A DYNAMIC BIOPSYHOSOCIAL MODEL OF ALCOHOLISM

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ABSTRACT

Alcohol abuse and alcoholism in the United States cost nearly $43 billion in 1975 - including $19.64 billion in lost production, $12.74 billion in health and medical costs, $5.4 billion in motor vehicle accidents, $2.86 billion in violent crimes, $1.94 billion in social responses, and $0.43 billion in fire losses (*). There are about 13 million problem drinkers (including alcoholics) in the United States. Of these, less than 10 percent seek treatment. For those receiving treatment, the overall improvement rate ranges from 30 to 70 percent, depending on how broadly improvement is defined.

The treatment of alcoholism has not significantly advanced in the last 25 years. This in part reflects the lack of integration of the physiological, psychological, and sociological factors affecting alcoholism. Workers in the field express the need for interdisciplinary theory-building showing sets of reciprocal causal patterns. The basis of effective treatment that is independent of a specific therapist is a comprehensive theory of alcoholism. Some steps have been taken recently to bring together different areas of knowledge to form a interdisciplinary theory. Models have been proposed which imply that there is some interaction between the host, agent, and the environment, yet these models have been far too abstract to be of great use in treatment. Some models do not allow for the inclusion of important variables, other models do not show how the alcoholic can be moved towards remission.

Ulrick Goluke has expressed a comprehensive theory of alcoholism using a system dynamic model. The model shows four types of drinking behavior, social drinking, alcoholism, remission, and recidivism. Alcoholism arises through the interaction of the social drinking norm, the stimulation arrival rate, self-esteem, social interactions, and coping skills.

(*) U.S. Department of Health, Education, and Welfare. Third special Report to the U.S. Congress on Alcohol and Health from the Secretary of Health, Education and Welfare, June, 1978. Washington, DC: Government Printing Office.

This paper describes a revision and expansion of the Goluke model. The main sectors are job performance, social network, self-esteem, structural health, the homeostatic capacity of alcohol, adaptation to alcohol, and coping skills. In this model, drinking is caused by adherence to the social drinking norm, and/or stress. Stress is the result of the discrepancy between the actual and desired levels of job performance, number of relationships (significant others), quality of relationships, self-esteem, and/or structural health.

The lifespan of an individual is examined. Alcoholism can arise from stress, a high social drinking norm, a low level of coping skills, and physical/psychological susceptibility to alcohol. The model provides a theory that integrates knowledge of factors associated with remission. These include economic stability, reinforcement from family and friends, religious experience, making restitution, resistance to being labeled alcoholic, education on effects of alcohol abuse, experience with self-control, and treatment. Treatments includes disulfarium, tranquilizers, self-esteem therapy, Alcoholics Anonymous, coping skill training, employer involvement, and family therapy. Other sorts of interventions are being suggested by the model as leverage points in the treatment of alcoholism.

An unexpected development contributing to behavorial science is the light the model begins to shed on the difference between seeking an action to work towards an unmet goal, and seeking an action because it has given lots of satisfaction. Current thinking is that one can get from one to the other by having variable goals.

THE ALCOHOLIC LIFECYCLES MODEL

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CHAPTER 1: INTRODUCTION TO THE ALCOHOLIC LIFECYCLES MODEL

This chapter presents the purpose and structure of the Alcoholic Lifecycles Model (ALM). For a complete description of ALM equations and runs, see Lifecycles of Alcoholics: A Systems Perspective on Addiction and Treatment (Spencer 1981).

1.1 The Problem

Approximately two-thirds of the adult American population drinks, and 10 percent of these drinkers are likely to experience either alcoholism or problem drinking at some point in their lives. The cost of alcohol misuse and alcoholism in the United States in 1975 is estimated at $43 billion, including $19.64 billion in lost production, $12.75 billion in health and medical costs, $5.14 billion in motor vehicle accidents, $2.86 billion in violent crime, and $.43 billion in fire losses (Noble 1978). Alcohol abuse is a health hazard of major importance.

The recovery rates of alcoholism are independent of treatment type (Clare 1977). This is an indication that alcoholism is not well understood. Information on alcoholism has increased and continues to increase, yet the treatment of alcoholism has not significantly advanced in the last 25 years (Gordis 1976). This lack of improvement in treatment is in part a reflection of the lack of integration of physiological, psychological, and social factors affecting alcoholism. Research in these fields on alcoholism abounds; alcoholism research has traditionally been multi-disciplinary. Multi-disciplinary research must be integrated in order to improve alcoholism treatment effectiveness. Interdisciplinary theory building, showing internally consistent sets of reciprocal causal patterns, is what is needed now (Sadava 1978).

1.2 Purpose of the Study

The purpose of this study is to contribute to the effectiveness of treatment of alcoholism by developing an interdisciplinary theory which deepens the understanding of the causes of alcoholism and allows identification of the most powerful points of intervention in treating the disease.

The starting point for this study is a computer simulation model developed by Ulrich Goluke (1980a,b). Forty lines from Goluke's model were used in the six-hundred thirty line Alcoholic Lifecycles Model. Coluke's model has been revised, so that the variables in the model are now more concrete and open to measurement. Sectors have been added to the model so that the most important ways in which

distress arises in individual's life are represented explicitly, thereby enabling different life stress and treatment modalities to be tested.

1.3 Overview of the Alcoholic Lifecycles Model (ALM) Structure

The organizing principle of the model is allocation of personal resources to the four dimensions of life: job, health, self and relationships. The perception of how well one is doing along each of the dimensions is enhanced by alcohol. Alcohol adds a perceptual glow to each dimension, making job, health, self, and relationships seem better. If performance along each dimension is perceived as failing, more time and effort is allocated to that dimension. If that dimension continues to be perceived as failing, desires for performance that dimension are eroded, and less time and effort is expended. This organizing principle is shown in Figure 1.3.1.

The generic structure displaying the organizing principle is shown in Figure 1.3.2. This structure holds for each of the dimensions of job, health, self, and relationships. There are interactions between the dimensions beyond the allocation of time to each dimension. Social, physiological, psychological, and environmental factors interact to produce alcoholism.

Figure 1.3.1: Organizing Principle of ALM

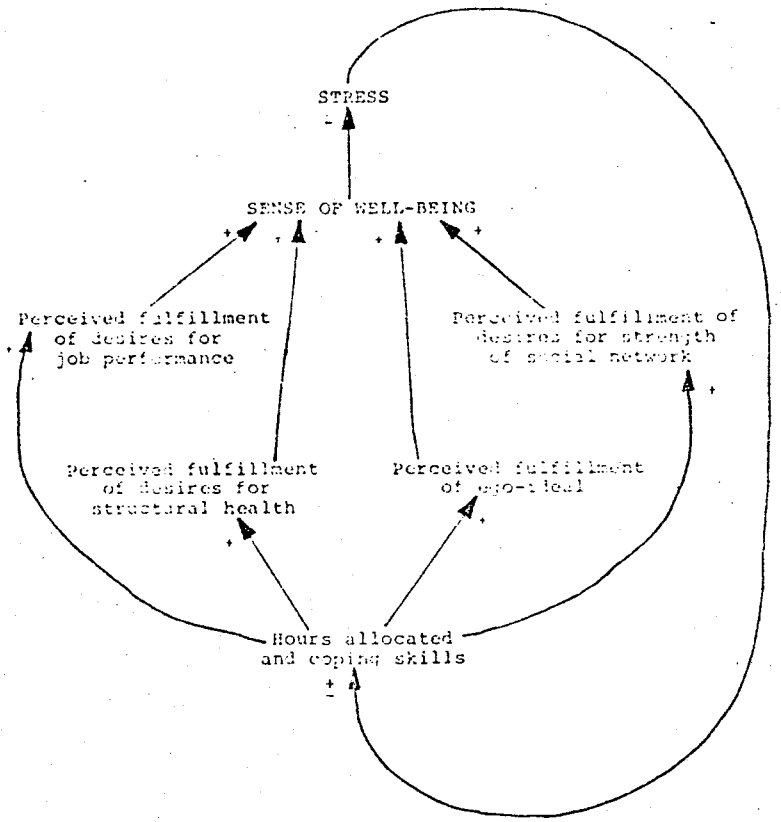

Figure 2.2.1: Alcoholic Lifecycle Arising from Moderately-low Self-Esteem with Poor Coping Skill Response to Stress

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ESFICT=1(1)/1.01(1.2)/1.02(1.3)/1.025(1.35)/1.027(1.37)
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FSCS=-0.5(0.9),TCSS=0(2000),PLTPERC=2.5(5),LENGTH=80(0)

PS=*,SH=H,SN=R,SI=S,JP=J,CS=C,CSU=U,AC=A
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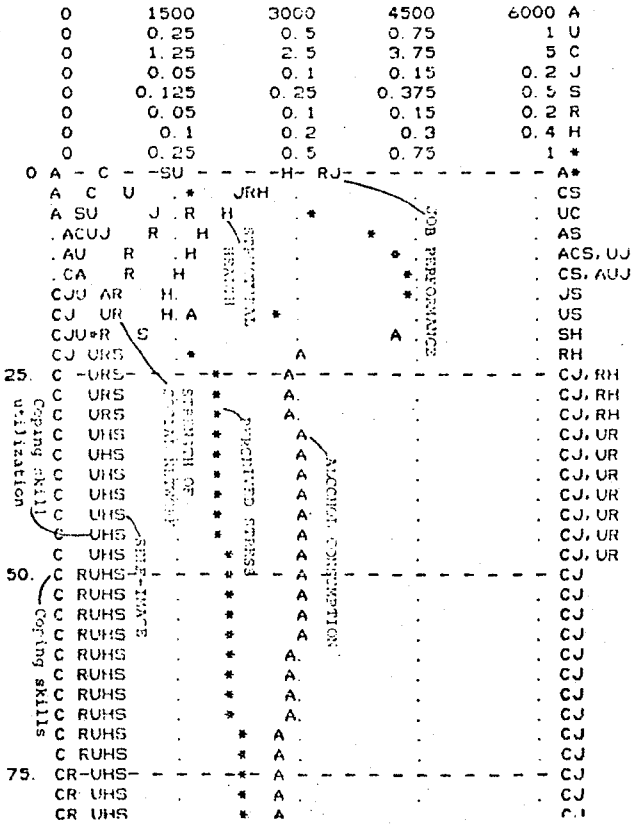


CHAPTER 3: EXAMINATION OF TREATMENT INTERVENTIONS

This chapter looks at the effect of two treatment packages on one alcoholic. A summary is presented on the results of treatments on two alcoholics.

3.1 The Treatments

Eight treatments for alcoholics were examined closely. They are:

- Aversive therapy
- Pharmacotherapy for stress
- Counseling for job, health, self, and relationship coping skills
- Insight treatment & maintaining insight
- Learning coping skills treatment
- Acceptance of Discrepancy treatment
- Self-image therapy
- Goal therapy

Treatments were tested separately and in pairs, all beginning during the alcoholic's 35th year of life. The effectiveness of treatments in terms of alcohol consumption, perceived stress, and the four dimensions of life is summarized in Table 3.1.1. Successful treatment must be defined along all of these dimensions (Caddy 1980).

Table 3.1.1: Comparison Of The Effects Of Treatment On Different Alcoholics

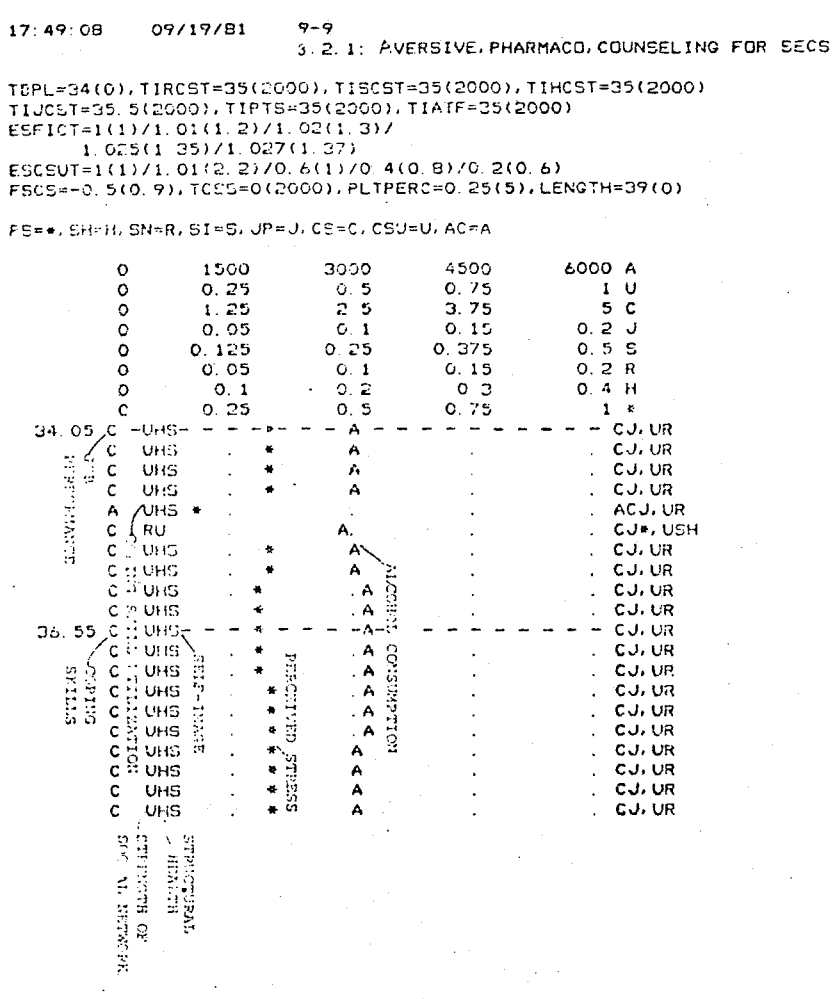
Treatment	Alcoholic with Moderately Low Self-Esteem & Reduced Response of Coping Skills to Stress	Alcoholic with Four-Year Job Loss and Periodic Relationship Loss History
Acceptance	Always alcoholic, low stress, low dimensions	Always alcoholic, low stress, low dimensions
Self-Image	Always alcoholic, medium stress, low dimensions	Always alcoholic, medium stress, low dimensions
Aversive, by force tranquilizer, counseling	Remission 6 mos, relapse, medium stress, low dimensions	Alcoholic, remission 1 yr, relapse, medium dimensions during remission, low after relapse. This guy has more to start with, so stays dry longer. Medium stress
Insight Aversive by choice	Lifetime remission, high stress, low dimensions	Lifetime remission, medium stress climbs to high stress, medium dimensions sink to low
Goals	Always alcoholic, medium stress, low dimensions	Always alcoholic, medium stress, low dimensions
Insight, Goal Aversive by choice	Lifetime remission, high stress, low dimensions	Remission until age 59, then binge drinking, low stress, high dimensions
Insight, Coping Skills	Lifetime remissions, high stress, low dimensions	Remission until age 44, then binge drinking, low stress, high dimensions
Insight, Acceptance Aversive by choice	Lifetime remission, medium stress, low dimensions	Remission until 77, high dimensions, low stress
Insight, self-image Aversive by choice	Lifetime remission, high stress sinks to medium stress, low dimensions	Remission until 53, binge drinking, high dimensions, low stress

3.2 Aversive Therapy, Pharmacotherapy, and Counseling

The alcoholic with moderately-low self-esteem and low response of coping skills to stress undergoes aversive therapy by force from his environment rather than by his choice. A tranquilizer is given for six months, and job, health, self, and relationships counseling is received.

As a result, his drinking stops at age thirty-five for about two months. He resumes drinking because acknowledgement of his drinking problem remains low and stress has not been reduced enough to allow the dimensions of his life to recover. It is interesting to note that even if pharmacotherapy continues for two years or even for ten years in the model, he still goes back to alcohol. He is not acknowledging his drinking problem.

Figure 3.2.1 Alcoholic with Moderately-Low Self-Esteem from Birth Undergoes Aversive Therapy, Pharmacotherapy, and Counseling. Ages 34 to 39 plotted each three months.



3.3 Insight Treatment, Learning Coping Skills Treatment

The alcoholic with moderately-low self-esteem and a poor response of coping skills to stress receives insight treatment and learning coping skills treatment.

With the boost to his acknowledgement of his drinking problem, he stops drinking for life. There has been a growing discrepancy between the actual and desired levels of job performance, health, self-image, and strength of social network that was not perceived while drinking. Suddenly these discrepancies are perceived and the resulting stress decreases coping skill utilization. This decreases effectively available coping skills. Even though coping skills are being learned, since effectively available coping skills are the ground upon which coping skills are increased, coping skills do not increase. The dimensions of his life remain low and stress remains high. Structural health improves somewhat as the physiology recovers from adaptation to alcohol. But the high stress levels take their toll, and disallow complete recovery. The low level of effectively available coping skills also erodes structural health.

Figure 3.3.1: Alcoholic with Moderately-Low Self-Esteem from Birth Receives Insight Treatment and Learning Coping Skills Treatment

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    1.027(1.37)
ESCSUT=1(1)/1.01(2.2)/0.6(1)/0.4(0.8)/0.2(0.6)
FSCS=-0.5(0.9),TC SS=0(2000)

PS=*,SH=H,SN=R,SI=S,JP=J,CS=C,CSU=U,AC=A
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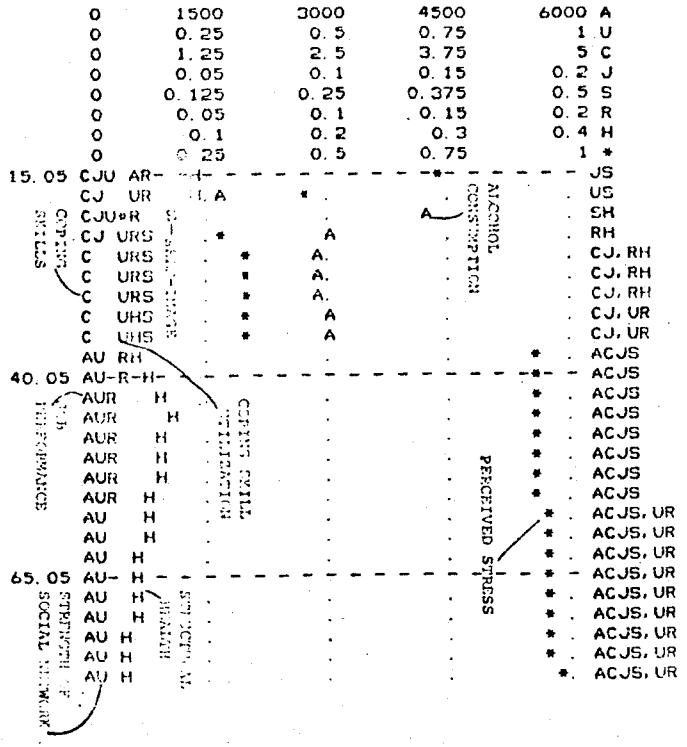

CHAPTER 4: CONCLUSIONS

4.1 Conclusions

Different alcoholics respond differently to the same treatment, and can recover under some treatments and not under others. It is too early to generalize about the differentiation of types of alcoholics and the relative effectiveness of treatments. This work does point to the importance of the acknowledgement of the drinking problem, the insight generation rate, and the loss of conviction rate. These seem to be powerful points of treatment intervention. Self esteem also seems to be a key dimension. Self-esteem influences not only coping skill utilization and therefore coping skill development, but also the decision to stop drinking and keep from drinking.

4.2 Suggestions for Further Research

The model now can best serve in improving effectiveness of treatment of alcoholism if it is used as an investigative tool by those treating alcoholics. From this use clearer identification of leverage points for treatment will be made.

These key hypotheses should then be tested in the real world. The model now suggests that tests be devised to

determine if the intrinsic response of the individual's coping skill fractional increase and utilization in the face of stress can be measured and changed apart from changes occuring due to changes in in health and self-esteem. Grumet suggests that a "binge profile" includes a decrease in the strength of the social network (emotional seclusion), promimity to previous sources of alcohol, a change in the discrepancy between desires and actual levels of the dimensions of life (a disruption of psychological homeostasis), and a failure of personal warning systems (1980). This would be an interesting hypothesis to test in the model.

As it is now, the model represents a clear synthesis of the important aspects of addiction and treatment. The model should be packaged as a teaching tool and as a research tool.

Lifespan studies normally take a lifespan to complete. "Growth studies", says "George Vaillant (1972), "are like large shade trees. If we wish to enjoy their benefits, we must put up with shapes, location, and species not of our choosing. Or we can plant now one for our grandchildren to enjoy and to criticize". ALM offers the unique opportunity to observe the human lifecycle from beginning to end in a few minutes through one's own biologically unchanging perspective from whatever scientific framework one chooses.

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