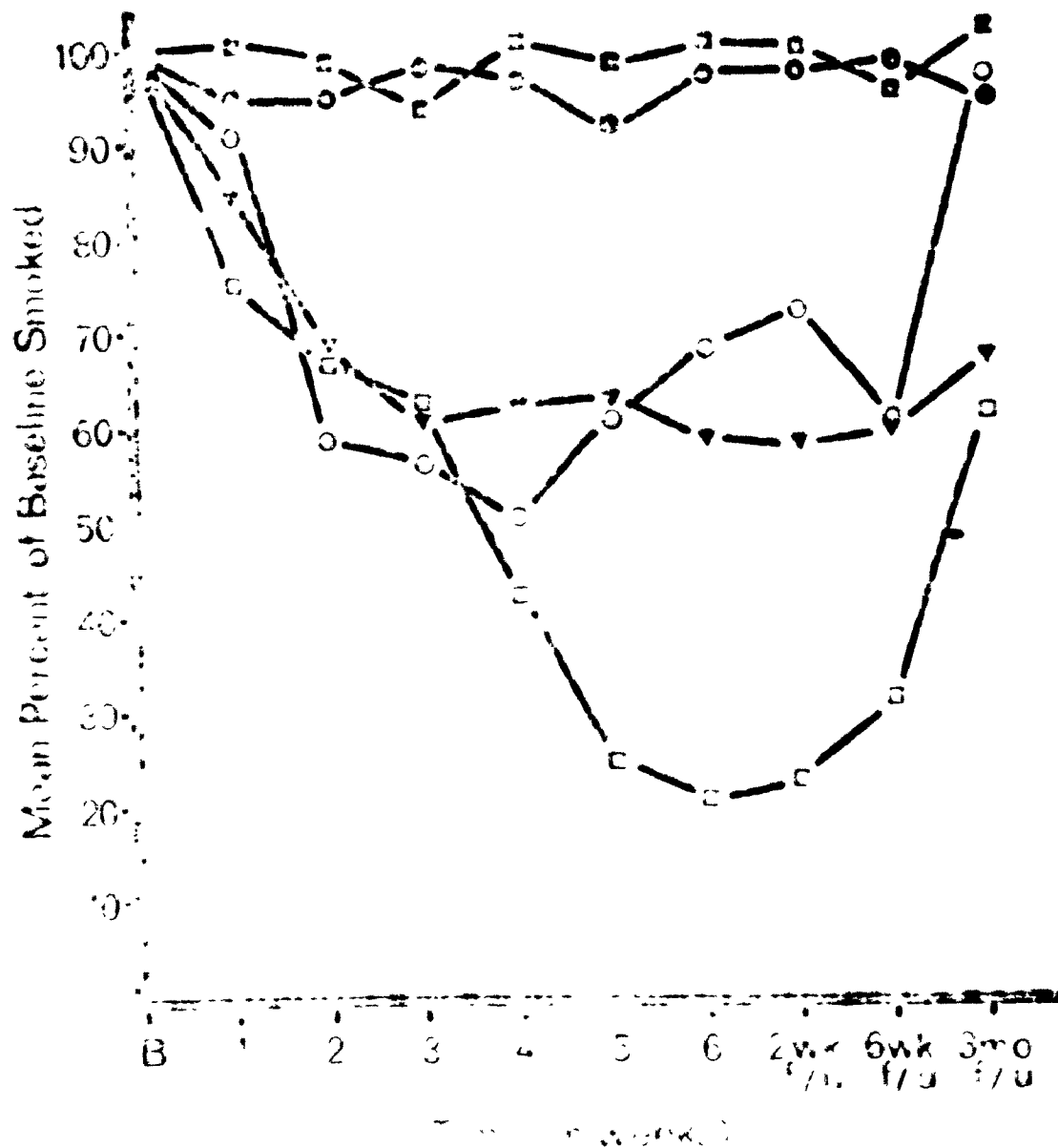


Fig. 2. Mean Percent of Baseline Smoked for all Groups During Baseline, Treatment, and Follow-up. (Legend: Open Squares=Relaxation-Satiation Group; Open Circles=Satiation Group; Closed Triangles=Relaxation Group; Closed Squares=Recording-Only Control Group; Closed Circles=Minimal-Treatment Minimal-Contact Control Group.)

A one-way analysis of variance across groups was performed at the six-week follow-up, as previously mentioned (See Appendix A, Table 3). This yielded a significant between group component ( $F=6.13$ ,  $df=4/48$ ,  $p<<.01$ ). The R-S Group had relapsed to 31.86% of baseline; the R Group to an only slightly higher 60.85%. However, the S Group showed a decrement from the two-week follow-up, its percentage lowered to 61.57%. A closer look at the data indicates that nine of 13 subjects reduced their smoking rates, with one having quit completely. This result could not be attributed to any known extraneous factor. The control groups fluctuated downward only slightly (N-T=97.38%, R-C=96.71%). The Tukey Test was again applied to this data. Only the R-S Group was significantly different from both control groups ( $p<.05$ ). The R and S groups differed significantly only from the N-T control ( $p<.05$ ). Although, the R-S still maintained an approximately 30% less decrease over the R and S groups, this result did not achieve significance.

At the three-month follow-up, a one-way analysis of variance demonstrated no difference between groups ( $F=1.09$ ,  $df=4/48$ ,  $p>.05$ ). (See Appendix A, Table 4.) Both the R-S and the R groups still maintained 62.49% and 67.60% of baseline intake respectively, while the S Group returned almost to baseline (93.55%).

Looking more closely at the success of the individual subject, it may seem that at the end of treatment, 12 of 14 R-S subjects were smoking under the "safe" limit of 10-

12 cigarettes per day (Surgeon General's Report, 1964). Of these 12, four were abstinent. This may be compared to the other two groups, where seven of 13 subjects were under this limit with none abstinent in the S Group; and four of ten subjects, one of whom was abstinent in the R Group. At three-month follow-up, seven of 14 subjects in the R-S Group remained in this category, with four still cigarette free; three of ten subjects, with one abstinence, comprised the R Group; but the S Group dropped markedly to two of 13 subjects remaining under the "safe" level.

There is little doubt that the combined Relaxation-Satiation (R-S) Group was the most effective and long lasting treatment, in terms of both reducing cigarette intake and maintenance of this reduction for a protracted period.

## Discussion

The results of this study demonstrate that the use of satiation in combination with the learning of an alternate response is an effective method of reducing cigarette intake (See Figures 1 and 2). The short term effects of this method, up to a six-week follow-up, indicate that the R-S Group maintained significantly reduced cigarette intake, when compared to the R or the S groups. However, this difference was not significant at the three-month follow-up, as the R-S Group doubled its cigarette intake, from 31.86% of baseline intake at treatment end, to 62.49% of baseline at a three-month follow-up. No significant changes occurred in either control group. The hypothesis that long term smoking cessation could be maintained was not supported.

Several factors may have accounted for this poor maintenance. First, the aversion created by the present procedure may have lacked intensity. The hypothesis had been put forward that the aversion to smoking would be strongest when the aversive reaction were most closely related to the smoking act itself. In this case, the smoking act was manipulated (by having subjects smoke rapidly) so that it created nausea, dizziness, etc. The degree to which subjects experienced this state was difficult to gauge, except on a subjective level. Only one subject vomited (on one occasion) and even this may have been due to the fact that she had the flu. Successful methods such as those used by Schmahl et al., (1972) and Lichtenstein et al., (1973), utilizing rapid smok-

ing with the presence of warm, smoky air would aid in intensifying the conditioned aversion. The subjects in the satiation group in this study, decreased smoking frequency most dramatically (30% from the first to the second treatment session), demonstrating the power of this procedure, but also showed the poorest maintenance at a three-month follow-up, indicating the transient nature of this procedure. The subjects, although instructed to treat extra-therapeutic cigarettes as experimental (i.e., to smoke them as rapidly as they could), evidently did not follow this procedure. Reports from these subjects indicated that they found it difficult to apply this method, as rapid smoking is not socially adaptable, and could not always be performed either at work or in other social situations.

In contrast to this, the relaxation "ritual" procedure appeared to have a more lasting, if weaker, effect on smoking frequency. The R Group demonstrated greater stability in smoking decrement when compared to the S Group. At the three-month follow-up, subjects in the R Group still maintained 67.80% of baseline (number of cigarettes smoked), whereas the S Group had returned to almost baseline (96.55%). Thus relaxation, as a reinforcing alternate response appears to be an important stabilizing factor in smoking reduction, and may have accounted strongly for the large reduction in smoking by the R-S Group. Subjects found the relaxation training extremely valuable and desirable; most practised the procedure daily, as directed. The "ritual" i.e., "doing

something else in lieu of reaching for and lighting a cigarette" (Hunt and Watarazzo, 1970), was found, by most subjects, as simple and socially acceptable as it was unobtrusive. With practice, most subjects discovered that they were able to achieve a profound state of relaxation, by utilizing this "ritual" as an alternate response to smoking a cigarette. Although this procedure was intrinsically reinforcing and desirable, it may have suffered from the same deficiencies as those found in the aversive procedures mentioned earlier. That is, the reinforcing aspects of the state of relaxation were not similar enough in their stimulus properties to adequately replace those associated with smoking itself.

The two control groups used in this study were designed to control, as accurately as possible, for the non-specific factors, which have been cited by several authors, as factors which contaminate experimental variables in most studies (Bernstein, 1969; Keutzer et al., 1969; Hammen, 1971; Sushinsky, 1972). Of greatest importance in this study, was the use of a non-motivated control group, the first application of such a control in a comparative smoking treatment program. The reactive effects of self-recording behaviour has been noted in a study by McFall (1970). He noted that subjects who simply recorded their smoking intake, tended to decrease their smoking frequency. That is, when they were paying unusually close attention to their smoking behaviour, it decreased. The group of non-motivated smokers in this study failed to demonstrate any appreciable decrement in smoking

behaviour, even though some of the subjects reported abhorrence at the number of cigarettes they were smoking, when confronted with their own data. This lends further support to the previously stated fact that smokers appear to be able to cope with high states of dissonance, i.e., expressing the desire to stop, but still continuing to smoke (Dubitzky and Schwartz, 1969).

The Minimal-Contact Minimal-Treatment Control Group consisted essentially of motivated smokers, who tried to give up smoking through individual effort. It is likely that any smoker who joins a cigarette smoking treatment program, may try slowly to "cut down", regardless of the type of treatment he is in, and this reduction may not be a function of the salient treatment variables. It would appear, from the results of the present study, that even motivated smokers, will not respond to suggestions and encouragement to quit on their own (with no promise of future treatment), unless they are exposed to externally imposed, formal and plausible therapeutic procedures. This notion lends credence to the hypothesis that most smokers feel that smoking is not under their own control (Smith, 1970).

There are several aspects of this study which warrant further consideration and examination. It has already been stated that the conditioned aversion paradigm might be manipulated in order to create a stronger suppression of the smoking response. Successful methods might include the increase of the smoking rate in the experimental rapid smoking procedures, or the use of simultaneously introduced blasts of

hot, smoky air (Schmahl et al., 1972; Lichtenstein et al., 1973). In comparing the present study to the Lichtenstein et al. (1973) report, one may observe that our satiation group achieved poorer smoking reduction than either Lichtenstein et al.'s rapid smoking group or a group treated with blasts of hot, smoky air; or another group treated with a combination of the two procedures. Each of these latter three groups did not differ significantly from each other. Although both studies used approximately the same number of active treatment sessions ( $\bar{x}=7.4$  vs 6 in the present study), Lichtenstein et al. had subjects smoke slightly more cigarettes per session ( $\bar{x}=2.7$  vs 2 in the present study). Lichtenstein et al.'s rapid smoking group had ten subjects abstinent at treatment termination compared with no subjects in the present study. The reason for this difference may lie in the fact that subjects in Lichtenstein et al.'s study were seen initially for three consecutive days and then only at the request of the subject, whereas in the present study, treatment sessions were spaced bi-weekly over a three-week period. The development of a strong and lasting conditioned aversion may be greater under "massed practice" conditions as opposed to temporally distributed practice conditions. This hypothesis counters traditional learning theory principles, but may best be explained by Hullian Learning theory, (Kimbble, 1961). Hull's theory states that every response of an organism "left an increment of reactive inhibition"..... and ..... "was assumed to decay with rest" (Kimbble, 1961, p. 282). It was further pos-



tulated that this reactive inhibition was a primary negative drive which very closely resembled fatigue. Thus, under this formulation extinction will occur more rapidly with "massed" rather than "distributed" practice. Under massed trials, reactive inhibition would tend to build in the organism until extinction occurred. Under distributed trials, recovery (i.e., loss of reactive inhibition) would occur more easily, so that extinction would be more difficult. In this study, some subjects may have found that the several-day interlude between treatment sessions, acted as recovery periods during which the temporarily-induced aversion extinguished and smoking-eliciting cues re-attained their previous significance. This may have accounted, to a great degree, for the large discrepancy between the two similar treatment methods.

The rationale for the use of an alternate response in this study has been previously described here and elsewhere (Katz, 1973). There are certain related and important considerations attached to this thesis which deserve consideration with regard to the implementation of such a technique. The application of an alternate response implies the necessity for self-regulation or self-control of behaviour. Once smoking behaviour is successfully suppressed through some contingent aversive process, the onus is placed on the subject to actively implement the alternate response. Since smoking is cued by a myriad of stimuli and situations (conceivably both covert and overt) the question arises as to whether a single response, e.g., relaxation, will ade-

quately act as a reinforcing agent. It is conceivable that some control for the execution of the alternate response is necessary. There is a definite need for appropriate socially and interpersonally acceptable alternate responses which will "structure" time or be "something else to do" in situations where smoking behaviour previously was the reinforced response. If this behavioural "space" is not filled, then one may assume that either the satiation will extinguish or that the smokers will be reinforced vicariously by seeing other smokers smoking (Bandura, 1969) or that both situations may occur. In order to combat this, it is conceivable that an array of alternate responses should be available to the subject, so that he might choose the appropriate one in a given situation. These might include gum-chewing (Resnick, 1968), control of discriminative stimuli (Kolan, 1969; Roberts, 1969); relaxation as in this study, behaviour rehearsal and covert verbalizations (Steffy, Weichenbaum, and Best, 1972); or any one of a plethora of possible alternate behaviours (both covert and overt).

In developing self-control skills, the subject must first make a commitment to change previous behavioural patterns, so that they include these new procedures. One method of ensuring this commitment may be the utilization of a contingency contract. The nature of contracts related to smoking reduction has been explored by several authors (Tooley and Prats, 1967; Elliot and Tiche, 1968; Winett, 1973). In these studies, subjects made explicit contractual obligations to have partial amounts of their money deposits re-

turned contingent on reducing, and eventually eliminating their smoking intake. The contract can be seen as an initial step in the development of self-control. The use of a contract, as a commitment or promise of performance, as well as a guide to how self-control may be achieved in terms of certain proven methods (Marfan and Caroly, 1972), may function as an integral component of a smoking reduction program.

Thus a general model for the successful elimination of maladaptive behaviour, in general, and smoking, in particular, may be presented as follows:

It is generally necessary to manipulate external variables initially in order to change behaviour. One such method could be aversive control. Subsequently or concomitantly, the subject must develop skills so that he may identify environmental and mediational ("internal") cues which may initiate the smoking chain. Then the subject must learn the contingent self-application of both positive and negative reinforcers--both symbolic (Bandura, 1969), and environmental--which will increase the probability of non-smoking, on the one hand, and decrease the probability of smoking on the other. In this way, it is hoped that successful long term abstinence may be established.

## References

- Ayllon, T. Intensive treatment of psychotic behaviour by satiation and food reinforcement. Behaviour Research and Therapy, 1963, 1, 53-61.
- Ayllon, T., & Michael, J. The psychiatric nurse as a behavioral engineer. Journal of the Experimental Analysis of Behaviour, 1959, 2, 323-334.
- Azrin, N.H., & Holz, W.C. Punishment. In W.K. Honig, (Ed.), operant behaviour: areas of research and application. New York: Appleton-Century-Crofts, 1966. Pp. 380-447.
- Azrin, N.H., & Powell, J. Behavioural engineering: The reduction of smoking behaviour by a conditioning apparatus and procedure. Journal of Applied Behaviour Analysis, 1968, 1, 193-200.
- Bandura, A. Principles of behaviour modification. New York: Holt, Rinehart and Winston, 1969.
- Bernstein, D.A. The modification of smoking behaviour: A review. Psychological Bulletin, 1969, 71, 418-440.
- Best, A.J., & Steffy, R.A. Smoking modification procedures tailored to subject characteristics. Behaviour Therapy, 1971, 2(2), 177-191.
- Castela, J.R. Treatment of compulsive behaviour by covert sensitization. Psychological Record, 1966, 15, 33-41.
- Castela, J.R. Covert sensitization. Psychological Reports, 1967, 20, 452-464.
- Castela, J.R. Treatment of smoking by covert sensitization. Psychological Reports, 1970, 26(2), 415-420.

- Shanahan, R., Saitz, L., & Layder, T. Elimination of cigarette smoking by punishment and self-management training. Behavior Research and Therapy, 1971, 9(3), 255-264.
- Cicchetti, D.V. Extension of multiple range tests to interaction tables in the analysis of variance: A rapid approximate solution. Psychological Bulletin, 1972, 77, 405-409.
- Dmitzov, G., & Schwartz, G.I. Cognitive dissonance and changes in cigarette smoking in an organized control program. Journal of Social Psychology, 1969, 79(2), 219-225.
- Eirun, S. Treatment of tobacco addiction: Experiences in tobacco withdrawal clinics. In Can we help them stop? (Editor: American Cancer Society, Illinois Division, 1974).
- Elliot, A., & Higgins, T.S. Breaking the cigarette habit: A technique involving threatened loss of money. Psychological Reports, 1969, 17, 503-513.
- Eysenck, H.J., & Ekstrom, S. G. Eysenck personality inventory. A. San Diego, California: Educational and Industrial Testing Service, 1963.
- Evans, G., & Gendall, R., & Allen, J. An improved apparatus for the study of the habit of cigarette smokers. Behavior Research and Therapy, 1966, 4, 301-308.
- Evans, J. The effect of varying nicotine content of cigarettes on human smoking behaviour. Psychopharmacologia, 1971, 19(2), 188-192.

- Gardner, R.W. A test of covert control therapy to reduce cigarette smoking: A comparative study of the effectiveness of two different strategies with a direct test of the effectiveness of contingency management. (Doctoral dissertation, University of Louisville) Ann Arbor, Michigan: University Microfilms, 1970. No. 71-29, 132.
- Gendreau, P.E., & Dodwell, P.C. An aversive treatment for addicted cigarette smokers: Preliminary report. Canadian Psychologist, 1968, 2, 28-34.
- Greene, R.J. Modification of smoking behaviour by free operant conditioning methods. Psychological Record, 1964, 14, 171-173.
- Grimaldi, K.E., & Lichtenstein, E. Hot, smoky air as an aversive stimulus in the treatment of smoking. Behavior Research and Therapy, 1969, 7, 275-282.
- Hullford, J. Factors related to successful abstinence from smoking: Final report. Los Angeles: American Institutes for Research, 1966.
- Hawner, G.L. Factors affecting self-controlling responses in smoking cessation. (Doctoral dissertation, The University of Wisconsin) Ann Arbor, Michigan: University Microfilms, 1971. No. 71-25, 304.
- Hark, P.J. An examination of the effectiveness of covert conditioning in the reduction of cigarette smoking. (Doctoral dissertation, Michigan State University) Ann Arbor, Michigan: University Microfilms, 1970. No. 70-23, 4-5.

- Howe, L.E. Control of coverants, the operants of the mind. Psychological Record, 1965, 15, 501-511.
- Hunt, W.A., & Natarazzo, J.D. Habit mechanisms in smoking. In W.A. Hunt (Ed.), Learning mechanisms in smoking. Chicago: Aldine, 1970.
- Jacobson, E.A. Progressive relaxation. Chicago: University of Chicago Press, 1938.
- Janis, I.L., & Mann, L. Effectiveness of emotional role-playing in modifying smoking habits and attitudes. Journal of Experimental Research in Personality, 1965, 1, 34-90.
- Jarvik, M.E. The role of nicotine in the smoking habit. In W.A. Hunt (Ed.), Learning mechanisms in smoking. Chicago: Aldine, 1970.
- Johnstone, E. & Donoghue, J.R. Hypnosis and Smoking: A review of the literature. American Journal of Clinical Hypnosis, 1971, 13(4), 265-272.
- Katz, R.C. Effects of punishment in an alternate response context as a function of relative reinforcement rate. Psychological Record, 1973, 23, 65-74.
- Keutzer, C.S. Behaviour modification of smoking: The experimental investigation of diverse techniques. Behaviour Research and Therapy, 1968, 6, 137-157.
- Keutzer, C.S., Lichtenstein, E., & Nees, H.L. Modification of smoking behaviour: A review. Psychological Bulletin, 1968, 70(6), 520-533.
- Koenig, K.P., & Masters, J. Experimental treatment of habitual smoking. Behaviour Research and Therapy, 1965, 3, 235-243.

- Kraft, E., & Al-Issa, I. Desensitization and reduction in cigarette consumption. Journal of Psychology, 1967, 62, 323-329.
- Lawton, W.P. A group therapy approach to giving up smoking. Applied Therapeutics, 1962, 4, 1025-1028.
- Levinson, B.L., Shapiro, D., Schwartz, G.E., & Fursky, B. Smoking elimination by gradual reduction. Behaviour Therapy, 1971, 2(4), 477-487.
- Lichtenstein, E., Harris, D.Z., Birchler, G.R., Wahl, J.W., Schmal, D.P. Comparison of rapid smoking, warm, stoky air and attention placebo in the modification of smoking behaviour. Journal of Consulting and Clinical Psychology, 1970, 40(1), 92-96.
- Lichtenstein, E., & Keutzer, C.S. Experimental investigation of six procedures to modify smoking: A follow-up report. Behaviour Research and Therapy, 1969, 2, 139-140.
- Lichtenstein, E., & Keutzer, C.S., & Hines, K.H. "Emotional" role-playing and changes in smoking attitudes and behaviour. Psychological Reports, 1969, 25(2), 379-389.
- Luchessi, J.R., Shuster, C.R., & Evely, C.S. The role of nicotine as a determinant of cigarette smoking frequency in man with observations of certain cardiovascular effects associated with tobacco alkaloid. Clinical Pharmacology and Therapeutics, 1967, 8, 789-790.



- Marrone, R.L., Merksamer, V.A., & Salzberg, P.K. A short duration group treatment of smoking behaviour by stimulus saturation. Behaviour Research and Therapy, 1970, 8(4), 347-352.
- Marston, A.R., & McFall, R.V. Comparison of behaviour modification approaches to smoking reduction. Journal of Consulting and Clinical Psychology, 1971, 36(2), 153-162.
- McFall, R.V. Effects of self-monitoring on normal smoking behaviour. Journal of Consulting and Clinical Psychology, 1970, 35(2), 135-142.
- McFarland, J.W., Sirbel, H.W., Donald, W.A.J., & Folkenberg, E.L. The five-day program to help individuals stop smoking. Connecticut Medicine, 1964, 28, 385-390.
- McGuire, R.J., & Vallance, W. Aversion therapy by electric shocks: A simple technique. British Medical Journal, 1966, 1, 112-113.
- Montantern, R.F., & Ratliff, A.G. Systematic desensitization as a technique for treating smoking behaviour: A preliminary report. Behaviour Research and Therapy, 1969, 2, 307-309.
- Nolan, D.C. Self-control procedures in the modification of smoking behaviour. Journal of Consulting and Clinical Psychology, 1966, 32, 92-93.
- Ober, D.C. Modification of smoking behaviour. Journal of Consulting and Clinical Psychology, 1963, 32, 543-549.

- O'Keefe, J. The anti-smoking commercials: A study of television's impact on behaviour. Public Opinion Quarterly, 1971, 35(2), 242-248.
- Powell, J., & Azrin, N. The effects of shock as a punisher for cigarette smoking. Journal of Applied Behaviour Analysis, 1964, 1, 63-71.
- Preerack, J. Reinforcement theory. In J. Levine (Ed.), Nebraska symposium on motivation. Lincoln: University of Nebraska Press, 1965.
- Pyno, S., Agnew, R.W., & Kopperud, J. Modification of an overlearned maladaptive response through a relearning program: a pilot study on smoking. Behaviour Research and Therapy, 1966, 4, 197-203.
- Resnick, J.H. Effects of stimulus satiation on the overlearned maladaptive response of cigarette smoking. Journal of Consulting and Clinical Psychology, 1968, 32, 501-505.
- Roberts, A.H. Self-control in modification of smoking behaviour: Replication. Psychological Reports, 1969, 24, 674-676.
- Sacht, L., Ryan, J., & Vorcov, T.E. Comparison of smoking treatments. Behaviour Therapy, 1970, 1(4), 465-472.
- Schacht, J.L., Lichtenstein, E., & Harris, D.E. Successful treatment of habitual smokers with warm, smoky air and rapid smoking. Journal of Consulting and Clinical Psychology, 1972, 23(2), 105-111.

Scoville, C.R. Comments on paper by Jarvik. In W.A. Hunt (Ed.), Learning mechanisms in smoking. Chicago: Aldine, 1970.

Shapiro, D., Turek, I., Schwartz, G.E., & Shnidman, S.R. Smoking on cues: A behavioural approach to smoking reduction. Journal of Health and Social Behaviour, 1971, 12(2), 107-113.

Smith, G.W. Personality and smoking: A review of the empirical literature. In W.A. Hunt (Ed.), Learning mechanisms in smoking. Chicago: Aldine, 1970.

Steffy, R.A., Reichenbaum, D., & Best, C.A. Aversive and cognitive factors in the modification of smoking behaviour. Behaviour Research and Therapy, 1970, 8, 119-123.

Stolerman, P., Golafaro, T., Fink, R., & Jarvik, M.E. Influencing cigarette smoking with nicotine antagonists. Psychopharmacologia, 1973, 23, 247-259.

Streizer, M.E., & Koch, G.V. Influence of emotional role-playing on smoking habits and attitudes. Psychological Reports, 1969, 22, 817-820.

Surgeon General's Report. Smoking and health. (Publication No. 1103), Washington, D.C.: United States Public Health Service, 1964.

Tuchinsky, L.W. Expectation of future treatment, stimulus satiation and smoking. Journal of Consulting and Clinical Psychology, 1972, 32(2).

- Fameris, G.S. The psychodynamics of quitting smoking in a group. American Journal of Psychiatry, 1972, 129(5), 101-107.
- Tooley, J.T., & Pratt, J. An experimental procedure for the extinction of smoking behaviour. Psychological Record, 1967, 12, 209-218.
- VonDoeberlein, F.E.A. The use of hypnosis in 1,000 cases "tobacco addicts". American Journal of Clinical Hypnosis, 1967, 10, 194-197.
- Wagner, G.K., & Briggs, R.A. Comparative behaviour modification approaches to habit-decrement smoking. Journal of Consulting and Clinical Psychology, 1970, 38(2), 257-263.
- Wolfrum, L.L. Modification of chronic smoking behaviour: A comparison of three approaches. Behaviour Research and Therapy, 1970, 7, 257-263.
- Wolfrum, L.L. Aversive control of smoking behaviour in a group context. Behaviour Research and Therapy, 1972, 10(2), 97-104.
- Wilde, G.J.S. Behaviour therapy for addicted cigarette smokers: A preliminary investigation. Behaviour Research and Therapy, 1964, 2, 107-109.
- Winer, D.J. Statistical principles in experimental design. New York: McGraw-Hill, 1971.
- Winett, R.A. Parameters of deposit contracts in the modification of smoking. Psychological Record, 1973, 22, 49-60.

Wolpe, J. Psychotherapy by reciprocal inhibition.

Stanford, California: Stanford University Press,

1958.

World Health Organization Expert Committee on Addiction-

Producing Drugs: Seventh Report. WHO Technical Re-

port Service. No. 1957.

Appendix A

Table 1

Summary of One-Way Analysis of Variance  
of All Groups During Baseline

Source	Sums of Squares	Degrees of Freedom	Mean Square	F
Total	5254.10	53		
Between	337.89	4	86.97	0.976*
Error	4916.22	49	99.31	

\*  $p > .05$

Table 2

Summary of Two-Way Analysis of Variance of all Groups  
During Baseline, Treatment Period and Two-Week  
Follow-up

Source	Sums of Squares	Degrees of Freedom	Mean Square	F
Total	44936.6453	431	104.0293	
Between	32368.6425	53	610.7291	
Groups	2435.4052	4	1958.9514	3.9124*
Error	24533.2367	49	500.6783	
Within	12468.0028	378	32.9841	
Trials	3535.4915	7	512.2116	30.892**
Groups X Trials	3175.2463	28	114.1158	6.8823**
Error	5757.2650	343	16.5309	

\*  $p < .05$

\*\*  $p < .00001$

Table 3

Summary of One-Way Analysis of Variance  
of all Groups at Six-Week Follow-up

Source	Sums of Squares	Degrees of Freedom	Mean Square	F
Total	5111.18	52		
Between	1727.36	4	431.84	6.13*
Error	3383.82	48	70.50	

\*  $p < .01$

Table 4

Summary of One-Way Analysis of Variance  
of all Groups at Three-Month Follow-up

Source	Sums of Squares	Degrees of Freedom	Mean Square	F
Total	5857.76	52		
Between	485.95	4	121.49	1.09*
Error	5371.81	48	111.91	

\*  $p > .05$

Appendix B

CENTRAL POLICE RESEARCH ON DRUG DEPENDENCE

SMOKING HISTORY QUESTIONNAIRE

NAME ..... MARITAL STATUS .....  
ADDRESS ..... NO. OF DEPENDENTS .....  
TELEPHONE NO. ..... OCCUPATION .....  
AGE ..... YEARS OF EDUCATION .....  
TODAY'S DATE .....

1. How old were you when you began to smoke? .....
2. How many years have you been smoking?.....
3. How many cigarettes do you smoke per day? .....
4. At what time of day do you usually smoke?  
..... or when relaxed? .....
- ..... or with company? .....
- ..... or when playing? .....
5. At what time have you considered your smoking a problem?  
.....
6. How many times have you attempted to stop smoking before? ..... if yes,  
how many times? .....
7. How long did each attempt last?  
1. .... 2. ....  
3. .... 4. ....  
5. .... 6. ....
8. What methods did you use to help you stop smoking? (e.g.,  
cold turkey, cutting down etc.)  
.....



9. Do you have any health problems? if so, please elaborate  
.....

10. What times are most convenient for you to come to SGMU?

	Mon.	Tues.	Wed.	Thurs.	Fri.
Morning	....	.....	....	.....	....
Afternoon	....	.....	....	.....	....
Evening	....	.....	....	.....	....

NOTE: WE DO NOT HAVE SECURITY DAYS.

Appendix C  
Relaxation "Ritual"

The relaxation "ritual" that was taught to subjects in the R-S and R groups consisted of a chain of tensing-relaxing exercises as follows:

1. Clench teeth and push tongue against roof of mouth.
2. Take in deep breath and hold it, almost to the point of it being aversive, then breathe out completely.
3. Breathe deeply twice more.
4. Draw stomach muscles in toward spine.
5. Breathe deeply once.
6. Tighten leg muscles by either squeezing knees together or by making a type of forward and downward movement with muscles of thigh.
7. Breathe deeply, hold it, breathe out.
8. Breathe deeply once more.