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VISUAL DEPRIVATION AS A THERAPEUTIC TOOL IN THE TREATMENT OF SMOKING BEHAVIOR

by

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Acknowledgements

There are probably a number of good arguments both for and against the inclusion of an acknowledgements section in a formal thesis. By the time a student reaches that stage in writing when he can weigh them, however, he has been pretty well impressed by the fact that no one gets very far alone, and that either accidentally or purposefully, others have involved themselves in his progress. With this realization, further debate really becomes academic.

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Abstract

Visual Deprivation as a Therapeutic Tool in the Treatment of Smoking Behavior

The purpose of this thesis was to determine the effect of a 24 hour period of visual deprivation upon the subsequent smoking patterns of subjects. Previous studies (Suedfeld, Landon, Pargament, and Epstein, 1972; Suedfeld, 1973; Suedfeld, 1974) have shown that a similar period of full sensory deprivation or sensory deprivation together with taped anti-smoking messages significantly reduced subjects' later smoking rates. Visual deprivation, a more easily induced and controlled condition, is known to produce many of the same sensory and cognitive effects as its full sensory counterpart (Zubek, 1969). A demonstrated extension of its effectiveness would have both theoretical and practical importance.

Accordingly, 48 male smokers who had averaged 20 cigarettes a day for at least one year and who had expressed a desire to quit were randomly assigned to one of four experimental conditions: (1) a 24 hour period of visual deprivation with no smoking permitted, (2) a like period of visual deprivation with smoking permitted, (3) no deprivation (confinement) with no smoking permitted, and (4) no deprivation (confinement) with smoking permitted. Subjects monitored their smoking rates for a five day period immediately prior to the experimental session. A second five day monitor period was carried out one month after treatment. Statistical analyses of the pre-post measures showed a significant reduction in smoking rates across all conditions, but no significant differences among groups for visual deprivation, smoking deprivation, self-monitoring, or their interactions.

Qualitative data from post treatment questionnaires supported the latter findings.

Results were discussed within the context of the relationship of visual to sensory deprivation and in terms of design differences between this study and previous investigations of the smoking-deterrent effectiveness of deprivation states. A tentative explanation of the overall significant decrease in smoking levels was presented. Its implications for the present experiment and Suedfeld's past research were delineated. Avenues for future research were suggested.

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CHAPTER I

INTRODUCTION

The persisting habitual consumption of cigarettes by large segments of the population has been of phenomenon of interest and concern to medical and behavioral scientists for nearly 40 years. Though the foci of research interest varied during that period, recent investigative efforts have centered upon the evolution and refinement of techniques effective in the reduction or elimination of smoking behavior. This latter problem has been approached from various conceptual viewpoints -- pharmacological, psychotherapeutic, learning theory, and cognitive theory -- and with an often bewildering variety of procedures or combinations of procedures. The present study represented an evaluation of one promising stream of research in this area, the use of full or partial sensory deprivation as a tool in the treatment of smoking habituation.

Early in the last decade, the major medical society of Great Britain and the national health agencies of the United States and Canada published reports concerning the effects of smoking, particularly cigarette smoking, upon the health of habitual users of tobacco (Smoking and Health: Summary and Report of the Royal College of Physicians of London on Smoking in Relation to Cancer of the Lung and Other Diseases, 1962; Smoking and Health; Report of the Advisory Committee to the Surgeon General of the Public Health Service, 1964; A Canadian Study of Smoking and Health, 1966). All three studies presented evidence in support of the conclusions of the Surgeon General's report that cigarette smoking is causally related to lung cancer, and that strong associations exist between cigarette consumption and cancer of other respiratory and body sites, cardiovascular diseases, chronic bronchitis and pulmonary emphysema. Moreover, the more comprehensive

British and American summaries were in agreement in referring to smoking as a habituation rather than an addiction, attributing the compulsion or drive to smoke primarily to psychological or social sources.

The importance of the conclusions regarding the effects and motivational sources of smoking obtain perspective against the statistical context provided by the British and American studies. The report of the Royal College of Physicians states that three-quarters of the adult male population and one-half of the adult female population of Britain could be regarded as smokers (1961 statistics). Without differentiating between sexes, the Surgeon General's study placed the number of American smokers at 70 million (1962 statistics). No similar data were included in the more restricted Canadian report. It was apparent that significant numbers of individuals in the two countries -- and, presumably, in the third -- had become habituated to a drug whose long term effects were grossly detrimental to their health. The primary motivations for adopting and continuing its usage were, seemingly, social and psychological.

The publication and subsequent attention given to the reports' findings generated a somewhat ambiguous behavior pattern. Data from biannual surveys commissioned by the United States Clearinghouse for Smoking and Health indicated a substantial decline in the number of adult smokers over the six year period from 1964 to 1970. Approximately 24 million individuals were estimated to have given up cigarettes during that time. Yet the surveys noted that 48.8 million Americans still used cigarettes regularly; the percentage of smokers within the adult male populations (43.2) exceeding that within the female (30.9). Moreover, cigarette production in the United States and Canada has remained at

comparable or higher levels than those attained during the period of the reports' immediate appearance. Generally, then, the impressiveness of the spontaneous cessation effect appeared to have been lessened by the number of those who had retained the habit, the influx of a new generation of smokers, and the return of some whose abstinence from cigarettes was temporary only. Smoking behavior seemed to be a deeply ingrained habit, resistant to change even when those habituated were confronted with factual certainties regarding its effects.

The evidence presented in the three reports and the impressive tolerance for dissonance manifested by the majority of cigarette users stimulated a renewal of interest among researchers concerned with the phenomenon. Though investigative studies of cigarette smoking predated report dissemination, their major area of concentration had been upon the personality and motivational patterns involved in the maintenance of smoking. Concomitant with report publications, however, there began to appear a growing number of exploratory studies whose emphasis was upon the development of potentially useful techniques for the elimination of smoking behavior (Keutzer, Lichtenstein, and Mees, 1968; Bernstein, 1969; Schwartz, 1969; Johnston and Donoghue, 1971; Lichtenstein and Keutzer, 1971; Kroll, 1974). A seemingly disparate, hectic quality characterized this evolving field. The procedures employed were derived from several different models or approaches: pharmacological, educative, suggestability, psychotherapeutic, and learning theory. Factors selected as criteria for success/failure differed from study to study. Design and control measures were often inadequate.

Despite divergencies, the research does permit discernment of a

progressive and, thereby, unifying trend. Investigators initially concerned with the problem of smoking reduction came predominantly from a medical background. Techniques, outcome criteria, and design incompleteness reflected both that orientation and, often, the applied settings of the experimenters. With the increasing interest of behavioral scientists in the area, there occurred gradual changes in treatment models or approaches and in the refinement of design and outcome evaluation procedures. The progression was from medical to psychological influence. Its effects became evident in the successive theoretical frameworks from which the problem was broached and in a growing attention to difficulties of control and assessment.

A review of the pertinent literature employing this developmental course furnishes some baseline for evaluation of comparative effectiveness and allows for the emergence of a promising direction for experimentation. To provide further order, studies have been grouped under the following headings: pharmacological model, smoking clinics (educative approach), hypnotic techniques, psychotherapeutic model, behavior modification procedures, and cognitive-attitude change approach. Organization of presentation within each section includes (1) a review of representative studies, (2) summary of the rationale for each approach, (3) critique and comment upon approach effectiveness and methodological difficulties.

Review of the Literature

Pharmacological Model

Experimentation with smoking deterrent drugs long preceded report publication. Dorsey (1936) was the first to describe the use of lobeline sulphate, a nicotine mimetic, in the treatment of chronic smokers. Clinical

observation led him to conclude that the drug was effective in reducing the desire to smoke among patients motivated to quit. Using a somewhat more controlled approach, Wright and Littauer (1937) compared the effect of lobeline sulphate and an inert substance, magnesium oxide. Though the lobeline group noted a decreased craving for cigarettes, they also reported a number of gastrointestinal side-effects. The severity of these effects was of such a magnitude that the authors advised against the broad use of the drug as a 'cure' for smoking habituation.

Later pharmacological advances provided the means for a clearer evaluation of lobeline's action upon cigarette consumption. Rapp and Olen (1955) employed a reduced dosage of the drug buffered with fast and slow acting antacids (Bantron) together with a starch placebo in a treatment-reversal study with 200 subjects. Results seemed to provide impressive evidence for the new compounds efficacy. Over 80% of the participants were abstinent at the end of the Bantron treatment period. A second control study, however, brought the initially promising into question. Participants given the reduced dosage of lobeline alone and the antacids alone again within a counterbalanced paradigm showed no appreciable decrease in smoking at the end of either period.

Wary of the possible influence of extraneous variables, Bartlett and Whitehead (1957) attempted to structure their design in such a way as to control for differential subjective motivation and experimental placebo effect. Investigators instructed subjects to respond normally to their desire for a cigarette and to make no conscious effort to reduce their consumption. Participants were then administered Bantron, the tranquilizing agent Meprobamate (Miltown), and a sugar placebo across

four counterbalanced orders. End of treatment data revealed no noticeable decrement in consumption attributable to any of the three substances.

Additional partial support for the usefulness of the smoking deterrent drug was offered once again by Rapp (Rapp, Dusza, and Blanchet, 1959). 28 volunteers expressing a desire to quit and 25 who stated no such intention were treated first with Bantron and then with a starch placebo. Two outcome measures were employed: number of cigarettes consumed during treatment and mean amount (weight) of each cigarette smoked. End of experiment results showed a steady, impressive decline in the frequency of smoking for the motivated group during Bantron administration. No decrease at all was evident among non-motivated participants. Both groups displayed intriguing 'compensation' patterns on the second evaluative measure. Non-motivated subjects reduced sharply the amount of each cigarette they consumed under Bantron. Those who declared an intention to quit, however, greatly increased the amount of each cigarette smoked in proportion to the declining number consumed.

Rapp's findings, while consistently reported as favorable to buffered lobeline, were by no means free of challenge. Scott, Cox, Maclean, Price, and Southwell (1962) replicated the second part of his original study (Rapp and Olen), comparing a lobeline-antacid compound, Lobidan, with an antacid placebo. A double-blind treatment-reversal paradigm was employed with 55 motivated and non-motivated subjects. Only 29 volunteers completed the six week project, 23 of whom had a stated desire to discontinue smoking. Of the term subjects, 19 were uneffected by either Lobidan or antacids, 4 showed a decrease in consumption during the Lobidan regimen, and 6 reported a similar decrease while under antacid

placebo administration.

Merry and Preston (1963) strengthened the case against the effectiveness of lobeline and provided support for the extraneous variable hypothesis of Bartlett and Whitehead. The study required 90 motivated volunteers to spend an initial two week period in an attempt to stop smoking on their own resources. Those subjects still smoking were then divided into two groups, one of which was treated with Lobidan, the other with an antacid placebo. All were told the medication would be helpful. 13 of the original participants quit smoking on their own initiative. 14 dropped out of the project either at this phase or later. Of the remaining 63, 70% reduced their consumption by half or more, regardless of treatment condition. 30% stopped smoking completely. The authors concluded that there was no difference in performance under Lobidan or placebo. The results suggested the importance of instructional set, and subject motivation and expectation.

Physicians involved in a Smoking Deterrent Study conducted by the British Tuberculosis Association (British Tuberculosis Association, 1963) matched inert placebo tablets in taste and appearance with Lobidan capsules. 80 subjects, a mixed pool of healthy individuals and those afflicted with various respiratory ailments, were randomly assigned to two groups. Each received either Lobidan exclusively or the facsimile exclusively for six weeks. At the end of that period, 45 participants reported no change in smoking frequency, 27 showed a decrease of 50% or more, and nine had quit. There was no difference between groups on either reduction or elimination criterion. Additionally a six week follow-up revealed no difference in recidivism rates between Lobidan and placebo recipients.

The results of the studies reviewed here are generally non-supportive of the efficacy of lobeline variations in combatting cigarette habituation. There is some indication (Rapp and Olen; Rapp, Dusza, and Blanchett) that the nicotine mimetic can play a minimal, ancillary role in the discontinuation of smoking for subjects with some degree of motivation to stop. But the exact nature of the role is clouded by the presence of extraneous variables (instructional set, expectation). The majority of the findings would seem to support the conclusion of the Surgeon General's report that "There is no acceptable evidence that this goal (quitting smoking) can be achieved solely by modifying sensory drives or using tobacco substitutes" (Smoking and Health; Report of the Advisory Committee to the Surgeon General of the Public Health Service, 1964, page 354).

Pharmacological research concerned with the effectiveness of medication to alleviate the possible after-effects of smoking withdrawal (hunger, nervousness, irritability) has been equally discouraging. Studies employing benzedrine sulphate (Miller, 1941), Miltown (Bartlett and Whitehead, 1957) hydroxyzine hydrochloride (Turle, 1958), and Ritalin and Valium (Whitehead and Davies, 1964) have all reported negative results.

The pharmacological approach to smoking behavior presupposed the dominant factors maintaining the activity were physiological. Accordingly its treatment rationale centered upon the amelioration of physical dependence by direct substitution (lobeline sulphate) or by supplementary medication. This theoretical framework and the medical background of researchers espousing it dictated that design structure center upon the 'cure', the immediate cessation of smoking, as the criterion of success. Only one of the studies included here (British Tuberculosis Association) made use of a

follow-up survey to monitor the stability of treatment effects.

All of the studies reviewed suffered from methodological flaws and imprecisions. Subject populations and subject relevant variables were not clearly specified or standardized across investigations. Potential placebo effects of the experimental situation were often ignored or poorly controlled for. The general omission of a post treatment assessment has been alluded to above.

Educative or Clinic Model

As with pharmacological research efforts, impetus for the development of various short-term programs to eliminate smoking came from medical investigators. Ejrup (1960, 1967) designed a ten day smoking deterrent format that combined an introductory lecture on smoking and health, provision of literature on the problems and treatment of smoking behavior, and administration of a battery of pharmacological agents. Participants visited clinic facilities daily to receive an injection of lobeline hydrochloride, and supplies of meprobamate and an amphetamine. They also reported on treatment progress at this time. Data collected from over 1,000 volunteers at the conclusion of their treatment seemed highly significant. 76% of those reporting had stopped smoking and 22% had reduced their consumption to one quarter or less of their pre-treatment average. However, results of a six month follow-up (as cited in Keutzer, Lichtenstein, and Mees, 1968) disclosed that 56% of those who had quit smoking relapsed. Interpretation of treatment value is rendered more difficult by the fact that over 96% of those who participated suffered from serious physical ailments attributable at least in part to their smoking habit.

Plakun, Ambrus, Bross, Graham, Levin, and Ross (1966) carried out a

series of eight two-week programs with a format similar to Ejrup's. Volunteers heard an initial lecture on the health hazards of smoking and a discussion of the medical regimen they were to follow. Approximately half the subjects were then given a week's supply of lobeline sulphate in tablet and lozenge form. Amphetamine capsules were also provided to counteract increased feelings of hunger. Remaining subjects received placebo tablets and capsules as a control. Both subgroups met together the next week to discuss their experiences, progress, and problems and to offer and obtain support. Reports presented by participants at the end of their programs revealed a difference that was statistically significant, but of little real importance. 66% of the 'pure' treatment subjects discontinued smoking. 50% of the treatment-placebo group in like manner stopped. An attempted post treatment assessment was a partial failure. 122 of 313 subjects returned the follow-up questionnaire. Omitting group specification, the authors reported that only 42% of initially successful participants were still abstinent.

Plakun et al viewed these first eight clinics as pilot investigations and subsequently completed an additional 19 programs with modified formats (1966, 1967). Program length was extended from two to four weeks and greater emphasis was given to the other components of the clinic model, its educational and group supportive aspects. Various medications were also provided. Average end of treatment cessation rate for the new programs was 34%. Six month follow-ups showed a decline in this figure to 16%.

The trend toward heavier reliance upon educative and peer supportive functions of short-term clinics was given further prominence through the work of MacFarland (1965). In an attempt to create a totally involving

situation for participants, this investigator developed a Five Day Plan that included daily group meetings composed of lectures, demonstrations, practical suggestions for avoiding smoking, and group discussion. Each group member was assigned a 'buddy' upon whom he could rely for support outside the meetings. In addition those in attendance were presented with a physical fitness regimen that had the actual effect of restructuring the subjects' daily habits and of providing a number of discrete substitute behaviors that could be invoked when the urge to smoke was felt. End of clinic data for over 2,000 participants placed the success or cessation of smoking rate between 70% and 80%. Once again, however, follow-up surveys were discouraging. Only 34% of those who stopped smoking were abstinent after three months and only 15% to 20% were not smoking after a year.

Thompson and Wilson (1966) conducted a similar five day clinic with one past treatment modification. Follow-up assessment was carried out for all participants (298) ten weeks after program conclusion. Additionally a matched subgroup of 50 subjects was monitored weekly for supportive and informational purposes. 73% of all volunteers reported they had ceased smoking by the last day of the clinic. At ten weeks this figure had dropped to 29% for the main body and 33% for the monitored subgroup. A second survey of successful subjects from both groups was made after a ten month interval. There was no difference between groups. 16% of all volunteers contacted were not smoking.

Taking note of the hope to despair pattern that characterized the outcome and follow-up data of previous clinics, Frederickson (1967) devised a triphasic program format that was all but open-ended. Volunteers heard a lecture that stressed the advantages of non-smoking and outlined the

positive, supportive aspects of the clinic format. Those who chose to participate were then instructed to spend a week in intense observation of their own smoking patterns, noting frequency, time, place, activity, and feelings associated with the behavior. Subjects were also asked to compile a list of subjectively important reasons for breaking their cigarette habits.

The second phase of the program began at the week's end. Participants were randomly assigned to small groups of 10 to 15, each group moderated by two ex-smoking volunteers. Groups were scheduled to meet for a period of two months. The structure of each meeting was standardized. Members reported on their progress and problem areas, receiving consultation and advice from their peers. Subjects then formed four-person teams to decide on individual goals and procedures for the next week. Finally the members reconvened for presentation and discussion of the separate strategies.

At the end of eight weeks, individuals were transferred to new groups which served as supportive milieus for the consolidation and maintenance of gains. These last met for periods of from five to six months with the intervals between gatherings gradually lengthening. Smoking rate data collected at the conclusion of phase two showed this stage of treatment successful. 53% of the participants reported they discontinued smoking, 23% reduced consumption by three quarters, and 15% cut their smoking rates by half. Results from the consolidation phase were also indicative of success. At the end of that stage, 65% of those attending were not smoking, 15% were maintaining consumption at one quarter of baseline, and 5% were smoking only half of their original average. No follow-up assessment was reported. Subject attrition rate for the active three phases of the program

was approximately 33%. About one-half of those present at the introductory lecture chose not to participate.

Rationale of the educative or clinic approach to smoking modification was broader than that of its pharmacological counterpart. Like the latter, it focused upon immediate cessation as its area of treatment. It acknowledged, too, that the immediate process of withdrawal was physiologically and psychologically difficult. But it also posited that decision-making and motivational factors operative in the situation were of equal importance. Though one factor was often stressed over the others, each of the programs reviewed sought to design treatment components that would be effective with the three: physical and psychological reactions to discontinuance, rational decision to quit, and motivation to adhere to decision.

The most obvious criticism of studies employing a clinic paradigm derives from the applied orientation of their investigators. Almost all the efforts lack the controls necessary for an accurate evaluation of treatment procedures. Assessment is further complicated by the use of different criteria for success (complete termination, percentage reduction, consideration of oneself as a smoker/non-smoker plus abstinence for a stated period). The use of chronically ill and, presumably, highly motivated patients as subjects (Ejrup) clouds any interpretation of treatment effectiveness. Though precise evaluation is not possible, it does seem that short-term intensive clinics can aid with the initial process of giving up smoking. With the exception of Frederickson, however, their long range effect appears negligible.