AN EXPLORATORY STUDY OF INTROVERSION-EXTROVERSION, LOCUS OF CONTROL AND THE EFFECTS OF ANTI-SMOKING TREATMENTS

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ABSTRACT

AN EXPLORATORY STUDY OF
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AND THE EFFECTS OF ANTI-SMOKING TREATMENTS

By

Robert John Shaffer

A survey of the literature dealing with anti-smoking treatments and relevant personality measures was conducted. A study was designed to investigate the relationships between extroversion as measured by the Eysenck Personality Inventory (EPI), the Firth Smoking Situation questionnaire (a measure of desire to smoke under a variety of arousing situations), Locus of Control (LOC) as measured by the Rotter I-E Scale and success of five treatment techniques, i.e., operant conditioning (OP), Covert sensitization (CS), will power (WP), group support (GS), and attention placebo (AP). It was predicted that the sample of 111 smokers contacted through newspaper and television announcements would be more extroverted than the EPI norms, and more external than a normative group on the I-E scale. It was hypothesized that the Firth questionnaire would positively correlate with extroversion, that the OP condition would prove most successful for those scoring below the median on the EPI and I-E, that those scoring above the median on these measures would do best in the CS condition, but would relapse more quickly than other groups, and that

low scorers would be most successful among those in the WP condition. It was further hypothesized that extroversion would not change as a result of treatment, but that a positive correlation between post-test I-E scores and percent of estimated baseline at the end of treatment should exist.

Comparisons were made using Pearson product-moment correlations, t-tests, and single-factor analysis of variances. It was found that the sample was indeed more extroverted than the EPI industrial norms. No significant change in extroversion as a result of treatment outcome was found. No other hypotheses were confirmed.

Limitations of this study were discussed, and suggestions for further investigations were made.

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To the memory of my father

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Chapter I

INTRODUCTION

Cigarette smoking behavior leads to numerous aversive consequences. Unpleasant personal and social problems such as halitosis, stains and clothing burns are relatively benign. More serious are the increased risks of lung cancer, emphysema, and coronary artery disease (U.S. Public Health Service, 1962, 1964). Despite these immediate unpleasantries and long-term dangers, many smokers are unable to quit.

Bernstein (1969, 1970) has reviewed some of the traditional techniques used to eliminate smoking behavior. Bans (with sanctions including the death penalty in 17th century Germany, Jarvik, 1970), and taxes have been legislated, but Brecher and Brecher (1964) note the lack of success of such prohibitions, and their repugnance in a free society. Public campaigns of various sorts including advertising, lectures, and other media presentations have shown a similar lack of success (Cartwright, Martin, & Thomson, 1960; Watne, Montgomery, & Petie, 1964). Keutzer, Lichenstein, and Mees (1968) report the use of numerous psychologically-based group therapies (Lawton, 1962, 1967; Thompson & Wilson, 1966). Encouraging initial results rarely, however, last through follow-up. According to Bernstein (1970), this rapid relapse rate is also characteristic of the various large scale clinics (Ejup, 1964). Techniques of "re-education," lectures, personal

consultations, and in some cases, drugs, result in cure rates ranging from 30 to 85%, but relapse frequently follows. The first reported successful treatment by psychoanalysis is by Green (1923). Psychoanalysis is disadvantaged by being a long and expensive treatment process. Mann (1966) found active, "emotional" role playing to be more effective than "cognitive" role playing (i.e., taking a lung cancer patient's role as opposed to debating the issue). Clawson (1964) recommends hypnosis, but provides no group data. Edwards (1964), however, compared hypnosis with a nicotine substitute (Lobeline). No differences between groups were noted. Indeed, after initial improvements, subjects were smoking more upon follow-up. Drug treatments have used two main strategies: nicotine substitutes (e.g., Lobeline preparations), and mild psychotropics (e.g., Vallium, etc.). In reviewing treatments and double-blind drug studies, Bernstein states: "In general, it seems reasonable to conclude that suggestion is the primary and common "active ingredient" in all anti-smoking preparations tested so far." (Bernstein, 1970, pp. 25-26.)

Behavioral Techniques

Partly as a result of the discouraging outcomes reported above, and partly due to different theoretical concepts of the nature of smoking behavior, behavioral or "learning-theory" based treatments have been attempted.

Smoking behavior may be placed within an instrumental or operant conditioning paradigm. The behavior may be initiated and

maintained by immediate positive reinforcement from the effects of nicotine and/or social factors (Jarvik, 1970). Raymond (1964) classed smoking as an addiction, but more precisely, it may be conceptualized as a habit, as defined by Hunt and Matarazzo (1970):

> A fixed behavior pattern overlearned to the point of becoming automatic and marked by decreasing awareness and increasing dependence on secondary, rather than primary, reinforcement (p. 67).

Keutzer, Lichenstein, and Mees (1968) note that smoking behavior is maladaptive, occurs in discrete units and is thus easily recordable and observable, and is relatively frequent in occurrence. These factors combine to make smoking behavior an ideal area in which to investigate habit mechanisms in general, not to mention the important salutory benefits of successful treatments.

Bernstein (1969, 1970) and Keutzer et al. (1968) have provided comprehensive reviews of behavioral studies dealing with cigarette smoking reduction treatments. The earliest behavioral treatments utilized somatic aversion techniques to a great extent. Raymond (1964) paired on emetic drug with smoking in a respondent paradigm. The subject had remained free from smoking up to a one year follow-up. Intermittent electrical shocks were administered to 10 subjects by McGuire and Vallance (1964) as they inhaled cigarette smoke. Results at a one month follow-up revealed six abstainers, one improved, and three not improved. Hot smokey air was blown into the faces of subjects while smoking, until the cigarette was extinguished, at which point mentholated air was presented as a reinforcement and relief stimulus (Wilde, 1964).

Ultimately, all five of seven subjects who had improved relapsed (Wilde, 1965). Slightly better results were obtained by Franks, Fried, and Ashem (1966) with a revision of this treatment. Resnick (1968, a,b) required normal, double, or triple their usual cigarette intake from three groups of smokers in order to reach a point of satiation. He reported smoking reduction among the latter two groups. Clairborn, Lewis, and Humbel (1972) however, found the treatment to be no more effective than a placebo. Mees (1966) utilized a method involving breath holding concurrent with the imagination of smoking. A six month follow-up found subjects smoking up to 87% of their pretreatment rates.

Somatic aversion therapies have been criticized from various perspectives. Stoller (1968) condemns inflicting pain on subjects, as does Mayer (1970). Mayer also questions the long-term consequences of such therapies, in terms of effectiveness and possible psychological damage. Church (1963) notes that the effects of punishment in general are difficult to control. High relapse rates have been cited by Bernstein (1969, 1970) and Keutzer et al. (1968). As a partial consequence of these points, non-somatic aversions and other behavior modification methods have been devised.

Covert sensitization (Cautela, 1966) is a method in which a subject is taught to visualize vivid scenes with aversive consequences following imaginary indulgence in the maladaptive behavior. Wolpe's (1958) systematic desensitization, in which hierarchies of anxiety situations are successively imagined under conditions of

deep muscle relaxation until anxiety is no longer elicited, has been used by Morganstern and Ratliff (1969) on the assumption that smoking is a response to anxiety.

In an attempt to achieve greater generalization, various self-modification, self-control, or internalization approaches have been proposed. Homme (1965) has suggested the term "coverants" to refer to covert operants; to be used in a process in which a low probability thought such as "smoking is dangerous" is reinforced by a pleasant, high probability thought. Pumroy and March (1966) requested their subjects to simply cease smoking in a hierarchy of favored locations for smoking, from least popular to most popular. Other similar techniques also stressing control of operants and internalization of reinforcement are becoming more prevalent (Ferraro, 1973; Logan, 1973; Premack & Anglion, 1973). Combinations of treatments have been attempted. Tooley and Pratt (1967) successfully employed coverants, covert sensitization, and "contractual management" (i.e., non-smoking demands are met in exchange for social approval or reinforcement from significant others) sequentially with a young couple.

Rather than confound treatment variables by using different methods sequentially, numerous outcome studies have been attempted to compare these techniques with others, or with a variety of different control groups. In an early study, Koenig and Masters (1965) compared electrical aversion, systematic desensitization, and supportive counseling in an attempt to reduce smoking behavior. No differences

between groups emerged, although therapist effects were present. Interestingly, those therapists rated least empathic produced the best results. Also of interest was the finding that subjects could predict their own likelihood of success. Decreases in smoking behavior eroded during follow-up periods. Mees (1966) investigated self administered electric shock, two breath-holding conditions (in lab and at home), and a placebo-shock group. No significant between-group effects were noted, nor were improvements lasting. Operant self-control, self administered electrical aversion and Transactional Analysis were studied by Ober (1967). All groups were improved at one month follow-up, smoking reduction ranging from 49% to 58%. There were no significant differences between groups. Rutner (1967) studied the effects of covert sensitization, coverants, breath-holding, contractual management, and self-monitoring. Groups were seen once, instructed in the method assigned, and told to apply it independently of the therapist. After three weeks, all five groups significantly reduced smoking. Contractual management was slightly more successful than the other methods. Keutzer (1968) employed group treatments of breath-holding, coverant instruction, negative practice (Yates, 1968, in which intense smoking supposedly builds a state of reactive inhibition, thereby making smoking aversive and abstinance reinforcing), a drug placebo, and a no-contact control group. All groups but no-contact control improved. There were no differences of significance between groups. As cited earlier, Clairborn et al. (1972) found no differences between Resnick's

satiation technique (1968, a,b) and a placebo control. In a weight reduction context, Foreyt and Hagen (1973) found no differential weight loss between covert sensitization, placebo, or controls. The former two groups, however, expressed subjective aversion to formerly favorite foods. Sipich, Russell, and Tobias (1974) compared covert sensitization, self-control/will-power, self-monitoring, attention-placebo, and no-contact control. All but self-monitoring and no-contact controls showed a significant improvement through a six month follow-up. There were, however, no differences in effect between the three groups.

Bernstein (1969, 1970), Keutzer et al. (1968), McFall and Hammen (1971) and Ober (1968) note the tendency for non-specific and non-behavioral methods to be as successful as behavioral techniques. Keutzer et al. state:

> A consistent pattern to the reported results emerges: while virtually all behavior-modification treatments of smoking compare significantly favorable to non-treated control conditions, they do not yield significantly better results from those obtained with placebo-attention control treatment (where employed) or with non-behavioristic modification treatments (such as supportive counseling or Transactional Analysis) (1968, p. 526).

Personality Variables

In the light of the inconsistencies between theoretical predictions and empirical results revealed by the comparative studies reviewed, it is apparent that other variables must be taken into account. Eysenck (1973) observes that large error-variances and consequent non-significance in some experiments are frequently the result of

uncontrolled organismic variables. He proposes that personality is a systematic organismic variable of concern to smoking research. Among the aspects of personality that have received attention in regard to smoking behavior, two are especially salient. They are generalized expectancies of internal and external control of reinforcement, and traits of introversion and extroversion.

Internal-external locus of control. Rotter (1966) has defined internal-external (I-E) locus of control (LOC) as follows:

> When a reinforcer is perceived by the subject as following some action of his own but not being contingent upon his action, then, in our culture, it is typically perceived as the result of luck, chance, fate, as under the control of powerful others, or is unpredictable because of the great complexity of the forces surrounding him. When an event is interpreted this way ...we have labeled this a belief in external control. If the person perceives that the event is contingent upon his own behavior or his own relatively permanent characteristics, we have termed this a belief in internal control (p. 1).

It follows from the above definitions that externals would be less likely than internals to raise expectancies following success, or lower them after failure (Rotter, 1966). Rotter also proposes a roughly curvilinear relationship between I-E and "emotional health," with some cultural biases favoring internality. Internals are reported to be of higher socioeconomic status (SES), more alert to sources of reinforcement in the environment, and more active in improving the environment in regard to potential reinforcements than externals (Rotter, 1966). Abramowitz (1969) found internals reporting less depression than externals, while Butterfield's external subjects revealed more debilitating anxiety than internals (Butterfield,

1964). Both of these studies, however, relied heavily on self reports, rather than objective measures.

Introversion and extroversion. Eysenck and Eysenck (1968) describe introverts and extroverts (I/E):

> The typical introvert is a quiet, retiring, sort of person, introspective, fond of books rather than people...distant except to intimate friends. He tends to plan well ahead... does not like excitement,...likes a well ordered mode of life. He keeps his feelings under close control, seldom behaves in an aggressive manner. He is reliable, somewhat pessimistic... The typical extrovert is sociable,...needs to have people to talk to...does not like reading or studying by himself,...is generally an impulsive individual...generally likes change... carefree...optimistic, tends to be aggressive...and is not always a reliable person (p. 6).

In an extensive series of books and studies, Eysenck and his associates (Eysenck, 1947, 1960, 1967, 1973; Eysenck & Eysenck, 1968, 1969; Eysenck & Rachman, 1965; Eysenck, Tarrant, Woolf & England, 1960) have developed and supported a type/trait theory of personality. This theory proposes that differences in level of cortical arousal lead to broad personality differences. Extroverts are believed to have low cortical arousal, introverts, higher levels. The reticular activating system (RAS) has been suggested as the source for these differences (Eysenck, 1967). This theory has two implications for learning and smoking behaviors: due to faster build up of reactive inhibition, extroverts will condition more slowly and extinguish faster than introverts (Eysenck & Rachman, 1965); extroverts require more external sensory stimulation to maintain a positive affective tone, introverts require less (Eysenck, 1973). From the second implication, Eysenck (1973) argues that if nicotine provides

the basis for the maintenance of the smoking habit (Jarvik, 1970), and smoking may be initially arousing in its effects on cortical activity, with possible tranquilizing effects as it continues (Armitage, Hall, & Morrison, 1968), then more extroverts would be likely to initiate the smoking habit. Further, extroverts would smoke when bored to raise arousal; introverts, when tense to lower arousal. It follows for Eysenck that anti-smoking treatments should differ in accord with personality. Introverts would be less likely to be helped by arousing, aversion treatments, than by a method like systematic desensitization. The converse would be the case for extroverts (Eysenck, 1973).

Empirical studies of personality variables. Empirical studies relating personality to smoking behavior have not been lacking. An early study of Matarazzo and Saslow (1960) found smokers to be more extroverted than non-smokers. This was also the finding of Straits and Sechrest (1960). In a comprehensive review of the empirical literature, Smith (1970) cites 22 of 25 studies in agreement on this point. The samples included: U.S. male and female adults, high school and junior high school students; British and Australian adult males; and Puerto Rican male and female high school students. Measurement devices included: The Maudsley Personality Inventory, Cattall's Sixteen Personality Factor Questionnaire, The Minnesota Counseling Inventory, peer ratings and special questionnaires. On the other hand, Keutzer (1968) found no significant relationship between extroversion and treatment outcome. It should be recalled,

however, that her treatments did not include those specified by Eysenck (1973) as having the greatest differential effects.

I-E has also received much attention. Lilienfield (1959) found smokers to be more external than non-smokers. Smith's (1970) review also cites four of five investigations reporting smokers to be more external. Samples included: male and female adults, and high school and junior high school students. Instruments included: The James Test of Internal and External Control, The Neuropsychiatric Adjunct, and special questionnaires. Hjelle and Clouser (1970) report external females smoke significantly more cigarettes than internal females, while men show a strong tendency in this direction. Ryan (1973) emphasizes the differences between smokers, rather then between smokers and non-smokers, stating: "Among smokers, smoking behavior is highly dependent upon personality characteristics, so that one type of person may be expected to have one characteristic rate or pattern, and another person may have another rate or pattern." (Ryan, 1973, p. 240.) James, Woodruff, and Werner (1965) observed that smokers who claimed to believe the Surgeon General's report and quit were more internal than those who believed the report and did not quit. Moss (1973) found internals to be more likely to quit than externals. But Lefcourt (1965) found no relation between I-E and smoking. Rutner (1967), Keutzer (1968), and Best and Steffy (1971) also found no relation between treatment outcome and I-E.

Changes in internality. Although Rotter (1966) claims satisfactory test-retest reliability for his measure of I-E, studies have noted changes in scores. Some studies have deliberately attempted to raise internality. Smith (1970) found that the resolution of life crises preceded rises in internality. Brief psychotherapy had a similar effect in a study of Gillis and Jessor (1970). In a comparison between client centered and a verbal reinforcement type of counseling for disabled subjects, Coven (1970) found the verbal reinforcement counseling to be superior in raising internal expectancies. Pierce and Schauble (1970) were able to directly teach internality to clients. Dua (1970) however, discovered that an active, behavioral technique was more effective in raising internality than a re-educative treatment. Diamond and Shapero (1973) successfully raised internality through the use of encounter group techniques. Both professional group leaders and trained graduate students served as therapists. Inadvertant changes have also been observed. Berger and Koocher (1972) note that a group of narcotics addicts became significantly more internal in expectation when their institution was closing and they were preparing to cope with the outside environment.

The importance of relative increases in internality lies in their cultural value, and the positive associations with the various aspects of mental health previously cited. It is possible that generalization of internal expectancies may increase the over-all effectiveness of an individual, especially in regard to obtaining reinforcement from the environment.

In summary, these studies find extroversion positively correlated to smoking. There is rather substantial evidence that externality is also linked to smoking behavior. However, the results of treatment outcome investigations are hardly unanimous. These varying findings are possibly due to the different types of treatments used. Various sorts of intentional and unintentional manipulations and treatments have been shown to alter I-E expectancies. It is conceivable that effects from altered expectancies may generalize to situations other than those causing the alteration. It is also possible that increased effectiveness in obtaining reinforcements may result from increased internal expectancies.

Statement of the Problem

This study has been undertaken to further aid in resolving the following questions: Do smokers who seek outside assistance in quitting in fact differ in extroversion and LOC from normal populations? Do introverts feel a greater need to smoke in arousing situations? Of greater practical importance, do different treatment techniques have differential effects as a function of the subject's LOC or extroversion? Will result of treatment correlate with changes in personality scores?

Hypotheses. The above questions are stated formally as hypotheses below:

1. The sample of smokers will be more extroverted on the Eysenck Personality Inventory than a normative control group. Prior research on smokers (Smith, 1970), has overwhelmingly found smokers in general to be extroverted. It is believed that smokers who wish to quit would also be extroverted.

2. The sample of smokers will be more external on the Rotter I-E Scale than a normative control group. The majority of studies reviewed by Smith (1970) have found smokers to be external. It is likely that smokers who seek the aid of a clinic in quitting would be so as well.

3. There will be a significant linear negative correlation between scores on the EPI and the Firth Smoking Situation Questionnaire. The question of the differential functions of smoking between introverts and extroverts, as deduced by Eysenck (1973), has implications for treatment methodology. A smoking situation questionnaire developed by Firth (1971) should differentiate between introverts, who would smoke to lower their arousal level when tense, and extroverts, who would smoke to raise their arousal level when bored.

4. Of those subjects assigned to the covert sensitization condition (CS):

   a) Those scoring above the median on the EPI (extroverts) will show greater reduction in smoking than those below the median (introverts).

   b) Those scoring above the median on the I-E scale (externals) will show a greater reduction than those scoring below the median (internals).

Different treatments should have different effects upon smokers with different personalities. An aversive treatment would be more successful in reducing the number of cigarettes smoked by extroverts than by introverts, due to its arousing features, and more effective with externals than with internals, because the involvement of externals in a more passive treatment will be easier to maintain than the involvement of internals, who might feel subtly manipulated (Rotter, 1966).

5. Of those subjects assigned to the operant conditioning treatment (OP):

   a) Those scoring below the median on the EPI will show a greater reduction than those scoring above the median.

   b) Those scoring below the median on the I-E Scale will show a greater reduction than those scoring above the median.

An operant technique requiring much involvement but little effective arousal, should have the opposite pattern of success, i.e., best results for introverts and internals.

6. Of those subjects assigned to group support condition (GS):

   a) Those scoring above the median on the EPI will show a greater reduction than those scoring below the median.

   b) Those scoring above the median on the I-E Scale will show a greater reduction than those scoring below the median.

   c) There will be a quicker relapse rate among those subjects within this treatment condition.

It is probable that a group support treatment would have significant initial success with extroverts and externals, due to the social participation and the diffusion of responsibility, but previous studies suggest that relapse will follow shortly after cessation of treatment.

7. Of those subjects assigned to the will-power condition (WP), those with scores below the median on the I-E Scale will show a greater reduction than those with scores above the median. A simple "will-power" treatment would be suited to reduce the cigarette consumption of internals, by permitting them to rely on their own inner resources.

8. As a result of treatment outcome:

   a) No significant change in EPI post-test scores is expected.

   b) There will be a significant positive correlation between change in I-E Scale scores and outcome.

While various investigations of smoker's personality in relation to treatment outcome have been undertaken, little attention has been paid to changes in personality or generalized expectancies in relation to smoking treatment success. In Eysenck's theory, I/E is a constitutional temperment, thus any changes in this trait, as assessed by post-test scores, would reflect either error or physiological change. Thus no changes in I/E as a result of treatment outcome are expected. Internal-external LOC, on the other hand, is a psychological trait of expectancy, reflecting environmental and intra psychic or cognitive events. Therefore, successful treatment is likely to lead to increase in internality and possible generalized benefits.

Chapter II

METHODOLOGY

Subjects

Announcements of a free smoking clinic under the auspices of the Michigan Lung Association were made through local newspapers and a television station. One hundred and eleven smokers attended the organizational meetings where pre-test data were gathered. This included the pre-test personality measures discussed below, demographic data (see Kantrowitz, 1975, for further details on demography), an estimate of daily cigarette consumption, and slips of paper on which actual cigarette consumption was measured for a 10 day period. This initial sample consisted of 45 males and 66 females. The mean age of this group was 37.18 years, SD of 9.67. Their estimates of daily smoking averaged 31.3, with an SD of 7.34.

Of the 111 subjects who provided pre-test data, 73 remained throughout the program to supply post-test data. Fourteen of the remainder did not attend the first treatment session. Twenty-four dropped out of the study or missed more than three of the eight treatments. Table 1, below, summarizes the distribution of subjects among groups and their treatment data.

Table 1. Attendance and Smoking Data by Treatment Groups.

Groups	OP		CS		WP		GS		AP		NC	
Sex	M	F	M	F	M	F	M	F	M	F	M	F
ATTENDANCE												
Session 1	6	7	8	7	3	11	6	9	5	13	*	
Session 2	8	6	6	5	3	9	4	8	5	10		
Session 3	8	4	6	5	3	9	5	7	5	10		
Session 4	6	5	4	4	3	9	4	9	3	10		
Session 5	5	4	5	5	3	9	5	7	2	11		
Session 6	6	4	3	3	3	9	5	8	2	7		
Session 7	4	3	2	2	3	9	5	6	3	8		
Session 8	4	2	3	4	3	9	5	5	3	4		
Final n	6	4	4	6	3	9	5	8	4	8	7	9
Pre-treatment Estimate	35.8		27.8		32.0		31.8		29.1		31.6	
Baseline Measure	26.7		21.9		19.92		27.8		20.9		25.0	
Post-Treatment	7.7		6.9		13.9		7.6		11.23		24.9	

*No contact made

Instruments and Measurements

I-E Scale. The Rotter I-E Scale is a 29 item forced choice questionnaire designed to assess belief in sources of reinforcement. There are six filler items, leaving a range of scores from 0 to 23. The higher the score, the greater the externality expressed. Text-retest reliability for one month is moderately good, ranging from .72 to .78 in two samples (Rotter, 1966). After two months, it dropped to .55 in one sample reported by Rotter (1966). The trend is toward a typical

drop of one point upon readministration. No significant correlations with the Marlow-Crown Social Desirability Scale were present. Evidence for satisfactory construct validity lies in correlations of .55 to .60 with the Likert type James-Phares I-E Scale (Rotter, 1966). Norms quoted by Rotter (1966) range from a low of 5.48 for female Peace Corps Volunteers, to a high of 10.00 for 18 year old males in the Boston area.

EPI. The Eysenck Personality Inventory (Eysenck & Eysenck, 1968) is a 57 item yes-no questionnaire designed to assess degree of extroversion and neuroticism (i.e., "emotional ability"). It also contains a lie scale. There are two alternate forms available, with a mean difference of 2.10 points in favor of form B. Test-retest reliability for the whole instrument ranges from .84 to .94, and .80 to .97 for the separate forms. Split-half reliability ranges from .74 to .91. Factorial validity, construct validity, and concurrent validity are all reported as satisfactory (Eysenck & Eysenck, 1968). Reference group norms for rather widely differing populations are provided by the manual. Correlations between I-E and the EPI are only .07 (Shriberg, 1972).

Firth Smoking Situation Questionnaire. As part of a factor analysis of demographic variables associated with smoking situations, Firth (1971), devised a 22 item questionnaire consisting of 12 high arousal, and 10 low arousal potential smoking situations. Subjects were asked to imagine themselves in these situations and rate their desire for a cigarette on a seven point scale. A copy of this instrument is included as the Appendix.

Procedures

Potential subjects who had expressed an interest in attending the clinic were contacted by telephone and invited to a group meeting, at which time the pre-test measures were administered, as well as instructions on baseline measurement of daily smoking. They were informed that the tests would help to assign them to the most effective group, and would aid in further research and treatment.

The treatment program lasted six weeks, and consisted of eight sessions, two per week for the first two weeks, and one per week for the remaining four weeks. Six groups were formed with greatest priority given to a normal distribution of I-E Scale scores, smoking rate and, of course, scheduling within each condition. Four treatment conditions and two controls were formed:

Operant conditioning (OP). This program was based on Stuart and Davis (1974). It involved baseline determination and continued daily monitoring, immediate positive reinforcement of non-smoking behaviors by reference to a "reward deck" which consisted of individually determined benefits of abstinence written on cards designed to be carried and consulted when an urge to smoke is resisted, individually determined tangible reinforcements given for continuing to meet the percentage criterion of gradual reduction, praise and social support from significant others for non-smoking behavior, and a gradual decrease in smoking through a) reduction in number of cigarettes smoked, and b) restriction of smoking to six locations, which are themselves gradually eliminated. Key elements of this condition were

reliance on individually tailored reinforcements, lack of punishing stimuli, and a general sense of subject participation.

Covert sensitization (CS). This program followed the program outlined by Cautela (1970). The first session was devoted to teaching muscle relaxation. As treatment progressed, and facility in relaxation was acquired, less time was spent inducing relaxation. Ten situations determined by group consensus as desirable smoking situations were vividly imagined each session. Imagined aversive stimulation (e.g., nausea) followed imagined smoking. Relief or escape trials, in which smoking was resisted, alternated in a random manner. Subjects were instructed to practice at home.

Group Support (GS). A discussion group and therapist met for sessions that attempted to diminish smoking through peer support and peer pressure. The advantages of quitting, recounting of smoking experiences, and general support were emphasized.

Will-power (WP). Subjects in this condition were informed that they could stop smoking by their own volition most easily. They were contacted exclusively by telephone after the first meeting. The telephone calls were meant to obtain information on smoking rates. No suggestions as to anti-smoking techniques were made, other than a reminder that their own capacities and resources could be relied upon.

Attention-placebo (AP). An attention-placebo group was formed and told that smoking is the result of their unconscious attitudes and habits. These habits could be reconditioned through subliminal techniques. In a process used by Sipich et al. (1974), the supposed

"reconditioning" phrases were tachiscopically presented upon a screen. These were, in fact, nonsense syllables. The subjects were told that viewing these stimuli would be relevant to their treatment and would result in reduction in their smoking. It was felt that any misleading information supplied was vital to the efficacy of the treatment, and justified by the scientific contribution of the investigation.

No-contact (NC). No-contact controls were requested to record baseline smoking for one week, and take pre- and post-test smoking measures.

It was determined that any condition resulting in markedly inferior treatment outcome would be given the option of further treatment. The subjects in the NC group were offered this opportunity.

Table 2 summarizes treatment procedures over the eight sessions for each condition.

Therapists. The therapists included one male and two female graduate students trained as a group in the treatments to be employed. One therapist was beyond the Master's level, the remaining two were first year clinical psychology graduate students. Each of the three therapists conducted one group from each of the six conditions.

Post-test measures. The post-test measures consisted of the alternate form (B) of the EPI, readministration of the I-E Scale, and solicitation of subjective perceptions, complaints and suggestions from the participants. They were administered immediately following the final session. Follow-up calls recording daily cigarette consumption were made on a weekly basis for 10 weeks, once at three

Table 2. Summary of Treatment Procedures.

Group	OP	CS	AP	WP	GS
Session					
1	Measurement Procedures Reward deck preparation Location hierarchy formed	Treatment rationale Relaxation training	Treatment rationale Tachiscopic presentation	Treatment rationale	Group Discuss.
2	Tangible and social reinforcers Reward deck and location hierarchy explained	Relaxation Aversive situation formed	Tachiscopic presentation	Smoking recorded & support given by telephone	Group Discuss.
3	Smoking cues, token use explained Reduction to 75% of baseline Two smoking locations eliminated	Relaxation and aversion treatment	Tachiscopic presentation	Smoking recorded & support given by telephone	Group Discuss.
4	Aversion deck formed Reduction to 50% of baseline Two smoking locations eliminated	Relaxation and aversion treatment	Tachiscopic presentation	Smoking recorded & support given by telephone	Group Discuss.
5	Cue control and behavioral chains explained Reduction to 25% of baseline	Relaxation and aversion treatment	Tachiscopic presentation	Smoking recorded & support given by telephone	Group Discuss.
6	Review and maintenance Reduction to 10% of baseline Smoking in only one location	Relaxation and aversion treatment	Tachiscopic presentation	Smoking recorded & support given by telephone	Group Discuss.
7	Review End Smoking	Relaxation and aversion treatment	Tachiscopic presentation	Smoking recorded & support given by telephone	Group Discuss.
8	Maintenance	Relaxation and aversion treatment	Tachiscopic presentation	Smoking recorded & support given by telephone	Group Discuss.

months, six months, and again at one year. Due to the later treatment of the NC condition, no further follow-up was performed on this group.

Data analysis. The resulting data, based on number of cigarettes smoked per day, was analyzed by means of two factor (time X condition) repeated measures analyses of variance (Keppel, 1973) for the six weeks of treatment, and the 10 weeks of follow-up. One factor analyses of variance were performed on end of treatment data and three month data. The data derived from EPI and I-E Scale scores, and the Firth questionnaire were correlated by the Pearson product moment correlation (Bruning & Kintz, 1968). Comparisons between high and low scorers on the EPI and the I-E Scale within the treatment conditions were performed via *t* tests. The dependent variable for these comparisons was percentage of baseline estimate smoked at end of treatment. This is the measurement suggested by Keutzer et al. (1968) and Koenig & Masters (1965).

Chapter III

RESULTS

A two factor repeated measures analysis of variance was performed on the smoking data from the six weeks of treatment of all groups but NC. As can be seen from Table 3, significant effects were obtained for the time factor F (5,260) = 50.625, p <.001, indicating that improvement occurred over the duration of treatments. The treatments, themselves, did not differ significantly from each other, nor did any significant interactions occur. A one factor analysis of variance on end of treatment data was performed in order to include the NC condition. Significance was obtained for conditions F (5,67) = 6.62, p <.01. This data is summarized in Table 4. Post-hoc comparisons using the Scheffè test determined that CS and GS conditions differed from NC at the .05 level. No other comparisons were significant.

Table 3. Two Factor Repeated Measures Analysis of Variance on Smoking Rates During Treatment

Source	Sums of Squares	df	MS	F
Between (B)	15,585.25	56	--	--
Condition (C)	393.37	4	98.34	.34
Error B	15,191.88	52	292.15	--
Within (W)	18,538.17	285	--	--
Time (T)	8,695.59	5	1,739.12	50.63*
T X C	911.05	20	45.55	.25
Error W	8,931.526	260	34.35	1.33

*p <.001

Table 4. One Factor Analysis of Variance on Smoking Rates at End of Treatment

Source	Sums of Squares	df	MS	F
Between (B)	3,189.77	5	637.95	6.62*
Within (W)	6,460.34	67	96.42	--
Total (T)	9,650.11	72	--	--

*p <.01

The initial hypothesis predicted that the smoking sample would be more extroverted on the EPI than a normal control group. To test for this, two t-tests were conducted, the first comparing the smoking sample to an American industrial sample, and the second to the American college norms. The American industrial sample consisted of 296 adult male industrial employees ranging in age from 19 to 64 years, with a mean of 43 (Eysenck & Eysenck, 1968). The college norms were derived from the scores of 1,003 male and female students. The findings indicate that the smoking sample was significantly more extroverted than the industrial norms, t = 3.842, p <.01, yet significantly more introverted than the college sample, t = 3.273, p <.01. These data are displayed in Table 5.

Table 5. EPI (Form A) Pre-Test Data.

	n	X	SD	t value
Sample	111	11.76	3.99	--
Industrial Norms	296	10.3	--	3.84*
College Norms	1,003	13.1	4.1	3.27*

--data unavailable

p <.01

The second hypothesis predicted that the sample of smokers would be more external on the I-E Scale than a normal control group. Previous research (Staats et al., 1974) has found differences in LOC related to age and sex variables. Thus the normative group chosen to test this hypothesis consisted of 200 rural and small town Ohioans, divided according to gender and four age groups, from 16 to over 60 years (Staats et al., 1974, Staats, personal communication). Eight *t* tests were performed. No comparisons were significant. Thus it was not established that the smoking sample was more external. These findings are presented in Table 6.

Table 6. I-E Scale Pre-Test Data

						Sample (N = 111)		
Age	16-25		26-45		46-60		60-	
Sex	M	F	M	F	M	F	M	F
n	10	15	21	35	13	14	2	0
X	9.2	10.9	6.7	8.9	6.9	7.6	9.5	--
SD	4.9	4.3	10.0	3.4	3.5	5.2	2.5	--
						Normative Groups (N = 200)		
n	25	25	25	25	25	25	25	25
x	10.4	10.2	7.4	8.7	6.8	8.8	7.4	10.2
SD	4.2	3.9	4.2	3.9	3.4	3.2	3.4	3.2
t value	.71	.59	.63	.16	.12	1.12	.82	--

The third hypothesis predicted a negative correlation between initial EPI scores and those on the Firth questionnaire. The correlation equaled +.036, which is clearly nonsignificant. There was no evidence relating smoking in different levels of arousal to degree of extroversion.

The fourth hypothesis stated that those subjects within the CS condition who were extroverted would be more successful than those who were introverted, and those who were more external would be more successful than those who were internal. As tables 7 and 8 indicate, neither *t* ratio was significant, thus neither extroversion nor LOC appears relevant to outcome in the CS condition.

Table 7. EPI Scores and Treatment Outcome Within the CS Condition.

	Low (Introverts)	High (Extroverts)
n	5	5
X % of Estimated Baseline	.226	.281
SD	.128	.186
t value	.49	

Table 8. I-E Scores and Treatment Outcome Within the CS Condition.

	Low (Internals)	High (Externals)
n	4	6
X % of Estimated Baseline	.270	.245
SD	.169	.151
t value	.063	

The fifth hypothesis concerned the OP condition. It predicted that introverted and internal subjects would show a more pronounced reduction in smoking than those relatively more extroverted and external, respectively. As can be seen in tables 9 and 10, neither *t* ratio yielded significant differences. The evidence does not support any outcome differences in the OP condition based on extroversion or LOC.

Table 9. EPI Scores and Treatment Outcome Within the OP Condition.

	Low (Introverts)	High (Extroverts)
n	6	4
X % of Estimated Baseline	.278	.275
SD	.450	.177
t value	.164	

Table 10. I-E Scores and Treatment Outcome Within the OP Condition.

	Low (Internals)	High (Externals)
n	5	5
X % of Estimated Baseline	.235	.287
SD	.287	.154
t value	.319	

The sixth hypothesis predicted that greatest smoking reduction would occur among those subjects in the GS condition who were relatively more extroverted and more external. It was also hypothesized that this group would suffer a more rapid relapse. Neither of the predictions concerning personality were supported by the *t* ratios, as shown in tables 11 and 12. A one-factor analysis of variance performed on the treatment conditions at three months follow-up disclosed no differences in rate of relapse among any of the groups, as seen in Table 13.

The seventh hypothesis predicted that internal subjects assigned to the WP condition would be more successful than external subjects. As shown in Table 14, this *t* ratio was not significant, and the hypothesis was not supported.

Table 11. EPI Scores and Treatment Outcome Within the GS Condition.

	Low (Introverts)	High (Extroverts)
n	3	9
X % of Estimated Baseline	.025	.252
SD	.035	.226
t value	1.239	

Table 12. I-E Scores and Treatment Outcome Within the GS Condition.

	Low (Internals)	High (Externals)
n	6	6
X % of Estimated Baseline	.236	.155
SD	.248	.178
t value	.589	

Table 13. One Factor Analysis of Variance on Smoking Rates at Three Months.

Source	Sums of Squares	df	MS	F
Between (B)	387.20	4	96.8	.72
Within (W)	6,976.69	52	134.17	
Total (T)	7,363.89	56		

Table 14. I-E Scores and Treatment Outcome Within the WP Condition.

	Low (Internals)	High (Externals)
n	7	5
X % of Estimated Baseline	.514	.516
SD	.357	.524
t value	.006	

The eighth hypothesis predicted no change in EPI post-tests as a result of treatment outcome, but a positive correlation between outcome and post-test I-E Scale scores. The correlation between EPI (form A) - EPI (form B) + the published difference between the two forms (Eysenck & Eysenck, 1968), and the percent reduction in estimated baseline smoking was found to be -.056. This is nonsignificant, as expected. EPI scores did not differ as a result of treatment outcome. The correlation between I-E (pre) - I-E (post) and outcome was +.08. This was also nonsignificant, contrary to expectations. Successful treatment did not significantly increase internality, nor did lack of success significantly lower it.

Chapter IV

DISCUSSION

Overall comparisons between conditions revealed that subjects in all treatment conditions improved over the duration of treatment, but not at differential rates. At the end of treatment, GS and CS conditions were significantly different from the NC controls, but not from each other. There were no differences between any treatment conditions at 10 weeks follow-up. These findings add further support to those of Keutzer et al. (1968), and Sipich et al. (1974). Namely, treatment is superior to no treatment, but a behavioral treatment such as CS is not demonstrably superior to a non-behavioral treatment such as GS or the AP control. The finding that the AP group was not significantly inferior to OP and WP conditions suggests that placebo factors are involved in outcome.

It was found that this sample of cigarette smokers attempting to quit was more extroverted than an industrial sample, yet more introverted than a college sample. The first comparison confirms the Eysenckian theory, that is, smokers are relatively extroverted. The two populations were similar in regard to age, although there was apparently a somewhat greater variance in SES among the smoking sample. In addition, the smoking sample consisted of both males and females, while the industrial sample was confined to the former. It is not known what percentage of the industrial sample consisted of smokers, or more

specifically, smokers attempting to quit smoking. Yet when compared to a population considerably younger, and of likely high SES, the sample of smokers is found to be more introverted. Evidently, factors of age and social status play some role in extroversion. Several questions immediately arise: Do generations and/or social classes consistently differ in extroversion? If such is the case, are the relatively more extroverted members of such groups more likely to smoke or to smoke and wish to quit? These questions would be amenable to further research.

A second characteristic of this sample of smokers was attitude toward LOC. Prior research has discovered significant differences in age and nearly significant differences in gender on the I-E Scale (Staats et al., 1974). Thus separate comparisons were made involving both sexes and four age groups. No differences between sample and normative groups were found. This result is not in conformity with some of those reported by Smith (1970). Again, this finding is weakened by a lack of knowledge concerning the smoking habits of the normative sample. One important difference distinguishing this sample of smokers from other smoking samples is the fact that quitters or those attempting to quit smoking have I-E Scale scores closer to, or indistinguishable from, those of a normative population. A study concerning differences in I-E Scale scores among smokers, those wishing to quit, quitters and those who have never smoked, would be useful.

On the basis of Eysenckian theory, a correlation between smoking in physically and psychologically arousing situations and high degree

of introversion was expected. None was found. Comments from subjects and patterns of scores on the Firth questionnaire suggested that individuals do indeed tend to smoke in differential patterns based on arousability, yet a direct correlation with extroversion does not exist. A possible differential effect of physical as opposed to psychological stress may play some role in accounting for these results. More likely, idiosyncratic reinforcement histories operating within individuals could be responsible.

Other findings of this study reinforce those of Keutzer et al. (1968), Ober (1968), and others: that is, personality variables such as extroversion as measured by the EPI, and attitudes toward LOC as measured by the I-E Scale, seem irrelevant to treatment outcome. This occurs even within several quite different treatment conditions, including behavioral methods such as an arousing sensitization treatment and an individualized operant treatment; and non-behavioral methods such as socially supportive groups and an independent willpower condition. Further, relapse seems to occur at uniform rates.

The strength of these results has been weakened by several factors. Most noticeable is the relatively small $\underline{n}$ within each of the treatment conditions. Additional data from more subjects would likely have resulted in a wider sampling of both personality scores and degrees of success. This, in turn, may have revealed trends that are not now apparent, or more firmly ruled them out.

Perhaps more significantly, however, was the fact that insufficient cells could be filled to perform a three factor (EPI X I-E X conditions) analysis of variance (Keppel, 1973). Thus any

interactions between these variables and outcome could not be detected. It does not seem unrealistic to expect outcome differences between internal introverts and external extroverts, for example, given different treatment conditions. This area remains open for further investigation.

Another factor that may have attenuated any trends is the success rate. Fifteen of 57 subjects in treatment conditions, or 26%, were completely abstaining at end of treatment, 8, or 14% were abstinent at 10 weeks, and 7, or 12.3% were still not smoking at the three month follow-up. Had there been more pronounced success, differences may have been more apparent. Therapists with greater clinical experience in the use of the techniques employed could have possibly increased this rate. Also, commitment may have been enhanced by the use of money deposits returned at the end of treatment. It should be noted, however, that this rate is not substantially different from that reported by previous researchers (Bernstein, 1970).

It was also found that relative success or failure within treatment had no effect on EPI or I-E Scale post-tests. This was contrary to expectations in regard to the I-E Scale, but in accord with expectations concerning the EPI. Several possible explanations deserve consideration in regard to LOC. It is conceivable that relative success within a treatment group that relies heavily on self control, (e.g., WP or OP) would be more likely to influence the I-E scale score than would success within a condition oriented towards external control (e.g., CS) or group processes (e.g., GS). Again, a

higher success rate might have induced more changes in LOC if such changes are actually a result of success. Follow-up post-tests correlated with follow-up smoking rates would also prove useful.

The correlation between outcome and change in EPI scores was extremely small (r = .08), as expected. However, determining a precise level of confidence is problematical when no significant differences are found. Thus, this finding must be accepted with some reserve. Nevertheless, due to the relatively large size of the sample (n = 57, NC group excluded), it does support Eysenck's opinion that extroversion is a relatively stable trait within individuals.

Subsequent treatment programs should be aware of the potency of placebo effects, and use them intentionally. It is important that commitment to a full course of treatment be maintained. This may be accomplished by requiring monetary deposits or contracts.

It is suggested that further studies in this area use larger samples, more mature or experienced therapists, and have a comprehensive knowledge of the demography (i.e., age, sex, SES and smoking habits) of any normative groups. If possible, local norms should be used. Specific questions that may merit further investigation include the following: What is the relationship between age, SES, and smoking? Is the extroversion and smoking relationship predicated on absolute scores or scores relative to demographic groups? How do the states of contented smoking, quitting, and non-smoking relate to LOC? What are the interactions between traits, attitudes,

and treatments? Does success in different types of treatment have a greater or lesser influence on LOC change? And, finally, does LOC change as a function of relapse?

As the relationships, if any, between personality, attitude, background and treatment technique are further explored, it may ultimately become possible to pair the individual smoker with the treatment providing the greatest likelihood of success.

Chapter VI

SUMMARY

A survey of the literature dealing with anti-smoking treatments and relevant personality measures was conducted. A study was designed to investigate the relationships between extroversion as measured by the Eysenck Personality Inventory (EPI), the Firth Smoking Situation questionnaire (a measure of desire to smoke under a variety of arousing situations), Locus of Control (LOC) as measured by the Rotter I-E Scale and success of five treatment techniques, i.e., Operant conditioning (OP), covert sensitization (CS), will power (WP), group support (GS), and attention placebo (AP). It was predicted that the sample of 111 smokers contacted through newspaper and television announcements would be more extroverted than the EPI norms, and more external than a normative group on the I-E scale. It was hypothesized that the Firth questionnaire would positively correlate with extroversion, that the OP condition would prove most successful for those scoring below the median on the EPI and I-E, that those scoring above the median on these measures would do best in the CS condition, but would relapse more quickly than other groups, and that low scorers would be most successful among those in the WP condition. It was further hypothesized that extroversion would not change as a result of treatment, but that a positive correlation between post-test I-E scores and percent of estimated baseline at the end of treatment should exist.

Comparisons were made using Pearson product-moment correlations, *t*-tests, and single-factor analysis of variances. It was found that the sample was indeed more extroverted than the EPI industrial norms. No significant change in extroversion as a result of treatment outcome was found. No other hypotheses were confirmed.

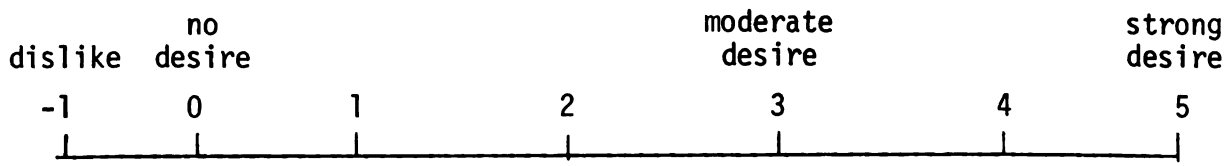
Limitations of this study were discussed, and suggestions for further investigations were made.

APPENDIX

APPENDIX

Situational Smoking Questionnaire

In the questions that follow you are to imagine yourself in the situations described and indicate what you think your craving for a cigarette would be in each of the situations. The degree of your desire to smoke should be indicated in terms of the scale shown here:



Thus for each situation you must write down the number corresponding to what you think your desire for a cigarette would be. Please remember that we are interested only in your desire for a cigarette in the various situations and not whether it would be proper or possible for you to <u>smoke</u> in these situations.

dislike		no desire			moderate desire		strong desire	
-1	0	1	2	3	4	5	(1.	You are having an important interview for a job.
-1	0	1	2	3	4	5	(2.	You have to fill in a complicated tax form.
-1	0	1	2	3	4	5	(3.	You have to look through several hundred coins to see if there are any rare and valuable ones.
-1	0	1	2	3	4	5	(4.	You are having a quiet evening with friends.
-1	0	1	2	3	4	5	(5.	You are witnessing a violent and horrifying film.
-1	0	1	2	3	4	5	(6.	You have to drive fast in heavy traffic.
-1	0	1	2	3	4	5	(7.	You have to wait for your train home, which is very late.

-1	0	1	2	3	4	5	(8. You are having a restful evening alone reading a magazine.
-1	0	1	2	3	4	5	(9. You are sitting in a dentist's waiting room knowing that you are to have a particularly difficult filling.
-1	0	1	2	3	4	5	(10. You are trying to hold a conversation at a large and very noisy party.
-1	0	1	2	3	4	5	(11. You are very tired and need to keep awake.
-1	0	1	2	3	4	5	(12. You have to ask your boss for a raise at a time when he is known to be in a bad mood.
-1	0	1	2	3	4	5	(13. You are trying to account for the discrepancy between your spending for the month and your bank statement.
-1	0	1	2	3	4	5	(14. You are looking through a long list of names to see if you can find anyone you know.
-1	0	1	2	3	4	5	(15. You are chatting with friends during a coffee break.
-1	0	1	2	3	4	5	(16. You have just been informed of the death of a close friend.
-1	0	1	2	3	4	5	(17. You have to do some rapid mental arithmetic for an intelligence test.
-1	0	1	2	3	4	5	(18. You are traveling on a train for several hours.
-1	0	1	2	3	4	5	(19. You go for a solitary walk in a quiet countryside.
-1	0	1	2	3	4	5	(20. You have just heard the announcement of a plane crash and you think a friend may have been involved.
-1	0	1	2	3	4	5	(21. You are having an important telephone conversation in a very noisy office.
-1	0	1	2	3	4	5	(22. You have just had a very big meal.

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