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**Irrational beliefs and emotionality in adolescents with and
without bronchial asthma**

Silverglade, Laura Forst, Ph.D.

The Ohio State University, 1989

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IRRATIONAL BELIEFS AND EMOTIONALITY IN ADOLESCENTS
WITH AND WITHOUT BRONCHIAL ASTHMA

DISSERTATION

Presented in Partial Fulfillment of the Requirements for
the Degree Doctor of Philosophy in the Graduate
School of The Ohio State University

By

Laura Forst Silverglade, B.A., M.S.W.

* * * * *

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CHAPTER I

INTRODUCTION

"Psychosomatic" is the term applied to the complex relationship among psychologic, social, and biologic aspects of health and disease. It refers to the inseparability and interdependence of psychosocial and biologic (physiologic, somatic) aspects of humankind (Lipowski, 1984). The ultimate concern of psychosomatic research may be said to be the identification of psychologic and environmental factors which place an individual at increased risk for the development, maintenance, or exacerbation of illness. In keeping with current thinking, the present study utilizes a biopsychosocial model of health and illness to investigate cognitive and emotional variables associated with the psychosomatic disease of bronchial asthma. This is a holistic, integrative approach which underscores the role of dynamic interacting, individual variables in the psychosomatic disease process.

As Zegans (1983) has pointed out, the biopsychosocial approach has evolved from earlier models of psychosomatic disease. Links among personality, emotion, and health have been written about for 2,000 years. In modern times, early

specificity theories attempted to establish a causal link between mental disturbance and organic disease. Dunbar (1935, 1947) suggested correlations between specific diseases and certain personality types. Alexander (1950) proposed a conflict specific theory which focused on specific unresolved psychological conflicts as the cause for certain psychosomatic disorders such as asthma, ulcer, or migraine. Similarly, Grace, and Graham (1952) advanced a specificity of attitude hypothesis which suggested a specific relation between the attitude which a person develops toward a stressful stimulus and the physiological changes which occur in response to the stimulus. Taking a more biological perspective and looking at environmental stressors rather than personological variables, research by Selye (1982) and Holmes and Rahe (1967) have indicated that stressful life events play a significant role in the etiology of psychosomatic disease states.

Current psychosomatic research has been substantially influenced by cognitive models of stress which suggest that, in order to understand the relationship between stress and illness outcomes, the factors that modify or mediate the relationship must be considered. Lazarus and Folkman (1984) have singled out appraisal as the unifying concept in stress theory. Appraisal refers to the evaluative process that imbues a situational encounter with meaning for the person. Appraisals of harm-loss, threat, and challenge serve as a

final common pathway through which personal and environmental variables influence the stress experience by leading to coping patterns which may have their own specificities with particular disease or groups of diseases. Furthermore, particular coping styles or types of coping activity may affect health outcomes because they are associated with patterns of physiological mobilization that predispose to certain disorders but not to others.

The specific cognitive model chosen as the theoretical basis for the present study is Cognitive Experiential Therapy (Tosi, 1974; Tosi & Marzella, 1975). Cognitive Experiential Therapy is an expanded version of classical Rational Emotive Therapy (Ellis, 1962), an approach well suited to dealing with cognitive appraisal and resulting coping outcomes. RET holds that most sustained negative emotions that interfere with effective behavior are the result of irrational ideas consisting of internalized sentences, or "self-talk." Ellis asserts that a good deal of what we call emotion is a kind of appraisal or thinking that (a) is strongly slanted or biased by previous perceptions or experiences; that (b) is highly personalized; that (c) is often accompanied by gross bodily reactions; and that (d) is likely to induce the emoting individual to take some kind of positive or negative action. The concepts of "belief" and "belief systems" are central to RET theory because they form the assumptive framework by which

individuals evaluate, appraise, and form conclusions about what they observe to be happening to themselves, to others, and in the world around them (Bernard & Joyce, 1984).

Within the RET framework the therapist helps clients identify, examine, and redefine beliefs so that they can perceive the world and themselves more accurately and think more rationally about their perceptions.

Cognitive Experiential Therapy has expanded and empirically tested out Ellis's ideas. This approach is a dynamic systems model which describes the reciprocal influence of social and physiological forces in the production of behavior. It recognizes that the concept of rationality-irrationality implies much more than evaluative cognition alone; it includes affective/physiological and behavioral-motoric variables as well (Reardon & Tosi, 1977). The growing body of RSDH research has attempted to establish logical and statistical relationships among certain irrational ideas or attitudes and concomitant affective, physiological, and behavioral variables while at the same time developing a comprehensive intervention model that is highly cognitive and experiential. Studies treating guilt (Tosi & Reardon, 1976), depression (Reardon, Tosi, & Gwynne, 1977), test anxiety (Boutin, 1978), nonassertion (Howard & Tosi, 1978), learning disability and hyperactivity (Tosi, Fuller, & Gwynne, 1980), migraine (Howard, Reardon, & Tosi,

1982), and anxiety neurosis (Tosi, Howard, & Gwynne, 1982) provide clinical support for RSDH as a treatment modality.

Factor analytic studies (Tosi & Eshbaugh, 1976; Tosi, Forman, Rudy, & Murphy, 1986) have demonstrated a statistical relationship among cognitive factors and affect, behavior, and physiological processes. A study by Forman, Tosi, and Rudy (1988) with migraine, ulcer, and lower back pain patients clearly demonstrated a significant relationship between physiological and psychological factors. Overall, psychosomatic patients were found to be more perfectionistic, self-downing, and prone to blame others than a medical control group.

In addition, the effects of altering physiological as well as emotional and behavioral processes through cognitive restructuring has been demonstrated in several studies. Empirical work in the RSDH literature has demonstrated that, as cognition is modified or restructured, other systems, including cardiovascular (Rudy & Tosi, 1980; Tosi, Rudy, Lewis & Murphy, 1988), musculoskeletal (Howard, Reardon, & Tosi, 1982), and gastrointestinal (Tosi, Judah, & Murphy, 1988) systems, are influenced in their operations (Friday, 1987).

NEED FOR THIS STUDY

There is a continued need for exploration into the psychological-personal make-up of patients with psychosomatic disorders. Lazarus and Folkman (1984) have noted that the successful development of a cognitive-behavioral approach to stress management is likely to be highly dependent upon advances in basic research on stress and coping, particularly in the development of reliable methods of assessing coping processes. However, to date, there has as yet been no effort to investigate the cognitive-emotional complex associated with specific childhood and adolescent psychosomatic conditions. This may be due, in large part, to the lack of reliable and valid instruments which measure general belief patterns in children and adolescents. Of the scales currently available (Hooper & Layne, 1983; Kassinove, Crisci & Giegeman, 1977; Knaus, 1974), limited reliability and validity data are provided and information related to norms is nonexistent (Schultz, 1988). Now an instrument has been developed by Wise and Schultz (1988) which should satisfy the need for a reliable and valid assessment tool to measure the general belief patterns in children and adolescents. The Common Beliefs Survey--Revised for Children (CBS-RC) has been developed, in part, to deal with the question of how and to what extent the relationship between irrational beliefs and

disturbances in adults is replicated in a child/adolescent population. This makes possible the exploration of the relationship between physiological, cognitive, and affective factors in a new population, asthmatic adolescents.

RATIONALE FOR POPULATION SELECTION

This investigation explored the relationship between irrational beliefs, emotionality, and level of severity of illness in groups of adolescents with bronchial asthma. Asthma is a disorder of the immune system that is characterized by distress in breathing, wheezing, and coughing. It often includes increased secretion of mucus in the lungs, constriction of the airways, headaches, and a feeling of tightness across the chest. While asthma is thought to be the result of the immune system's overreacting to some substance (allergen), asthma attacks can happen any time and frequently occur outside the influence of a specific allergen, particularly during periods of emotional upheaval or environmental stress (Gazzaniga, 1988). Bronchial asthma is the most common chronic disease among children and is said to effect about five to fifteen percent of the adult population. Asthma can vary in intensity from occasional discomfort or periodic attacks to continuous constriction of the airways which can lead to a condition called "status asthmaticus" (prolonged periods of

irreversibility of bronchoconstriction), which can result in death.

The symptoms that comprise bronchial asthma have been recognized since antiquity. Efforts to conceptualize asthma as a psychosomatic illness have dated back to Aretaeus in the second century AD. Maimonides, in the twelfth century, was probably the first author to underline the psychological aspects of the illness. The centuries-old recognition of the importance of disturbing life events as stimuli to attacks of the disease was probably responsible for the opinion that asthma was a "respiratory neurosis" (Stoudemire, 1985). Evidence suggests that life stressors may be directly associated with the precipitation of asthma attacks, influence the way the patient perceives his symptoms, and interfere in general with the response of the disease to medical treatment.

Of key importance is which life situations the patient perceives or interprets as stressful. Alexander (1950) suggested that the constant feature of the personalities of asthmatics is conflict centering in an excessive, unresolved dependence upon the mother or mother substitute, which is a wish to be encompassed or protected. Asthma occurs when there is a threat of separation from the protective mother or when the asthmatic anticipates rejection or loss of a significant other. Similarly, Grace, and Graham (1952) found that the attitude characterizing bronchial asthma

involved feeling unloved, rejected, disapproved of, "felt left out in the cold and wanted to shut the person out." Weiner (1980) reports research that suggests that actual or anticipated separation or loss plays an important role in initiating attacks in about fifty percent of all asthmatic patients and that subsequent attacks may be triggered by a wide variety of situations in which emotions, both pleasant and unpleasant, are aroused.

As Graham (1978) points out, since different attitudes lead to different kinds of overt behavior, one would predict some correlation between personality traits and diseases. This is, in fact, the case. A number of investigators have suggested that asthma patients may differ in certain personality traits from the general population. Asthmatic children have been found to be significantly more maladjusted (anxious, depressed, insecure, dependent) than normal children (Dekker, 1961; Kim, Ferrara, & Chess, 1980; Panides & Ziller, 1981; Williams, 1975). They tend to demonstrate a fear of losing parental support and have often been found to be inhibited about showing negative affect (crying, hostility) (Clarkson, 1952; Hollander, 1983; Rees, 1963/64). Adult asthmatic patients have been described as being dependent, immature, lacking self-confidence; characterized by fears of failing and expressing anger; and having a tendency to become depressed and helpless without the support of other people (Kinsman, 1980; Kinsman, Dirks,

& Paley, 1979; Knapp, 1976; Moorfield, 1971; Plutchik, 1978; Teiramaa, 1979). Attention has also been focused on the specific psychological conflicts that may make situations of loss or disappointment particularly distressing to asthmatics. Minuchin (1975) has described four characteristics of families which are found in families with asthmatic children. These include enmeshment, overprotectiveness, rigidity, and lack of conflict resolution.

Despite the large body of evidence in support of the prominent role of psychological factors in the production of asthma symptoms, there have also been a number of studies which suggest that asthma is purely the result of allergens and that there are no demonstrable differences between asthmatics and the general population in terms of personality traits, attitudes, or general level or neuroticism (Creer, 1980; Norrish, 1977; Rosenthal, 1966; Sperling, 1968). It is probable that many of the disagreements that can be found in the literature among different investigations concerned with the relationship between psychological variables and asthma are the result of treating the asthma population as a homogeneous group. Considering "asthma" to be a single disease is in many ways misleading. Graham (1978) points out that the special question in connection with asthma is the extent to which the underlying process is really the same in all patients

called "asthmatic." This problem of subdivision is important in any disease, but particularly in asthma where there appear to be two competing etiologic hypotheses (physiological versus psychological). He suggests that any investigation dealing with asthma must divide its population into subgroups, which are then analagous to two or more groups of patients with diseases totally different from each other.

To date, different studies have classified asthmatics in a number of different ways including age of onset of asthma, intrinsic/extrinsic asthma (degree of allergic response), lung function, rate of recovery from symptoms upon hospitalization, dependence on medication, and interference with normal functioning. More recently, it has been suggested that the most productive approach for empirical study is to differentiate children with self-limiting respiratory symptoms from those with more severe life-threatening forms of asthma (Kim, Ferrara, & Chess, 1980; Martin, 1977; Mrazek, 1985). This approach to subdivision has already proved fruitful. In general, studies with these subgroups have found increasing severity of neurotic (anxiety, depression, dependency) and psychosomatic symptoms associated with increasing levels of severity of illness in both children and adult asthmatics (Thompson & Thompson, 1985).

In addition to irrationality, this study examines several other variables. A more complex approach to looking at asthma must include emotional as well as physiological and cognitive elements. According to Ellis's model of human disturbance, irrational beliefs mediate the arousal of distress. RET theorizes that, when people's goals are blocked or thwarted by unavoidable activating events to which they respond with irrational beliefs, the end result is inappropriate and self-defeating emotions such as anxiety, depression, self-downing, hostility, and self-pity (Ellis, 1987; Ellis & Dryden, 1988).

Furthermore, Bessai (1977) has suggested that specific irrational beliefs may correlate with specific aspects of emotional distress, i.e., perfectionism with anxiety, self-downing with depression, importance of approval with anxiety. Research in this area has found a positive relationship between different aspects of irrationality and chronic negative emotional concomitants such as anxiety (Boutin & Tosi, 1979), depression (Beck, 1967; Reardon, Tosi, & Gwynne, 1977), and anger (Hogg & Deffenbacher, 1986; Zwemer & Deffenbacher, 1984). A second instrument, the Multiple Affect Adjective Checklist (MAACL) Trait/In General was utilized to examine the relationship between beliefs and three major concomitants of irrationality: anxiety, depression, and hostility.

Although wide empirical support has been found for the relationship between irrational beliefs and a variety of psychological distresses, few researchers have examined the effects of sex on irrational beliefs. If, as Ellis and Grieger (1977) suggest, culture plays a significant influence on the development and extent of irrational beliefs in a given sample, then one may speculate that cultural influences on the development of different behaviors for men and women may contribute to sex differences in irrational beliefs. For instance, men are expected to be rational while women are expected to be emotional or irrational (Forisha, 1978). Several studies do provide some support for the hypothesis of differential endorsement of beliefs based on sex (Alsakeder, Hovland, & Voomer, 1984; Coleman & Ganong, 1987; Denoff, 1987; Zwemer & Deffenbacher, 1985).

The rationale for selecting an adolescent (12 to 18) population for this study is twofold. First, a review of the literature reveals that, although there have been a great many studies looking at children and adults, there has been relatively little written about asthma and the adolescent. This is an area that needs further investigation. Secondly, the issue of stress and its appraisal is particularly relevant for the adolescent with asthma. Developmentally, adolescence is a stage of life which focuses on the tasks of autonomy and identity

formation (Erikson, 1959). If, as research suggests, the asthmatics' core conflict involves issues of dependence/independence, their attitudes in terms of irrational beliefs and their consequent affect in terms of increased evidence of anxiety and depression should be manifest clearly at this age.

However, Bernard, and Joyce (1984) have proposed that, while irrational ideas and cognitive errors are usually formed due to the cognitive limitations of childhood, most children and adolescents will discard many of their irrational ideas as they grow older. Kassinove, Crisci, and Tiagermen (1977), in a pilot study with 435 students in grades 4 through 12, found this to be the case. This suggests the possibility that age (early adolescence: 12-14; late adolescence: 15-18) may affect endorsement of beliefs. This question was also examined in the present study.

Finally, Foreman (1979) has suggested the possibility that, while irrational attitudes may play a role in the development of a psychosomatic disorder, other cultural variables, such as socioeconomic status (SES), may also be involved. In examining ulcer, migraine, and lower back pain groups, Foreman found significant differences in SES, with all three psychosomatic groups composing lower SES levels than the medical control group. This study also investigated the possibility that SES may play a role in the development of bronchial asthma.

PURPOSE OF THE STUDY

The main purpose of this study was to investigate whether there was a specific cognitive (beliefs)-emotional (depression, anxiety, hostility) complex which described asthmatic adolescents (12-18) who differed in severity of illness, sex, and age from each other and from a comparison group of nonasthmatic adolescents. The experimental design consisted of a 4 x 2 x 2 factorial design with severity of illness, sex, and age as independent variables. These dimensions were examined across each of the six factors of the CBS-RC and three factors of the MAACL. It was hypothesized that the finding of differences between groups would add empirical support to the CET research model, which assumes a dynamic, interactive relationship among cognitive, affective, and physiological factors.

It was also hypothesized that significant differences between groups would provide evidence of construct validity for the CBS-RC, a newly developed instrument which purports to measure the general irrational beliefs of children and adolescents.

In addition, it was hoped that the results of this study would lead to preventive measures for the control of asthma symptoms in adolescents. In a review of current treatment approaches to the management of asthma (relaxation training, systematic desensitization, hypnosis,

assertiveness training, biofeedback), King (1980) has noted that the efficacy of such intervention strategies is questionable. Cohen (1982) and Lazarus (1984) suggest that in selecting preventive interventions we should not focus on eliminating stressors or avoiding anxiety but deal with the mediating factors or cognitive processes which are associated with the visceral disease of interest. Cognitive-behavior therapy in general, and Rational Emotive Therapy in particular, are particularly well suited to this task. Tosi, et al., have already demonstrated the use of RSDH in the treatment of migraine (Howard, Reardon, & Tosi, 1982), hypertension (Tosi, Rudy, Lewis, & Murphy, 1988), and ulcer (Tosi, Judah, Murphy, 1988). If specific patterns of endorsement were found to be differentially associated with differing asthmatic populations, then this investigation would also serve as a starting point for addressing and remediating specific target beliefs which lead to maladaptive coping strategies resulting in the physical symptoms of asthma.

RESEARCH QUESTIONS

1. Is there a difference in the cognitive-emotional complex related to asthma in adolescents identified as having different levels of severity of illness when examined

in relation to each other and to a nonasthma comparison group?

2. Is there a difference in the cognitive-emotional complex associated with male and female adolescents?

3. Is there a difference in the cognitive-emotional complex associated with early (12 to 14 years) and late (15 to 18 years) adolescents?

4. Is there an interaction effect between:

- a) group and sex of subjects;
- b) group and age of subjects;
- c) sex and age of subjects?

5. Is there a difference in the cognitive-emotional complex associated with socio-economic status in adolescents identified as having different levels of severity of illness when examined in relation to each other and to a nonasthma comparison group?

THEORETICAL HYPOTHESIS

Based on the descriptions of asthmatic populations of children and adults found in the literature, it was hypothesized that adolescents who differ along the line of severity of illness would also differ in the ways in which they endorsed irrational beliefs and described the presence of anxiety, depression, and hostility.

STATISTICAL HYPOTHESIS

1. Main Effect for A:

There is no difference in the multivariate mean vectors reflecting dimensions of irrationality on the CBS-RC and emotionality on the MAACL in adolescents identified as having different levels of severity of illness when examined in relation to each other and to a nonasthma comparison group.

2. Main Effect for B:

There is no difference in the multivariate mean vectors reflecting dimensions of irrationality on the CBS-RC and emotionality on the MAACL associated with male and female adolescents.

3. Main Effect for C:

There is no difference in the multivariate mean vectors reflecting dimensions of irrationality on the CBS-RC and emotionality on the MAACL associated with early (12 to 14) and late (15 to 18) adolescents.

4. Interaction effect:

The multivariate mean vectors jointly defined by group, sex, and age do not differ from the simple addition of the main effects for group, sex, and age.

5. Additional hypothesis:

There is no difference in the multivariate mean vectors reflecting dimensions of irrationality on the CBS-RC and emotionality on the MAACL with respect to the socio-economic status of the subjects.

DEFINITION OF TERMS

Beliefs - our appraisals and evaluations of our

interpretations of reality (Ellis & Bernard, 1983).

Belief Patterns - belief patterns are operationalized as

that which are measured by the subscales of the Common Beliefs Survey--Revised for Children. Elevations on subscale factors, in combination, will be considered indicators of irrational thinking.

Rationality - rationality is a non-static concept based upon

logically correct thinking relative to a given set of facts (Tosi & Marzella, 1975). Maultsby (1971)

describes five rules for rational thinking and acting.

One's thinking and acting is considered rational when:

- 1) It is based on objective reality;
- 2) It is life preserving;
- 3) It helps one achieve his immediate and long-term goals;
- 4) It minimizes personal stress;
- 5) It minimizes environmental stress.

Failure to meet three of these conditions are considered irrational thinking and acting.

Irrationality - irrational beliefs are distortions of reality, expressed unconditionally and absolutistically, which lead to inappropriate feelings that often block goal attainment (Ellis & Bernard, 1983) .

Affect - the psychological aspects of emotions, or the emotional response which is assessed by means of verbal report as measured by the MAACL (Zuckerman & Lubin, 1965) .

Asthma - a disorder of the immune system that is characterized by distress in breathing, wheezing, and coughing. It often includes increased secretion of mucous in the lungs, constriction of the airways, headache, and a feeling of tightness across the chest (Gazzaniga, 1988) .

Multivariate mean vector - the multivariate mean vector, or centroid, is analagous to the mean utilized in a univariate analysis of variance. This mean vector is obtained by averaging scores across all variables.

LIMITATIONS

For the purpose of completion of this research project, the following assumptions were made:

The adolescents participating in the study were appropriately diagnosed in terms of severity of illness and were more similar to other adolescents sharing the same disease than to adolescents with differing psychosomatic disorders.

The adolescents reported their beliefs openly and honestly on the CBS-RC and truthfully selected affective descriptors on the MAACL.

The following limitations were also considered in this study:

The asthma subjects selected for this study were all medical outpatients referred by one physician, a pediatric allergist from Columbus, Ohio, and may not reflect a true sampling of the total population of asthmatic adolescents.

The control subjects selected for this study were all dental patients referred by one pediatric dentist from Columbus, Ohio, and may not reflect a true sampling of the total population of adolescents without asthma.

The sample consisted of those who were willing to take the time to respond voluntarily to the inventory and return the results to the researcher, and, again, may not reflect a true sampling of the total population of adolescents.

SUMMARY

There has been an ongoing need to understand the constructs of mind and body as they relate to health and disease. Research has established a connection between physiological, affective, and cognitive variables in populations of adult psychosomatics. This study has investigated whether such a relationship exists in an adolescent population of asthma patients as well. Two samples of adolescents were used, an outpatient asthma population and a nonmedical pediatric dental population. The asthmatic adolescents were divided into three groups according to level of severity of illness and all four groups were then compared across the dimensions of group membership, age, and sex. Two instruments were employed to examine irrationality (CBS-RC) and emotionality (MAACL).

CHAPTER II

REVIEW OF RELATED LITERATURE

The major issue addressed in this study focuses upon exploring whether there are different cognitive-emotional patterns associated with different levels of severity of asthma in adolescents ages 12 to 18 when compared to a similar nonmedical comparison group of adolescents. This investigation contributes to a much larger body of psychosomatic research which has attempted to examine the relationship between emotional, cognitive, and social factors in the production of illness. Cognitive Experiential Therapy, the model upon which this investigation is based, exemplifies a cognitive, biopsychosocial approach to looking at health and disease. Empirical support for the logic behind this model comes from several sources of literature. Current cognitive stress models have evolved from earlier psychosomatic models, both specificity approaches which explored personality variables in relation to illness and later generality models which focused on environmental stressors. Understanding the historical foundations of psychosomatic research, current cognitive stress models, as well as the theoretical and

empirical basis for Cognitive Experiential Therapy, is therefore key to understanding the focus of the present study. In accordance with this approach, a review of the literature contained within this chapter will include the following sections:

1. An historical overview of the mind-body relationship;
2. Theoretical foundations of cognitive approaches to stress and disease;
3. Rational-emotive and Cognitive Experiential Therapy--theory and research;
4. Possible developmental trends and sex differences in rational thinking;
5. Asthma:
 - Definition and epidemiological data for bronchial asthma;
 - Bio-physiological factors associated with the development and maintenance of asthma;
 - Psychological factors associated with the development and maintenance of asthma;
 - Socio-environmental factors associated with the development and maintenance of asthma;
 - Treatment Approaches

AN HISTORICAL OVERVIEW OF THE MIND-BODY RELATIONSHIP

When we discuss the mind-body interaction, what we are really asking is to what extent do cognitive and emotional aspects of personality play a role in the development and maintenance of disease. The age-old quandary over the relationship of mind and body is exemplified in the long-term confusion over the meaning of the term "psychosomatic."

Lipowski (1984), in his review of the historical development of psychosomatic concepts, notes that links among emotions, personality, and health have been recognized and written about for over 2,000 years. The modern meaning of the term psychosomatic incorporates two old conceptions. The holistic viewpoint, which dates back to the writings of Greek philosophers such as Plato and Socrates, holds that the notions of mind and body refer to inseparable and mutually-dependent aspects of man. This approach implies that attention to the person as a whole, a mind-body complex, is the best approach a physician can adopt in treating patients. The second core conception of the term psychosomatic is the psychogenic viewpoint, which implies an etiologic hypothesis about the role of psychological factors in human disease. This conception has an equally old lineage, tracing its roots to Hippocrates, Aristotle, and Galen, who postulated that emotions influence body functions and may cause disease.

Despite these early beginnings, in the past 200 years medicine has tended to minimize or ignore emotions or social stimuli, concentrating its search for the "cause" of illness on organic factors. According to Zegans (1982), since the Enlightenment we have taken a mechanistic view of the body which resolves the mind-body dilemma by denying mind any separate reality apart from physiochemical events.

This trend of focusing on the body to the exclusion of mental factors provoked in this century the rise of a counterreformation which came to be labeled "psychosomatic medicine." In 1925, a book was published in Vienna presenting philosophic arguments as well as clinical observations from several areas of medicine supporting the notion that medicine had neglected to consider the role of psychologic factors in the etiology of disease and in the treatment of patients. The contributors cited the work of Gestalt psychologists Freud, Pavlov, and Cannon as support for the assumption that the organism must be viewed as a structural and functional unity, one that includes the psyche (Lipowski, 1984). The initial aims of the American psychosomatic movement were to humanize the rest of medicine by considering the interplay between emotional factors and bodily processes, and particularly to identify those personal response mechanisms that place some individuals, by virtue of their personality and life history, at selective risk for certain diseases. Among the earliest of these

attempts was that of Dunbar (1935, 1947), who attempted to establish a correlation between specific diseases and certain personality types. The influence of Dunbar's ideas is evident today in the "Type A" behavior pattern described by Freidman and Rosenman (1959) as well as the work of Bahnson (1981), who has described a cancer-prone personality. Dunbar and other pioneers in the field, such as Deutsch, Groddeck, and Ferenczi (Taylor, 1987), were criticized for their linear, unidimensional theory formulation and their failure to consider the roles of environmental factors, physiological mechanisms of mediation, and target organ vulnerabilities as other important aspects of the psychosomatic process.

Today, the proposition that emotions are the sole "cause" of disease is viewed as arbitrary and invalid. However, concern with the nature and the role of the interplay of personality factors with other psychosocial and biologic variables in the development, course, and outcome of all disease remains one of the central issues in psychosomatic research. In the 1980s, the "psychosomatic" model is being gradually replaced by the biopsychosocial model of illness, which views etiology as multifactorial and views man as:

...a biopsychosocial organism who receives, stores, processes, creates, and transmits information, and assigns meaning to it, which in turn elicits emotional responses. The latter, by

virtue of their physiologic
concomitants, may effect all body
functions, both in health and disease
[Lipowski, 1984].

One of the first multifactorial approaches to explaining the role of psychologic factors in chronic illness was put forth by Franz Alexander (1950) in his specificity theory of psychosomatic disorders. Alexander hypothesized that certain organic chronic diseases of unknown etiology such as bronchial asthma, ulcerative colitis, hypertension, migraine, diabetes, eczema, and rheumatoid arthritis were vegetative responses to chronic emotional states which involve unresolved, unconscious conflicts such as anxiety, repressed hostile impulses, frustration, or dependent cravings. Alexander was particularly interested in the question of "choice" of disease and described specific unconscious conflicts and associated defenses which he believed played an important etiological role in the different psychosomatic diseases. For instance, he believed the asthma-prone child represses a wish to be held and protected by the mother and refrains from crying for fear of maternal rejection. The anxiety which this conflict engenders is expressed through the parasympathetic nervous system, which eventually results in disease. It was also Alexander's view that, in order for a disease to develop, in addition to a suppressed, unresolved intrapsychic conflict, the individual must encounter specific life situations which elicit those conflicts. He

or she must also possess a constitutional tissue, organ, or system vulnerability to a particular disease which he called the X factor. He also cited a number of environmental factors which may also play a role, such as birth injuries, parenting styles, and emotional climate of the family, or accidental physical and emotional traumatic experiences. The diagnostic validity of the specificity theory was tested by Alexander, French, and Pollock (1968) in a research study that extended over 14 years. The study was designed to demonstrate that each of the seven classical psychosomatic diseases could be diagnosed solely from psychological data. Both analysts and internists listened to recordings of clinical interviews with patients who were actively ill with one of these diseases. It was found that, on the whole, the team of psychoanalysts was more successful than the team of internists in predicting the correct diagnosis. While diagnostic accuracy was never greater than 60 percent for any one disease, the percentage of correct diagnoses was much higher than might be expected on the basis of chance alone. This research has been severely criticized for a number of methodological biases including editing the interview material in advance in a way which gave clues to the exact diagnosis. Other partial support for Alexander's specificity theory comes from Dongier's (1956) work with hyperthyroid patients and Weiner's (1957) study of duodenal ulcer patients. Groen and Bastiaans (1974, 1977) continue

to use this concept in investigating the role of specific situational stresses in specific conflict situations leading to psychosomatic conditions. Pollock (1977a,b) has formulated a "combinatorial specificity hypothesis" which preserves Alexander's notion of predisposing personality features with a view emphasizing the complex interplay between biological, psychological, and social factors in the pathogenesis of disease. Unfortunately, much of the support for Alexander's theories has come in the form of clinical case studies and anecdotal reports rather than controlled empirical research. Consequently, much of the more current findings have been overlooked or ignored.

Another specificity view, the specificity of attitude hypothesis, was proposed by Grace and Graham (1952). Grace and Graham identified specific conscious attitudes toward stressful external events. These attitudes were believed to play a role in precipitating the onset of disease. An attitude included (1) what the person felt was happening to him, (2) what sort of situation he found himself in, and (3) what he wanted to do about it. Attitudes were described for eighteen diseases, and both experimental and clinical predictive studies were carried out that supported their specificity response hypothesis (Graham, Stern, & Winokur, 1958; Graham & Lundy, 1962; Graham, Kabler, & Graham, 1962). The authors concluded that this evidence lends support to the hypothesis that: given exposure to a particular stimulus

which elicits a particular response (psychological and physical) because of the specific nature of the individual (psychological and physical), the probability of occurrence of a disease is increased (Graham, 1978). Although Grace and Graham described responses rather than predisposing personality characteristics, the reported attitudes were very similar to Alexander's formulations. While Graham and associates claim empirical support for their theory, other studies have not substantiated their findings (Malmo, 1967; Rahe & Arthur, 1968; Spiegel, Ehrlich & Glass, 1978).

In contrast to a specificity theory of disease, some researchers have advanced a nonspecificity theory of the association of psychological factors and disease. Selye (1982), in his General Adaptation Syndrome, proposed that disease process is the result of a stereotyped physiological response to any nonspecific stimulus stressor. He defined stress as an altered state of the individual that arises as a consequence of adaptive failure and not adaptive challenge. His research provided the impetus for other generality theories which hold that all demands are more or less qualitatively equivalent in producing physiological mobilization and that this mobilization increases general susceptibility to all diseases. Engel (1967) demonstrated the effects of loss or bereavement on a variety of human illnesses. Holmes and Rahe's (1967) "life change" studies

provided evidence of the increased likelihood of disease following objectively quantifiable life stressors.

Rather than suggesting that a specific personality, attitude, or conflict is associated with a specific disease, a number of studies in different areas suggest the possibility of a generic "chronic disease-prone personality" which might increase the risk factor in the formation of a variety of diseases.

Neuhaus (1958), in one of the first empirical investigations to suggest a general disease-prone personality, contrasted 34 asthmatic children and 25 of their siblings with a group of children with cardiac illness, and a fourth group of matched normal controls. Using projective tests, Neuhaus found asthmatics to be more insecure, neurotic, and dependent when compared to normal children but very similar to the group of children with cardiac illness.

Minuchin and associates (1974) conducted a seven-year interdisciplinary research project designed to identify the elements of family structure and functioning that related to the development and reinforcement of psychosomatic symptoms in children. Working with children with anorexia nervosa, diabetes, and intractable asthma, Minuchin identified four family characteristics which predisposed toward all three diseases: a pathologically enmeshed family system; a high degree of overprotectiveness of family members toward one another; rigidity, where families are heavily committed to

maintaining the status quo; and a lack of conflict resolution, where problems are ignored and left unresolved. A comparison of asthmatic, diabetic, and control children (Hillard, Fritz, & Lewiston, 1982) found that the presence of chronic illness, rather than asthma per se, was most significantly related to children's goal setting and parents' aspiration for their children.

In a factorial study investigating cognitive factors in three psychosomatic disorders (ulcer, lower back pain, and migraine) Forman, Tosi, and Rudy (1988) found that, while the three psychosomatic groups could not be differentiated from each other, psychosomatic patients as a whole were more perfectionistic, self-downing, and prone to blame others than a medical control group.

Most recently, Friedman, and Booth-Kewly (1987) conducted a meta-analysis of 101 studies of bronchial asthma, migraine, peptic ulcer, rheumatoid arthritis, and coronary heart disease. Results point to the probable existence of a disease-prone personality that involves depression, anger, hostility, anxiety, and possibly other aspects of personality. While the average magnitude of the relationship between personality problems (i.e., depression, anxiety, hostility) and disease appear to be modest at best (ranging between .10 to .32), as the authors point out, this relationship can be considered moderate or even high when compared to other readily accepted medical risk factors such

as the correlations of cholesterol or smoking to heart disease (both under .15).

A review of the literature on the relationship between mind and body cannot be complete without including a fourth view held by a small but vocal contingent of physicians and health researchers dealing with chronic disease processes who refuse to believe that psychology plays any significant role in causing disease. This trend, originating in the 19th century, of focusing on the body to the exclusion of mental factors continues to the present to impact upon views of health and disease. As recently as 1985, an editorial in the *New England Journal of Medicine* asked the question, "What about heart attacks, peptic ulcers, asthma, rheumatoid arthritis, and inflammatory bowel disease? Are they caused by stress in certain personality types, and will changing the personality change the course of disease?" The physician answers this question with the following statement: "It is time to acknowledge that our belief in disease as a direct reflection of mental state is largely folklore" (Angell, 1985). This approach regards most psychosomatic research as lacking scientific merit and contends that focusing on psychological factors in disease processes is counterproductive and results in "blaming the victim" for his or her own disease.

Summary of the Mind-Body Relationship

While a majority of the psychosomatic literature recognizes that most illnesses have a significant psychological component, it is difficult to delineate the exact relationship between mind and body. Earlier psychosomatic research has focused on determining whether specific personality characteristics, traits, or conflicts have a causal role in the development of certain diseases. Researchers such as Alexander, Graham, Pollock, or Bastiaans would answer in the affirmative. However, much of their research has had methodological problems and has not received wide support. More recent research suggests the possibility of a generic "disease-prone personality," which may put an individual at risk for contracting a number of diseases. Rejecting earlier linear, unicausal explanations of disease, the current model is a holistic, systems, biopsychosocial approach which recognizes that disease must be considered in the context of a number of dynamically interacting systems, all of which will partially determine how the illness is manifested and how the individual will respond to treatment.

THEORETICAL FOUNDATIONS OF COGNITIVE APPROACHES
TO STRESS AND DISEASE

A biopsychosocial model of disease, which views psychological factors as intervening or mediating variables between stress and illness, is consistent with the cognitive view of the individual as a uniquely symbolic animal who actively ascribes meaning to his or her behavior or circumstances and struggles to control and master these circumstances. An important philosophical assumption underlying the cognitive model is that of interactionism and reciprocal determinism, which emphasizes the complex and continuous causal interaction between individuals and their environment (Bernard & Joyce, 1984; Tosi, 1981). In this context, whether or not individuals will experience certain physiological responses when confronted by environmental challenge depends on their view of the world (beliefs about themselves and others), their typical pattern of emotional responding, and their psychological resources, or coping strategies.

A number of theorists have explored the role of cognition in stress and disease. Zegans (1984) views the physiological correlates of stress as the result of a complex, structured series of perceptions, appraisals, and adaptive responses. He has formulated a four-stage model to explain the process. The first stage is one of alerting alarm where a potential stressor is perceived that triggers

arousal in the central nervous system and focuses attention toward the stimulus. The second stage is appraisal. The nature of the stimulus is assessed through examining its content, the context within which it occurs, and past experience with similar situations. Possible consequences for the individual are examined and whether it should be ignored or investigated further. Zegans underlines that no simple linear relationship exists between the immediate recognition of a stressor and the resulting emotional response. A variety of different emotions may occur during this stage until some final judgment is made about the meaning of the event and its consequences. The third stage involves the development of a coping strategy. When unpleasant emotions are evoked by a stimulus, an individual then makes attempts to terminate those negative affects. This may either involve altering or eliminating a dangerous stressor or revising its meaning. Negative emotions and accompanying physiological states are lessened if the individual anticipates control or mastery of the situation. The fourth and final stage involves the stress response. If the individual's coping strategy proves to be inadequate, inappropriate, or excessively long, dysphoric emotional states such as grief, anxiety, anger, or panic, accompanied by inadequate ego defenses, poor cognitive organization, and the activation of altered autonomic and neuroendocrine patterns, will result. Zegans believes that each stage of

stress is accompanied by some alterations of organic processes. Usually this physiological involvement is transient and adjusts to the demands of the situation. If, however, prolonged alerting, poor appraisal, and inadequate coping are the rule, then more extreme physiological changes may be expected to occur.

Lazarus (1977), Lazarus and Folkman (1984), and Holroyd and Lazarus (1982) have focused particularly on the appraisal process and the adaptational consequences of appraisal. Like Zegans, Lazarus and associates believe that the cognitive mediational processes involving evaluation and judgment are crucial to the stress reaction. Appraisals can be separated into those that are concerned with the recognition that the individual is in jeopardy (appraisal of what is at stake--"Am I okay or in trouble?") and those that are concerned primarily with the evaluation of resources available for managing potential or actual harm (appraisal of coping--"What can be done about the situation?"). Lazarus further subdivides stressful appraisals into two categories: appraisals of threat, which refer to the anticipation of imminent harm, and harm-loss, referring to the judgment that damage has already occurred. Lazarus also posits a close relationship between the impact of personality characteristics on health outcomes and appraisal. Certain psychological characteristics may operate directly on the appraisal process and may predispose

the individual to perceive a particular class of events as highly threatening. For instance, an individual with high dependency needs may interpret situations involving loss as particularly stressful. At a more general level, certain psychological characteristics may lead to a more general "cognitive schema," which may predispose the individual to appraise a wider range of events as threatening (i.e., self-efficacy expectations, internal versus external locus of control). In either case, by increasing the potential threat of psychosocial stimuli, psychological predisposing variables may play a key role in exacerbating the emotional-biologic mediators that serve to activate biologic factors leading to disease. Lazarus, et al., also highlight the importance of viewing health outcomes as a product of effective coping strategies rather than simply a consequence of the presence or absence of stress. Coping affects health outcomes by influencing the frequency, intensity, and patterning of the neuroendocrine stress response. Furthermore, they imply a certain specificity reminiscent of Alexander when they suggest that particular coping styles or types of coping activity may affect health outcomes because they are associated with patterns of physiological mobilization that predispose to certain disorders but not to others.

Gazzaniga (1988) provides a physiological explanation of the mediating influence of appraisal on the stress

response. When an event perceived as threatening occurs, a complex response involving the autonomic nervous system and the neuroendocrine system result. The sympathetic and parasympathetic systems, respectively, produce the neurotransmitters noradrenaline and acetylcholine, and the hormone cortisol. Stress leads to disease processes when cortisol levels remain high for long periods. This can bring about protein imbalance and inhibition of the immune response. The extent of stress depends on how each adverse experience is interpreted by each individual. If a situation is perceived as a threat, particularly one involving loss of control or feelings of helplessness, the full stress response is evident with elevated levels of both neurotransmitters and cortisol. On the other hand, if the situation is perceived as a challenge, where the individual perceives a potential for real gain, although there are higher levels of neurotransmitters, there is no elevation of cortisol. This allows the individual to experience even a highly stressful situation as positive and not be at risk from the somatic effects that can occur with increased cortisol levels.

Like Lazarus, Beck (1970, 1984) has presented a model which stresses the importance of minimizing physiological arousal through cognitions which are realistic. Beck focuses on a variety of unproductive, unrealistic, and maladaptive coping strategies which aim at decreasing

emotional arousal level by making the person less aware of stressors and by limiting or changing cognitive mediation processes. These ultimately serve to increase rather than decrease negative emotion. Beck, et al. (1979), have identified a number of systematic errors in thinking which affect the appraisal process, generate negative emotions, and eventually lead to physiological arousal. These include such coping mechanisms as arbitrary inference, selective abstraction, overgeneralization, magnification and minimization, personalization, and absolutistic dichotomous thinking.

In the past fifteen years, a number of intervention studies have demonstrated the intimate connection between cognitive mediators such as appraisal and coping strategies and physiological processes. These include the treatment of pain (Hacket & Horran, 1980; Meichenbaum & Turk, 1976), headache (Anderson, Larence & Olson, 1981; Bell, Abramavitz & Hutchinson, 1983), lower back pain (Turner, 1982), and hypertension (Holroyd & Andrask, 1978; Mitchell & White, 1976).

Summary of Cognitive Theories of Stress

The assessment and treatment of the disease process in many psychosomatic illnesses is being strongly influenced by the advent of a cognitive view of psychological adjustment, stress, and disease. Cognitive models of stress suggest

that it is not the stressor itself but how the stressor is appraised, the ways in which individuals cope, their consequent emotions, and their resources which may all play a significant mediating role in determining whether stress leads to disease.

RATIONAL EMOTIVE AND COGNITIVE-EXPERIENTIAL THERAPY -- THEORY & RESEARCH

The two cognitive models on which the present study is based are Ellis's Rational Emotive Therapy and Tosi's Cognitive Experiential Therapy. Each will be discussed in detail in the following section.

Rational Emotive Therapy

Rational Emotive Therapy was developed by Albert Ellis in 1955. RET advances the proposition that the knowledge we acquire is influenced by the interpretations we impose on our perceptions and that psychological disturbance results from idiosyncratic interpretations and appraisals which people form and which they strongly believe to be true about themselves and the world around them (Ellis & Dryden, 1988). RET further holds that most sustained negative emotions that interfere with effective behavior are the result of irrational ideas consisting of internalized sentences, or "self-talk." Ellis asserts that a good deal of what we

call emotion is a kind of appraisal or thinking that (a) is strongly slanted or biased by previous perceptions or experiences; that (b) is highly personalized; that (c) is often accompanied by gross bodily reactions; and that (d) is likely to induce the emoting individual to take some kind of positive or negative action. Ellis calls this his ABC model of personality, where A stands for an activating event, B stands for the belief or appraisal of the event, and C stands for the resulting emotion (Ellis, 1962).

The concepts of "belief" and "belief systems" are central to RET theory. Bernard and Joyce (1984) define it as a broad hypothetical construct which embraces three distinct subclasses of cognitive phenomena: 1) thoughts that an individual is thinking and is aware of at a given time; 2) thoughts that the individual is not immediately aware of; and 3) more abstract beliefs that the individual may hold in general. The more general, abstract beliefs which people hold are usually not verbalized and compose the assumptive framework by which they evaluate, appraise, and form conclusions about what they observe to be happening to themselves, to others, and in the world around them. These abstract beliefs may be viewed as relatively enduring cognitive structures which affect people's interpretation of reality and subsequent behavior.

Abstract beliefs can be differentiated on the basis of whether they reflect absolutistic and imperative

(irrational) or relativistic and conditional qualities (rational). Thought and behavior tend to be irrational when they (1) lead to distortion of reality; (2) interfere with the accomplishment of goals, (3) are not life preserving; and (4) lead to significant personal and environmental stress (Tosi & Black, 1981). Ellis contends that people who hold rigid views and beliefs about how they, others, and the world should or must be under all circumstances are likely to experience some form of disturbance. The set of irrational beliefs an individual holds can be considered the core of psychopathology. Irrational philosophies often lead to phobias, obsessions, and psychosomatic disorders. Within the RET framework, the therapist helps clients identify, examine, and re-define beliefs so that they can perceive the world and themselves more accurately and think more rationally about their perceptions.

Ellis has described a set of irrational ideas or beliefs which is commonly held by most adults (see Table 1). These beliefs fall into three categories: awfulizing statements which exaggerate negative consequences; "shoulds, oughts and musts" which represent unrealistic demands; and statements of blame. Bernard and Joyce (1984) have identified three clusters of irrational beliefs in childhood. These include (1) I must do well and be approved of; (2) I must get what I want, and (3) I must be comfortable and life should be fun. Waters (1981) has also

generated a set of irrational beliefs for adolescents (see Table 2).

In addition, Ellis and others (Bernard & Joyce, 1984; Bessai, 1977) have attempted to identify some of the dysfunctional cognitive processes and faulty beliefs that lead to different emotional states. Bessai (1977) has suggested that specific irrational beliefs may correlate with specific aspects of emotional distress, i.e., perfectionism with anxiety, self-downing with depression, or importance of approval with anxiety. Bernard and Joyce (1984) identify the following dysfunctional emotions with the following irrational belief statements:

depression = I must be loved and approved of by every significant person in my life and if I'm not, it's awful.

I am not worthwhile unless I am thoroughly adequate, achieving, and attractive at all times.

anxiety = The world is much too difficult and dangerous a place to live in and should be made much easier.

I cannot cope with my world and desperately and absolutely need the acceptance, love, and support of others in order to accept myself and perform even minimally well.

TABLE 1

Ellis's Irrational Beliefs

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1. The idea that you must have sincere love and approval almost all the time from all the people you find significant.
 2. The idea that you must prove yourself thoroughly competent, adequate, and achieving; or that you must at least have real competence or talent at something important.
 3. The idea that people who harm you or commit misdeeds rate as generally bad, wicked, or villainous individuals and that you should severely blame, damn, and punish them for their sins.
 4. The idea that life proves awful, terrible, horrible, or catastrophic when things do not go the way you would like them to go.
 5. The idea that emotional misery comes from external pressures and that you have little ability to control your feelings or rid yourself of depression and hostility.
 6. The idea that, if something seems dangerous or fearsome, you must become terribly occupied with and upset about it.
 7. The idea that you will find it easier to avoid facing many of life's difficulties and self-responsibilities than to undertake more rewarding forms of self-discipline.
 8. The idea that your past remains all-important and that, because something once strongly influenced your life, it has to keep determining your feelings and behavior today.
 9. The idea that people and things should turn out better than they do, and that you have to view it as awful and horrible if you do not quickly find good solutions to life's hassles.
 10. The idea that you can achieve happiness by inertia and inaction or by passively and uncommittedly "enjoying yourself."
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Table 1, Continued

11. The idea that you must have a high degree of order or certainty to feel comfortable, or that you need some supernatural power on which to rely.
 12. The idea that you can give yourself a global rating as a human and that your general worth and self-acceptance depend upon the goodness of your performances and the degree to which people approve of you.
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TABLE 2

Waters' (1981) Irrational Beliefs of Adolescents

1. It would be awful if peers didn't like me. It would be awful to be a social loser.
 2. I shouldn't make mistakes, especially social mistakes.
 3. It's my parents' fault I'm so miserable.
 4. I can't help it, that's just the way I am and I guess I'll always be this way.
 5. The world should be fair and just.
 6. It's awful when things do not go my way.
 7. It's better to avoid challenges than to risk failure.
 8. I must conform to my peers.
 9. I can't stand to be criticized.
 10. Others should always be responsible.
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anger = When people act obnoxiously and unfairly, one should blame and condemn that and see them as bad, wicked, or rotten individuals.

Things are awful, terrible, horrible, and catastrophic when one gets seriously frustrated, treated unfairly, or rejected.

Research in this area has found a positive relationship between different aspects of irrationality and chronic negative emotional concomitants such as anxiety (Boutin & Tosi, 1979; King, Schler, & Catell, 1976; Zwimmer & Diffenbacher, 1984), depression (Beck, 1967; Hoge & Diffenbacher, 1986; Nelson, 1977; Reardon, Tosi, & Gwynne, 1977), and anger (Hoge & Diffenbacher, 1986; Novaco, 1975; Spielberger, Jacobs, Russel & Crance, 1983; Zwemmer & Diffenbacher, 1984).

Cognitive Experiential Therapy

An expanded version of classical Rational Emotive Therapy has been developed and empirically researched by Tosi and associates (Tosi, 1974; Tosi & Marzella, 1975; Tosi & Black, 1980). Cognitive Experiential Therapy is a psychotherapeutic conceptualization and intervention which emphasizes cognitive control over affective, physiological, and behavioral functions of a person. It is a dynamic systems model which describes the reciprocal influence of

social and physiological forces in the production of behavior. It recognizes that the concept of rationality-irrationality implies much more than evaluative cognitions alone. It includes affective, physiologic, and behavioral-motoric variables as well (Reardon & Tosi, 1977). Tosi has combined Mooney's (1963) prototypic model of person-environment interaction and Ellis's (1962) ABC model of linking emotions to cognition to include (D) physiological concomitants and (E) behavioral responses (see Table 3 for a description of the A-B-C-D-E model). The A's, B's, C's, D's, and E's operate as a network of relationships. The model suggests that an emotional response cannot make sense unless it is related to some kind of cognitive appraisal, situational event, and change in bodily functioning, with all processes operating together in a unitary fashion.

Tosi asserts that the self or person operates as an open system with the environment (see Figure 1). The self or ego system consists of five highly interrelated domains in the A-B-C-D-E model (Tosi, 1981). The environment, A, consists of the external environment or reality. The internal environment, B, consists of images, thoughts, ideas, attitudes, and beliefs which comprise the cognitive domain. C refers to affect, defined as a felt tendency or disposition for a given object (Arnold, 1960). Point D refers to physiological responses such as biochemical changes or sympathetic activation of the autonomic nervous

TABLE 3
The ABCDE Model

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- A-- Refers to an event or set of events (a_1, a_2, a_3, a_4) occurring in the internal or external world of the person related to time occurring along an awareness continuum.
- B-- Refers to cognitive responses (b_1, b_2, b_3, b_4) to A, internal or external, along an awareness and time continuum.
- C-- Refers to affective responses (c_1, c_2, c_3, c_4) to B about A along the awareness and time continuum.
- D-- Refers to physiological concomitants (d_1, d_2, d_3, d_4) related to A, B, C occurring along an awareness and time continuum.
- E-- Refers to a set of actions, (covert, overt) or behavioral possibilities (e_1, e_2, e_3, e_4) toward A related to A, B, C, and D occurring along the time and awareness continuum.
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(Tosi, 1981)

(TosI, 1980)

Figure 1: Depiction of the Person - Environment Interaction

system. Behavior is defined at point E and involves either a covert or overt action.

In this model, environmental or situational conditions ($A_1 \dots A_n$) and its component parts ($a_1 \dots a_n$) may generate individual interpretations, appraisals, or beliefs (B) about the environment or its subparts. Cognitive operations (B) may be divided into four cognitive sets, which may operate above or below the threshold of awareness (see Table 4 for a summary of cognitive symbolic operations). These cognitive operations either generate or become associated with a set of affective responses ($c_1 \dots c_n$), which may be either simple or quite complex in nature. Varying physiological concomitants ($d_1 \dots d_n$) may result from the emotional arousal or affective state. In the case of the bronchial asthma population, this could include parasympathetic involvement resulting in catecholamine deregulation leading to bronchial irritability, constriction, and asthma symptoms such as tightness in the chest, difficulty breathing, or wheezing. The above cognitive, affective, and physiological processes may then translate into behavioral responses or action tendencies ($e_1 \dots e_n$), which may be overt and/or covert. For an elaborated example of an A-B-C-D-E irrational self-defeating sequence for an asthmatic, see Table 5.

Three different types of stage directed therapy have been developed. These include:

TABLE 4

Cognitive Appraisals and the
Cognitive-Symbolic Coping Strategies

B₁--Appraisal of the event

B₂--Appraisal of the response to the event

B₃--Appraisal generalized to the entire ego/self system

B₄--Cognitive-Symbolic Coping Strategies

Dissociation-Association

Denial-Regression-Suppression-Projection

Logical-Critical-Divergent Thinking

Imagining

Distortions

a. Mislabelling

b. Overgeneralizing

c. Arbitrary Inference

d. Magnification/Minimalization

e. Selective Attention

f. Cognitive Polarization (either-or)

g. Projection

Destructive/constructive Approach-Avoidance

Tendencies

Proliferation

(Tosi, 1981)

1. Rational Stage Directed Therapy - cognitive skills are developed within the stage directed framework, but all therapy is conducted during the normal waking stage.

2. Rational Stage Directed Imagery - the development of cognitive skills (within the stage directed framework) is enhanced by imagery and relaxation procedures (progressive muscle relaxation, meditation, or simply imagining a scene with eyes closed, within a non-distracting atmosphere.

3. Rational Stage Directed Hypnotherapy - hypnosis and hypnotic imagery are used to facilitate the cognitive-behavioral restructuring process (Howard, 1979).

The growing body of RSDH, RSDI, and RSDT research has attempted to establish logical and statistical relationships among certain irrational ideas or attitudes and concomitant affective, physiological, and behavioral variables while at the same time developing a comprehensive intervention model that is highly cognitive and experiential.

Factor analytic studies of recently developed cognitive measures have suggested a statistical relationship among cognitive factors and affect, behavior, and physiological processes. Tosi and Eshbaugh (1976) performed a hierarchical factor analysis on the Hartmann Personal Beliefs Inventory and found the PBI to be organized into three levels. The highest order factor to emerge was a general measure of irrationality. The second order factors were interpreted as attitudes associated with depression and

TABLE 5

Example of the Elaborated ABCDE
Irrational Self-Defeating Sequence For Asthma

A. Event		Joan finds out she received a "C" on her final exam in biology.
B. Cognitive Responses	B ₁	Joan evaluates the situation with the thought "This is awful. Mother will be so angry with me."
	B ₂	Joan evaluates her response to the situation with the thought, "I should have done better, I didn't try hard enough. Now mother won't think much of me."
	B ₃	Joan generalizes to her entire ego/self situation with the thought, "What a stupid, worthless person I am."
	B ₄	Joan engages in a self-destructive coping strategy by overgeneralizing and making an arbitrary inference. "I might as well forget it. I'm bound to fail in everything I do. My parents will never love or approve of me again."
C. Affective Responses	C ₁	Anxiety
	C ₂	Self-contempt
	C ₃	Depression
D. Physiological Responses	D ₁	Increased bronchial irritability
	D ₂	wheezing and tightness in the chest
	D ₃	Full blown asthma attack
E. Behavioral Responses	E ₁	Joan diverts attention to her asthma symptoms
	E ₂	Joan gains her mother's sympathy

dogmatism. The third order factors were achievement anxiety, delay of gratification, moral conforming, and guilt and shame.

Similarly, Forman (1979) used a common factor analysis to replicate the factor structure described by Bessai (1977) in her Common Beliefs Survey III. The study was able to demonstrate a significant relationship between somatic symptoms and psychological factors. It was found that the beliefs of perfectionism, self-downing, and blame proneness significantly related to the psychosomatic conditions of migraine headache, peptic ulcer, and lower back pain.

Most recently, a replication study of the factor structure of the CBSIII (Tosi, Forman, Rudy, & Murphy, 1986) concluded that the instrument has strong factorial validity that provides evidence for its theoretical structure.

In addition to the Forman study, the effects of altering physiological as well as emotional and behavioral processes through cognitive restructuring has been demonstrated in several studies. In a study with delinquent females, Reardon and Tosi (1977) examined the effects of RSDI, cognitive restructuring, a placebo, and no treatment on self-concept and stress. Support was found for the effectiveness of RSDI in improving total self-concept.

Rudy, Tosi, and Reardon (1977) cite two case studies where RSDH was used successfully in the treatment of hypertension.

Howard (1979) studied the effects of RSDH on members of a barbell club and found that subjects significantly improved in neuromuscular performance, facilitation of muscular growth, anxiety reduction, and enhancement of self-concept.

In another case study, Howard, Reardon, and Tosi (1982) explored hypnosis and RSDH in the treatment of migraine headaches. It was found that, while hypnosis alone slightly reduced the frequency of migraines, RSDH was able to reduce the frequency of migraines from 7.5 to 1.6 per week.

Tosi, Judah, and Murphy (1988) demonstrated similar results with four groups of duodenal ulcer patients using a cognitive restructuring, hypnosis, RSDH, and a no treatment control group format. RSDH was found to significantly decrease frequency of gastrointestinal pain, increase personality coping styles, evaluation, and locus of control.

Murphy (1985), however, exploring the effects of four experimental treatment groups with patients experiencing chronic pain, did not find an integrated treatment of RSDT plus biofeedback was effective in reducing pain and enhancing coping.

Other studies focusing on affective and behavioral variables provide clinical support for RSDH as a treatment modality. These include the treatment of guilt (Tosi & Reardon, 1976), depression (Reardon, Tosi, & Gwynne, 1977), test anxiety (Boutin, 19780), nonassertion (Howard & Tosi,

1978), learning disability and hyperactivity (Tosi, Fuller, & Gwynne, 1980), and anxiety neurosis (Tosi, Howard, & Gwynne, 1982).

Summary

The two cognitive theories on which this study is based have been reviewed in some detail in this section. Rational Emotive Therapy focuses on beliefs and their appraisal. Ellis contends that long held irrational beliefs interfere with productive coping and may produce emotional illness and psychosomatic conditions. The Cognitive Experiential perspective (an expanded version of RET) is a dynamic systems model which describes the reciprocal influence of social and physiological forces in the production of behavior. It emphasizes cognitive control over affective, physiological, and behavioral processes. The efficacy of RSDH, RSDT, and RSDI for the treatment of a wide variety of behavioral, emotional, and psychosomatic disorders has been well documented. A review of the research was presented.

POSSIBLE DEVELOPMENTAL TRENDS AND SEX DIFFERENCES IN RATIONAL THINKING

In addition to examining the relationship between physiological and emotional variables to cognition (i.e., irrational beliefs), this study also examines the effects of

age and sex on the endorsement of irrational beliefs. Each will be discussed in turn.

Developmental Trends in Rational Thinking

Theory strongly suggests that developmental advances should influence rationality/irrationality. Basic learning processes and abilities (i.e., memory, attention, verbal mediation, cognitive strategy) appear to systematically develop in complexity over the childhood period (Flavell, 1982). Bernard and Joyce (1984) note the importance of taking into account the cognitive developmental status of children in understanding their disturbed cognition (i.e., irrational ideas) and cognitive processes (i.e., faulty reasoning). Children's capacity for rational and logical thought is limited by the types of ideas they acquire. Whereas certain beliefs may be characterized as irrational and consequently pathological in an older child at a higher stage of development, these same beliefs would be considered perfectly normal with a younger child at a lower stage of cognitive development.

Piaget's theory of intelligence and stage-related levels of cognitive development provides a model for understanding the growing process of rationality in children and adolescents and how they acquire beliefs about their

world. Piaget postulates four levels of intelligence that each individual sequentially passes through. These include:

1. sensorimotor (birth to 2) = The infant develops concepts of space, time, causality, and a scheme for permanent objects. He or she begins to consolidate cognitive structures which lay the foundations for the following stages.

2. pre-operational (2-7) = During this period, children develop symbolic representation and a language and begin to form stable concepts which allow feelings to acquire stability over time. During this stage, children have trouble decentering. Their pronounced egocentrism results in magical and dualistic thinking, difficulty differentiating causality, anthropomorphism, and animism. This stage also lays the foundation for defense mechanisms often encountered in later life.

3. concrete operations (7-11) = This stage heralds the beginning of logical or rational thought. Operational thinking is marked by concepts of conservation that enable children to discover what values are invariant through a process of transformation. Concrete operational children no longer see only black and white but gradations. With their new ability to classify objects they also gain the capacity to separate their feelings within the family from their feelings outside the family. They are also able to generalize and discriminate certain feelings. When they

attain the concept of reversibility, they also begin to realize that feelings can be reversed by their opposite. Their growing cognitive abilities to classify and seriate enhance their ability to understand feeling and the context of human relationships. However, by definition, concrete operational children cannot logically reason with abstract emotional concepts which do not exist in their sphere of perceived experience.

4. formal operations (11+) = Sometime during adolescence, children shift to formal operational thought. They can now consider many variables in many dimensions and have the capacity for hypothetico-deductive reasoning. The thinking of adolescents is qualitatively different from the thinking of children at the concrete operational period. They can now think beyond the present and beyond immediate reality. Since they can consider the possible as well as the real, they can think about hypothetical relationships, feeling states, and wishes. Their new cognitive activities help them achieve autonomy, consolidate identity, and move toward relationships of mutuality and intimacy (Greenspan, 1979).

It is important to keep in mind that children in early adolescence do not routinely employ formal operational thought in thinking and planning about their personal and social lives. Piaget calls this developmental lag "affective decalage" and suggests that conceptualizing an

emotional network of concepts may lag considerably behind the application of logical principles to the more physical, observable, or tangible realm of experience (Harter, 1977).

It is also important to remember that cognitive developmental research has consistently found that, while all children appear to demonstrate an invariant sequence in which they pass through Piaget's stages, the ages or boundaries which Piaget suggested have proven to be only approximations and there are wide individual differences with which children attain different stages (Gardner, 1984).

Since adolescence covers such a wide span of years (ages 12 to 18), it is reasonable to question whether the early adolescent (12-14) and the late adolescent (15-18) differ in levels of cognitive development and consequent levels of irrationality.

There is little research in this area due to the lack of valid and reliable instruments for measuring irrational beliefs in children. However, one study (Kassinove, Crisci, & Tiagermen, 1977) provides support for this hypothesis. In seeking to measure developmental trends in rational thinking, the authors developed a scale which assesses the degree of endorsement of a number of irrational ideas and administered it to 435 students in grades 4 through 12. Results indicated that, as children increase in age, thinking tends to become less irrational. However, the relationship between grade and total irrationality score was

only .33, a modest association. Interestingly, results also suggest that, while irrationality does decrease with grade, the relation between each individual irrational idea and grade was variable. For instance, the authors found no change at all in increased rational thinking in grades 4 through 12 in the endorsement of the item, "Unhappiness is caused by people or events around us and we have almost no control over it."

Sex Differences in Rationality

A second variable hypothesized as possibly having an effect on adolescent endorsement of beliefs is sex differences. While Ellis has never asserted that there are sex differences in irrational beliefs, he has suggested that culture plays a significant influence on the development and extent of irrational beliefs a person has. Ellis (1979) has enumerated a variety of environmental influences which contribute to behavioral patterns and emotionality. These include the specific teachings and relationships with others, such as parents, teachers, clergy, peers; influences of the mass media (books, newspapers, radio, TV, films, popular songs, and magazines); and the influences of different groups (peers, social classes, community, organizations, political institutions, and religious organizations).

Similarly, Bernard and Joyce (1984) believe children acquire basic behavioral patterns through modeling and other social learning influences. The irrational beliefs and faulty information processing which they acquire is transmitted to children in the language and communication patterns of adults. There is ample evidence of the differential treatment of male and female children throughout their lives (Saltzman & Chafetz, 1977). As a result of these differences, it is possible that as children grow they may acquire sex-specific beliefs and evaluations of themselves and their surrounding world.

Furthermore, it has been well documented that women in Western cultures have higher rates of affective and anxiety disorders in both clinical and nonclinical populations (Miller & Kirsch, 1985). Since there is a close relationship between irrational beliefs and aspects of emotionality (i.e., anxiety, depression, self-esteem), it is also plausible to expect women to exhibit a higher general level of irrationality than do men.

In a review of the literature investigating sex differences in cognitive coping styles and strategies, Miller and Kirsch (1987) report mixed findings. Specifically addressing irrational thoughts and cognitive distortions, the authors found that 2 out of 11 studies supported sex differences. Chan and Tsoi (1984) found that female Chinese college students scored significantly higher

than their male counterparts on the Cognitive Distortion Questionnaire. Kogan (1971), in a study with children, found that boys in stressful situations are more likely to guess on questions where they did not know the answer, even though subjects were penalized for guessing. The authors suggest that this evidence lends support to the hypothesis that boys do not generalize failure from one situation to another and tend to be more optimistic whereas girls tend to be more helpless and overgeneralize failure.

There have been several more recent investigations which have also found sex differences in the endorsement of irrational beliefs. In a Scandinavian study, Asakaded, Horeland, and Vaomer (1985) found a significant negative relationship between measures of masculinity and irrationality.

Zwemer and Diffenbacher (1985), looking at irrational beliefs, anger, and anxiety, found that men endorsed beliefs in "perfect solutions to problems" and "blame proneness" more often and "need for approval" less often than women.

Denoff (1987), with a population of maladjusted adolescents, found that sex differences along two belief dimensions were evident, with male drug abusers higher on "blame proneness" and "self-downing."

In a group of 270 college students, Coleman and Ganong (1987) found that a feminine sex role orientation as well as sex was related to irrational beliefs, with women more often

than men endorsing irrational beliefs about demanding love and approval and dependency on stronger people to take care of them.

It is important to note, however, that, while the above studies do suggest possible sex differences in the endorsement of irrational beliefs, the majority of research has not reported such differences.

Summary

Two variables which may effect the endorsement of irrational beliefs, age and sex, have been discussed. Both areas are poorly researched. However, both theory and research suggest that irrationality diminishes with age and that men and women may differ in endorsement of specific beliefs with men more likely to endorse "blame proneness" and women more likely to endorse "need for approval."

ASTHMA

Asthma is one of the most common and yet least understood medical disorders. This section will begin with a definition and the epidemiology of asthma and then give an overview of methodological issues in the asthma literature. While research in asthma could be grouped in a number of ways, in accordance with a biopsychosocial model of asthma, the literature has been divided into biophysiological,

psychological, and socio-environmental factors implicated in asthma. This section then concludes with a summary of present treatment interventions in the control of asthma.

Definition and Epidemiological Data for Bronchial Asthma

Asthma is a disorder of the immune system that is characterized by distress in breathing, wheezing, and coughing. It often includes increased secretion of mucus in the lungs, constriction of the airways, headaches, and a feeling of tightness across the chest (Gazzaniga, 1988). The American Thoracic Society defines asthma as a disease characterized by an increased responsiveness of the trachea and bronchi to various stimuli and manifested by forced expiration, which changes in severity either spontaneously or with treatment. All definitions of asthma describe the intermittent, variable, and reversible characteristics of the disorder. The frequency of asthma attacks occurs on an intermittent basis where a patient may suffer a burst of attacks over a brief period and then not suffer an asthmatic episode for a long duration. Asthma attacks can vary in intensity from occasional discomfort or periodic attacks to continuous constriction of the airways, which can lead to a condition called "status asthmaticus" where the formation of a mucous plug causes prolonged periods of irreversibility of

bronchoconstriction, which can result in death. In addition, severity of attacks can vary both from patient to patient and from episode to episode. The reversibility component of the disorder is the hallmark of asthma and differentiates asthma from other types of chronic respiratory conditions. Reversibility refers to the fact that an asthma attack can reverse either spontaneously or with adequate treatment (Creer, 1982).

Precipitating factors are numerous, ranging from allergens (pollen, molds, dust, foods, chemicals) to nonspecific, nonallergic stimuli (viruses, exercise, environmental irritants, laughter, stress). It has been estimated that psychological factors are important in 70% of cases, infective factors in 68% of cases, and allergic factors in 36% of cases (Rees, 1956). However, the complex interactive relationship between various physical and emotional factors which are necessary for asthma to occur is substantiated by the finding that psychiatric factors were exclusively present in only 1% of cases, infective factors in only 11% of cases, and allergic factors in only 3% of cases (Cohen & Lask, 1983). Regardless of the number or combination of precipitating factors demonstrated to cause asthma, the one common denominator remains the peculiar hyperreactivity of the airways. Bronchoconstriction or hyperreactivity of the bronchial tissues is almost

obligatory for the diagnosis of bronchial asthma (Sandler, 1985).

Bronchial asthma presents a major health problem in this nation, affecting as many as 1.2 million school-aged children, or approximately 5-15% of all children under the age of 16, and another 4-5% of all adults (Jurenec, 1988). Morbidity from asthma is significant, accounting for 25% of school absences related to chronic illness and ranking third among all chronic illnesses as a cause of physician visits. Studies of school attendance show that children with asthma have a significantly higher absentee rate than do nonasthmatic children, with 6.9% for mild, 7.9% for moderate, and 13.9% school days lost for severe asthmatics (Sandler, 1985). Despite the many treatment efforts for this disease, as many as 2.4% of the cases of childhood asthma result in death. Asthma is said to account for approximately 10% of all nonviolent deaths in childhood (Fritz, Rubenstien, & Lewiston, 1982). Furthermore, the number of asthma deaths per year in childhood is on the rise, particularly for adolescents (Strunk, 1987). In addition to physical and emotional distress, a child with asthma can present an enormous financial burden to the family. It has been estimated that care for an asthmatic child can consume from 2 to 30% of the family's income, taking up to 18% or more in half the cases surveyed (Taylor, 1972).

In terms of demographic data, according to the American Lung Association (1975), boys are affected two to three times as frequently as girls. Some studies have also reported that rate of asthma is higher in children of the middle and upper-middle classes (Graham, Rutter, Yule, & Pless, 1967), particularly among children of the white-collar executive group (Logan, 1960).

Overview of Methodological Issues in Interpretation of the Literature

One of the most consistent findings in a review of the asthma literature is the lack of consensus on the role of physiological, psychological, and environmental factors leading to asthma. A number of authors (Feingold, 1958; Mrazek, 1985; Williams, 1975) have pointed out various methodological considerations which make interpretation of findings problematic. These include:

1. Samples - Studies have been carried out on small samples which have been selected from highly biased clinic or hospital populations. This leads to questionable generalizability between these samples and the asthma population as a whole.

2. Design and method - Much of the early literature (prior to 1960) involve descriptive anecdotal accounts or single case studies. Even in the past decade, there have

been few strictly experimental studies using adequate controls. Attempts to use control groups have been fairly unsystematic, with a number of different populations used, including patients with psychiatric problems, unselected psychosomatic patients, patients with other chronic illnesses, unspecified "outpatients," and unspecified "normals."

3. Techniques - There have been wide differences in the objectivity of the methods used to measure psychological variables ranging from standardized psychological tests to projective tests, to unstructured interviews and impressions from medical histories.

4. Replication of research - There have been few attempts to crossvalidate findings. While past clinical studies have tended to produce similar findings in the study of psychological factors in asthma, few experimental studies have been replicated.

Perhaps the most significant yet problematic methodological issue in the interpretation of asthma findings rests in the division of asthmatics into subgroups. Asthmatic patients are consistently described as a heterogenous group both biologically and psychologically and wide variance is encountered in personality traits, attitudes toward illness, coping skills, and subjective perceptions of symptoms. The negative or inconclusive results sometimes obtained in comparative psychological

investigations of asthma may be a function of failure to discriminate important subgroups within the asthma population. Early researchers (prior to 1960) and some current investigators today continue to make this error. However, despite the recognition of asthmatics as a heterogeneous population and the need for subgrouping, there is still no satisfactory system that has been universally accepted for categorizing subtypes of asthma. Variations of the following descriptive classification schemes are most common.

1. Intrinsic vs. extrinsic asthma - First described by Rachman (1947), this distinction has been one of the most widely used. Extrinsic asthma refers to patients with a strong allergic component while intrinsic asthma refers to those patients whose asthma episodes are not related to allergens. Studies using this classification system have generally implicated "intrinsic" nonallergic groups as at most risk for psychological disturbance. However, this scheme has proven unsatisfactory because of the difficulty of separating patients into either one or the other category and the fact that research has demonstrated that classification by intrinsic/extrinsic has not led to an understanding of the factors that cause asthma (Creer, 1985). Investigations employing this method include Block, Jennings, Hoovey, and Simpson (1965); DeAraujo, Van Arsdale, Holmes, and Dudley (1973); and Wistuba (1986).

2. Rapidly remitting vs. steroid dependent - This classification, mainly used by Purcell and associates (Purcell, Bernstein, & Blents, 1960; Purcell, Turnbull, & Bernstein, 1962; Purcell & Mitz, 1962; Turnbull & Thorpe, 1962), has been utilized with hospitalized intractable asthmatics where patients are divided on the basis of how they respond to separation from their parents. Those whose symptoms abate upon admission to the hospital are referred to as "rapid remitters." This group, rather than those who continue to be dependent on corticosteroid therapy, has been identified as most prone to psychological problems.

3. Panic-fear response level - This system has been mainly employed by Kinsman and associates (Dirks, Jones, & Kinsman, 1977; Dirks, Fross, & Paley, 1978; Jones, Kinsman, & Klieger, 1981; Kinsman, Luparello, & Spector, 1973) in a series of investigations examining response styles in asthmatics which contribute to the maintenance of illness. It has been found that patients at the high end of the panic-fear continuum are likely to have longer hospital stays and greater dependence on steroids whereas patients at the lower end, who show little recognition or regard for symptoms, appear to have significantly increased rate of rehospitalization and incidence of death. This classification, as well as that employed by the Purcell group, has been used mainly with the most severe, intractable asthma populations.

4. Estimate of severity of illness - This classification, with applicability to a wider asthma population, is gaining increased support in the more recent literature (Kim, Ferrara, & Chess, 1980; Mrazek, 1985; Mrazek, Anderson, & Strunk, 1983; Norrish, 1977; Panides & Ziller, 1981; Plutchik, 1978; Teiramaa, 1978, 1979, 1981). This approach divides patients into mild, moderate, and severe groups on the basis of one or more the following variables: medical history of asthma in terms of chronicity, number of wheezing episodes, frequency, duration, and severity of asthma attacks; level and frequency of drug use --particularly the presence or absence of corticosteroid therapy; degree of impairment of pulmonary functioning; missed school and restriction from normal activity; frequency of physician visits or hospitalizations. There is considerable variability in the literature in the selection of which combinations of characteristics to utilize. On the whole, it appears that children and adults in the "severe" group, no matter how they are characterized, are most at risk for psychiatric symptomatology (Mrazek, 1986).

Summary

Many of the inconsistencies in regard to findings in the asthma literature can be attributed to a number of methodological problems which make comparing across studies difficult. These include the variability in treatment

populations, control groups, measuring instruments, and particularly the lack of agreement about how to divide the asthma population into subgroups. These methodological issues need to be kept in mind while reviewing the following findings.

Bio-physiological Factors Implicated in Asthma

Werner (1987), in a review of the pathophysiology of asthma, describes three theories which help explain the phenomenon of the increased airway responsiveness in asthmatics, the definitive characteristic in the disorder. The cholinergic bronchoconstrictor reflex theory cites abnormal sensitivity of bronchial receptors located in the lower respiratory tract as responsible for hyperreactivity. When stimulated, these receptors initiate a reflex arc passing through the central nervous system by way of the sensory and motor vagus nerves. This causes the release of acetylcholine from the parasympathetic division of the autonomic nervous system (ANS) and subsequent bronchospasm.

A second theory explaining airway hyperresponsiveness is the beta-adrenergic blockade hypothesis. The airway smooth muscle which ultimately leads to asthma symptoms is under the control of the autonomic nervous system. Asthma is said to result from an imbalance of the (ANS) where beta receptors of the adrenergic system receive an inadequate

supply of the catecholamine epinephrine. There is increasing evidence that asthmatics may have abnormally low secretion levels of epinephrine.

A third theory of understanding airway hyperresponsiveness is that of immunological-chemical mediator release. Mast cells, which are found in the respiratory tract, release many chemical mediators which result in bronchoconstriction. It has been found that asthmatics have up to five times the number of mast cells as the normal population.

The relationship of stress to asthma is complex and somewhat of a paradox. Allen (1983) explains that most stress-related diseases, such as hypertension, tension headache, or diabetes, are partially caused by activation of the sympathetic division of the ANS and increased production of the catecholamines epinephrine and norepinephrine and corticosteroids. In contrast, the stress-related hormones epinephrine and cortisone actually ameliorate the signs and symptoms of asthma by blocking the inflammatory and immunological systems which reduce the release of the chemical mediators of asthma. Nevertheless, stress does precipitate asthma attacks. This can be explained by the possibility that one person in 25 responds to stress in the parasympathetic rather than in the sympathetic system. This results in release of acetylcholine, which leads to constriction of the bronchioles. Stress also seems to play

a role in hyperimmune responses which trigger allergic responses in many asthmatics. Hyperimmune reactions seem to increase in frequency and intensity during times when people feel helpless and overwhelmed.

Summary

The physiological factors implicated in asthma are complex and poorly understood. Three possible theories explaining airway hypersensitivity in asthmatics have been briefly reviewed. The possible physiological relationship between stress and asthma was also introduced.

Psychological Factors Implicated in Asthma

The symptoms that comprise bronchial asthma have been recognized since antiquity. Efforts to conceptualize asthma as a psychosomatic illness have dated back to Aretaeus in the second century AD. Maimonides, in the 12th century, was probably the first author to underline the psychological aspects of the illness. The centuries-old recognition of the importance of disturbing life events as stimuli to attacks of the disease was probably responsible for the opinion that asthma was a "respiratory neurosis" (Mrazek, 1985). In this century, a number of psychological factors have been investigated in connection with asthma. These include: neuroticism, or overall psychopathology, anxiety, depression, anger, and alexithymia. Each will be discussed.

Neuroticism, or Overall Level of Psychopathology

A number of studies have looked at global levels of adjustment in both child and adult asthmatics. Neuhaus (1958), contrasting three groups of children ages 7 to 15 who belonged to either an asthma group, a cardiac group, or a group of matched normal controls, found that asthmatic children were significantly more maladjusted than controls. Those with asthma were described as significantly more anxious, insecure, and dependent.

Purcell, Bernstein, and Berkowitz (1960) compared two groups of asthmatic children ranging in age from 7 to 16 years on the basis of differential responsiveness (in terms of reduction in asthmatic symptomatology) to separation from their parents and admission into the Jewish National Home for Asthmatic Children. Purcell, et al., found that children in the rapidly remitting group (those whose symptoms disappeared upon separation from family) had significantly more neurotic symptoms, i.e., headaches, constipation, nightmares, depression, and anxiety, as ascribed to them by their parents.

Fine (1963) compared hospitalized asthmatic children to their nonasthmatic siblings and found that the asthma subjects were significantly more maladjusted, exhibiting the following characteristics: more dependency and introversion, more explosiveness and uncontrollability, low frustration.

tolerance, and tendency to inhibit themselves from crying, especially during times of conflict.

Block, Jennings, Harvey, and Simpson (1964), contrasting 31 asthmatic children who were also allergic with 31 asthmatic children who were not allergic, found that children scoring low on the Allergic Potential Scale (APS) were higher in overall psychopathology. On the basis of projective tests and interview, it was found that children in the low (APS) group (no allergies) were significantly more pessimistic about the chances of their basic needs being met, angry in response to frustration, conforming, and showing greater preoccupation with themes of orality and aggression. Mothers of these children described them as rebellious, clinging, intelligent, jealous, nervous, and whiny.

Kim, Ferrara, and Chess (1980) found that, in asthmatic children 3-7 years of age, certain personality traits or characteristics of temperament could significantly distinguish them from both normal controls and a control group matched for age with chronic eczema or allergic rhinitis. They found that the asthmatic group was characterized by lower regularity, lower adaptability, lower intensity of reaction, lower mood value, and lower persistence than control groups.

Similar findings appear in the research with adult asthmatics. In a study of 40 severe, chronic asthma

patients with a mean age of 44.4 years and utilizing a number of psychological self-report measures, Plutchek, Williams, Karaser and Kane (1978) found significant correlations between measures of personality, self-esteem, life problems, and severity of asthma where asthma severity was measured by patient's self-report of symptoms. Patients who rated their asthma as relatively severe also described themselves as anxious, fearful, angry, disgusted, and sad. They were low on self-esteem, reported high interpersonal conflicts, and tended to be depressed, aggressive, and relatively unsociable. These asthmatics scored higher on ratings of trustfulness, obedience, and dependency and at the same time they were lower than average on measures of impulsivity or dyscontrol. Physician's rating of drug dependence correlated lower but still significantly with several factors. Highly drug-dependent patients were not happy, not agreeable, not interested, and tended to be sad and anxious.

Two studies by Teiramaa (1978, 1979) also report increase in overall psychopathology with increase in severity of asthma. Using 100 adult asthmatic patients divided according to medication needed, Teiramaa found that the corticosteroid-dependent group were highly defended and exhibited significant introversion and repression as well as obsessions, depression, and anxiety. The second highest group, those on heavy medications but excluding steroids,

exhibited a greater number of neurotic and psychosomatic symptoms. This group appeared to have weaker defenses and overall poor coping ability.

In contrast, there are also several studies which have not found significant differences in overall adjustment or psychopathology between asthmatic and normal populations.

Graham, Ruttur, Yule, and Pless (1967), examining 3,300 English children between the ages of 9 to 11, found that, while asthmatic children had an overall greater level of psychiatric disturbance than nonasthmatic children (10.5% as compared to 6.3%), the difference was statistically insignificant. They also appeared quite similar to children with other chronic illnesses or physical handicaps. The authors concluded that any psychiatric factors that were found to be associated with asthma are probably the result of chronic illness and consequent impairment in social relationships.

A longitudinal study by McLean and Cliny (1973), following 72 asthmatic children and their families for a period of 12 years, also found that asthmatic children developed in a manner appropriate to their age and circumstances and exhibited no significant differences from normal children.

Viney and Westbrook (1985), using a sample of 53 asthmatic children ranging in age from 6-12 and a comparison group of nonasthmatic school children, found that, while

asthmatic children did express more helplessness than normals, they also expressed more positive emotions and expressions of competence than their matched controls. However, although this was true for the younger children (6-9), the authors also note a second trend in the preadolescent asthmatics (10-12), which includes more indirectly expressed anger, expressions of depression, and a decline in expressions of good feelings. This may be a developmental trend with preadolescent asthmatics tending to lose important adaptive capacity more characteristic of the younger children.

In an investigation of 55 adult asthmatics and a random selection of 55 nonasthmatic controls, Benjamin (1977) failed to show any significant difference in mental illness between the two groups and concluded that any excess of such illness that may be found in asthma sufferers is related to the degree of physical and social incapacity suffered.

Dependency

Probably the best known and most controversial psychological dimension associated with bronchial asthma has been the notion of dependency in asthmatics. The concept was first formulated by French and Alexander (1950), who, on the basis of clinical studies, hypothesized that conflict around excessive unresolved dependence on the mother was

such that a threat of separation from her could precipitate an asthma attack. An attack represented a suppressed cry for the mother, and crying in the child or confession in the adult were dynamically thought to be linked--both could relieve guilt and re-establish the dependent bond. Key themes in the asthmatic were fear of maternal rejection and wishes to be protected. French (1950) noted that these hypotheses were developed from the study of asthmatics in severe enough emotional distress to undertake psychoanalysis but he also felt that the kinds of conflicts associated with asthma should generalize to the asthma population as a whole.

Early studies, all psychoanalytic in origin, corroborated this finding. Harris (1950), contrasting 22 asthmatic children with 17 controls and using the Rorschach and TAT, found that asthmatic children had more fear of maternal separation, were less aggressive, and had difficulty confiding or crying.

Knapp (1960), citing clinical observations, suggested that some asthmatics have unusually intense, passive, and dependent personality trends.

Fine (1963), using a series of projective tests with 60 asthmatic children and 30 nonasthmatic siblings, reported greater dependency and lower frustration tolerance in the asthma sample. Similarly, a number of other investigators (Miller, 1950; Edgell, 1952; Alcock, 1960; Schiatta, 1950)

have also noted dependency in asthma subjects.

Unfortunately, many of these are anecdotal accounts of case histories and have been criticized as lacking scientific merit.

An early series of studies which also corroborated Alexander's hypothesis, but exemplified careful empirical research were those conducted by Graham and associates (1962). Graham proposed that attitudes predicted to be associated with certain illnesses should be more applicable to patients with that illness than with another. Thirty-six patients with 10 diseases were interviewed about general life attitudes and judges rated the interview transcripts. Attitudes found to be significantly associated with bronchial asthma were feeling unloved, disapproved of, and rejected.

Several more recent empirical investigations have also supported these findings. Williams (1975), in a well designed study, investigated the psychodynamic postulates concerning the meaning of separation for asthmatic children. Using projective tests and questionnaires, he confirmed that separation was a particularly sensitive issue for these children. Their difficulty in emotional separation appeared to result in a more dependent and closer relationship with the mother than was demonstrated by either a healthy comparison group or a comparison sample of children with cystic fibrosis. Williams concludes that the asthmatic

child in all degrees of severity displays a greater conflict with independence/dependence than normal children, that this core conflict is specific to asthma and appears to be triggered by threat of separation, and that there is no evidence supporting the concept of these characteristics being reactive to the sickness itself.

Panides and Ziller (1981), in a study with different groups of asthmatic children and their controls, also found dependency characteristic of asthmatics. However, they also found that dependency is related to severity of illness, with children in the severe group (corticosteroids) showing higher level of dependency.

With 68 severely asthmatic adults ranging in age from 15-59, Dirks, Paley, and Fross (1980) were able to correlate childhood separation from significant others and the experience of over- or underprotection in childhood with MMPI panic-fear scores. Those subjects high on panic-fear reported they had always felt inadequate and unable to cope with stress and consequently developed coping patterns characterized by fearfulness, helplessness, and dependency. Those who scored low on panic-fear had prolonged separations from family as children and consequently developed counterdependent coping styles. The authors note that there are some important differences between this research and Alexander's original nuclear conflict theory. Most importantly, these findings do not suggest a genetic

component but, instead, a maintenance factor for asthma. Secondly, unlike Alexander, who posited that the conflict overdependence/independence was common to all asthmatics, the present investigation suggests that these conflicts occur in only a subgroup of asthmatics.

There are several studies that dispute the above findings. Dubo, McLean, and Wright (1961) followed 100 asthmatic children longitudinally for 12 years and found that the majority seemed to develop in an age-appropriate and developmentally-appropriate manner. They suggested that, when maladaptations do occur, they are a response to the illness in individual cases.

Gauthier (1978, 1979), in two studies examining young asthmatic children (14-48 months) and their interaction with their mothers, also observed that the asthmatic children tended to develop in an age-appropriate manner, appeared relatively autonomous, and that the majority were well adjusted.

Anxiety

Anxiety is another variable which has received much attention in regard to asthma both as an aspect of personality and as an emotional reaction to the illness itself. While there has been a number of anecdotal accounts in the early literature of anxiety in asthma sufferers (Thompson & Thompson, 1985), the definitive work in this

area has come from Kinsman and associates (Dirks, Jones, & Kinsman, 1977; Dirks, Fross, & Paley, 1978; Kinsman, Dahlem, Spector, & Staudenmayer, 1977; Kinsman, O'Banion, & Resnikoff, 1973). Kinsman, et al., have developed two instruments, the Asthma Symptom Checklist, which measures state anxiety, and a 15-question adaptation of the MMPI, which measures trait anxiety. In a series of studies, Kinsman has shown that asthma sufferers who score high on panic-fear describe themselves as fearful, worried, sensitive, and pessimistic about their ability to cope with their symptoms. Furthermore, high panic-fear personalities are distressed by many aspects of their lives and seem predisposed to feel anxious, panicky, and helpless in a variety of situations both related and unrelated to asthma. The authors stress that these characteristics should not be regarded as an emotional reaction to their illness but, rather, a general personality style which may predispose them to react in certain ways in response to breathing difficulty. The high panic-fear personality has been significantly associated with a higher intensity of prescribed medication, corticosteroids in particular.

In two replication studies, similar results were found with asthmatic children ages 9 to 15 (Baron, Lamarre & Lapierre, 1986) and with asthmatic adolescents (Lebowitz, Thompson, & Strunk, 1981).

In a meta-analysis of fifteen empirical studies on asthma, Friedman and Booth-Kooley (1987) found the magnitude of the relationship between anxiety and asthma to be .36.

Depression

Many clinicians working with asthma patients have noted that asthmatics frequently develop depression. This has been described as a reaction to the illness itself as well as an aspect of personality. Depressed affect between or in conjunction with attacks may be the result of fear of the threat of death, decrease in self-esteem because of illness, disrupted self-image, diminished capacity for sexual and interpersonal relationships, or as a reaction to medication. Asthma attacks often occur when the patient is unable to cope with the stresses associated with personal or work-related relationships, when psychological defense mechanisms begin to fail, or when they are too powerful and actually deter expression and discharge of dangerous feelings. Depression may also predate the illness and can complicate medical management and impair the patient's ability to recover both physically and psychologically from acute upsets (Thompson & Thompson, 1984).

Knapp (1960) studied 406 attacks in nine adult asthmatics and found that 83% of his patients exhibited a high level of depression and were characterized by a sense of sadness, helplessness, and hopelessness. In a subsequent

case study of a 33-year-old asthmatic who died from his illness, Knapp (1965) hypothesized that, in many severe asthmatics, attacks are ushered in by a state of powerful emotional arousal and a breakdown of defenses. Overt despair and hidden hostility may then be directed against the self and may lead many severe asthmatics to a condition which, if prolonged, may result in death.

Fritz, Rubenstein, and Lewiston (1987) explicate the close physiological relationship between depression and asthma. Similar catecholamine-cholinergic imbalances have been identified in both disorders. It has been demonstrated that depression is at least partly due to increased cholinergic activity due to an abnormality of transmitter mechanisms. In asthma, bronchconstriction is also the result of increased cholinergic activity coupled with parasympathetic action in bronchial smooth muscle. Thus, depression and asthma may each have similar relative or absolute transmitter imbalances that additively worsen the severity of either or both disorders in a given patient. Fritz, et al., in fact, have found that, in reviewing a number of asthmatic patients who had died of their illness, a significant subgroup, 13%-18%, had either been formally diagnosed as having a depressive disorder or exhibited prominent themes of depression, pessimism, and disregard for their asthmatic symptoms.

Similar evidence was found in a retrospective study by Strunk, Mrasek, Fuhrmann, and LaBrecque (1985). In a case control study of 21 patients with severe asthma hospitalized at the National Jewish Center for Asthma from 1973-1982 who later died of their asthma, Strunk, et al., found psychological variables to comprise 10 out of 14 variables that significantly distinguished children who died of asthma from living asthmatic controls. Particularly prominent were depression, disregard of asthmatic symptoms, and conflicts between the patient's parents and hospital staff regarding medical management of the patient.

Asthmatics have also been found to have a significantly higher percentage of suicidal trends. In a chart study of 400 adults with chronic disease (asthma, essential hypertension, chronic obstructive pulmonary disease, and cholelithiasis), Levitan (1983) found a significantly higher rate for attempted suicides (28%) and successful suicides (50%) in the psychosomatic groups of asthma and hypertension. Furthermore, it was found that, in the asthma group, three times as many patients actually attempted suicide as compared to those who merely thought about it. Levitan cites this as support for the long-standing hypothesis (Menninger, 1932) that psychosomatic patients, among them asthmatics, tend to direct their hostility inward rather than outward, a condition which results in depression and, often, suicidal behavior.

Anger

Another variable often associated with asthmatics is anger. A number of studies have shown that asthmatics have difficulty in showing anger or hostility and tend to replace these emotions with an abnormal respiratory pattern.

French and Alexander (1950) were among the first to suggest that asthmatics, fearing the loss of approval or love from significant others, would repress angry feelings, which would eventually produce asthma attacks.

Groen (1952), in a review of case studies, found asthmatics to be impatient, tyrannical, and egocentric, with attacks precipitated by submission to authority or frustration in dominating a loved one.

Baundright (1957) compared 20 male hospitalized asthmatics with a group of ulcer patients on the Rorschach. He found that asthmatics have more themes of oppression, hostility, and impulsive behavior.

Ring (1957) compared 134 psychosomatic patients on fourteen illnesses and categorized them according to how they reacted to and expressed anger or fear. He found that asthmatics were "restrained reactors" who tended to repress anger and fear.

Hahn and Clark (1967) subjected asthmatic boys and control children to an experimental stress situation induced by a mental arithmetic task during which the subjects'

performances were criticized. It was found that asthmatic children gave markedly less aggressive responses in a post-stress interview. Similarly, Mathes and Knapp (1971) subjected asthmatic college students and their controls to a stress condition and found that conscious and unconscious anger after the experiment were significantly lower in the asthmatics than in the controls.

Furthermore, a third study, reported by Straker and Taremin (1974), suggests that degree of repression of anger/aggression increases with severity of asthma condition. The authors assessed severity of asthma in 42 chronically ill children in a summer camp and compared them to a normal control group on the basis of the amount of aggression the children expressed in the course of the day as rated by camp counselors. The authors found that mean aggression scores were significantly lower in children with more severe asthma.

In a recent study (Chiari, Barbaro, Nuzzo, & Rossi, 1987) examining the existence of possible differences in individual knowledge of emotions and possible self-control strategies with 20 male asthmatics (ages 9-11) and their controls, the authors found significant differences in regard to their views of anger. While almost all healthy children believed themselves capable of exerting self-control whether on the inner mental components or on its outer expression, asthmatic children saw changing the

direction of their mental processes as the only way to modify their anger. Furthermore, when angry, controls perceived other people as less nice, whereas asthmatic children perceived others as nicer. The differences the asthmatic children showed in self-control of the emotional expression of anger also correlated with a difference in the supposed perception of their anger on the part of others. Asthmatic children believed their behavior inevitably revealed to others the anger they felt.

Panides and Ziller (1980), studying 120 children with different severities of asthma, found that children with severe asthma (as defined by steroid regimens) tended to have difficulty with aggression and aggressive behavior and tended to be quite compliant.

In Friedman and Booth-Kewley's (1987) meta-analysis, anger and asthma were found to be significantly correlated (.26).

Alexithymia

Alexithymia is a term coined by two American psychoanalysts (Newmark & Sifneos, 1970). It literally means "lack of emotion" and refers to the apparent difficulty many psychosomatic patients have in verbally expressing or describing their feelings. The authors noted in repeated observations with psychoneurotic and psychosomatic patients that the latter show a specific

disturbance in affective and symbolic functions which renders their communicative style sterile and colorless. Alexithymics show a "pseudonormality" where they appear to be well adapted and show a high degree of conformity. Yet, in reality, they exhibit a constricted emotional functioning which leads to dependent interpersonal relationships or extracounterdependent behavior. Sifneos hypothesized that alexithymic traits result from deficits in neural pathways associated with emotional responses and, therefore, are of etiological significance with respect to psychosomatic disease. Alexithymia is now regarded as one of several possible "general onset situations or risk factors that seem to increase the susceptibility to disease, which is specified by other variables" (Weiner, 1982).

A number of studies corroborate the presence of alexithymic features in asthmatic children and adults. The most convincing evidence comes out of the panic-fear research (Klieger & Dirks, 1980; Dirks, Robinson, & Dirks, 1981; Brown, Fukuhara, & Feiguina, 1981; Baron, Lamarre & Lapierre, 1986). These investigators have substantiated a low panic-fear personality who is characterized by perseverance and self-containment during stress. They are often rigid and constricted and so independent as to be counterdependent. They have an unusually strong attitude about self-management of their asthma and are generally less likely to report an affective response to their breathing

difficulties. It is this personality type that has been implicated in the cause of most asthma deaths in adolescents and adults.

In a recent study, Steiner, Higgs, Fritz, Laszlo, and Harvey (1987) determined that about 15% of adult patients with bronchial asthma exhibit a repressive defense style characterized by the reporting of low anxiety on rating scales and high defensiveness while skin responses and heart rates show high autonomic arousal. They also show an insensitivity to emotional arousal and an inability to see changes in the severity of their illness.

In regard to children, two studies also indicate similar profiles. Hollander and Florin (1985) exposed 14 asthmatic children (ages 9-11) and their controls to a stress-inducing competitive achievement situation. Facial expressions of emotions were systematically analyzed from video recordings and peak respiratory flow was measured. The authors found that asthmatic children showed a significantly lower frequency and duration of overall emotional expression than their controls. Specifically, the frequency and duration of expressed anger/rage, enjoyment/joy, and surprise/startle were lower in the asthmatic children.

In the previously cited Kim, Ferrara, and Chess (1980) investigation with asthmatic children (3-7) and their controls, it was found that asthmatics differed

significantly from comparison groups in their temperamental profile, which they characterized as low rhythmicity, lower adaptability, lower intensity of reaction, and lower mood value, all of which correspond to a "slow to warm up" profile.

Summary

While psychological factors have been identified as an integral component of the etiology and course of asthma, there is no agreement in the literature regarding how these factors influence illness. This section has attempted to review the literature pertaining to studies investigating psychological factors most often associated with bronchial asthma. These include neuroticism or general level of pathology, dependency, anxiety, depression, anger, and alexithymia. Although not definitive, the research does strongly suggest that these factors are present in child and adult asthmatics and appear to increase in intensity with severity of illness. Paradoxically, however, a segment of the most severe subgroup (as measured by medication level) often score low on anxiety, depression, and anger on self-report measures and tend to exhibit a "pseudonormality." This has been alternately attributed to a possible physiological inability to experience or express feelings and a highly repressive defense style.

Socio-environmental Factors Implicated in Asthma

No investigation into the effects of asthma as an illness would be complete without considering the context of the family and other social stressors. The existence of emotional stimuli that originate in the family influencing the maintenance of asthmatic symptoms has been well documented.

French and Alexander (1950) were among the first to stress the importance of the mother-child interaction in the development of asthma symptoms. They suggested that the central nuclear conflict in asthmatics is an excessive, unrelenting dependence upon the mother and wish to be protected. They noted the history of maternal rejection in the lives of a substantial number of their asthmatic patients as a recurrent motif. Rejection by the mother leads to increased feelings of insecurity and increased clinging to the mother. In other cases, mothers of asthmatics have been found to push their child prematurely toward independence--a situation that results in increased insecurity and dependent clinging.

Research examining this special mother-child relationship has generally supported French and Alexander's hypothesis. Long (1958) showed that, of 19 asthmatic children separated from their families through a short hospitalization, 10 showed no signs of respiratory

disturbances even after being exposed to high concentrations of dust from their homes.

Similarly, the "parentectomy" literature (separating a child temporarily from his family by hospitalization) documents the vast improvements which can take place when the child is no longer in the family environment and the later return of symptoms when he/she is returned (Bernstein, 1963; Peshkin, 1959; Robinson, 1972; Purcell, 1969).

Owen (1963) measured the respiration of children between the ages of 3 and 13 while they listened to recordings of their mother's voice and the voice of a stranger. Results showed that, regardless of the tone of the voice, asthmatic children showed more abnormal respiratory patterns when listening to their mother's voice than when listening to that of a strange woman.

Pinkerton (1971), in a study of 100 asthmatic subjects, found that 86% of mothers of hospitalized asthmatic children had patterns whose attitudes toward their asthma fell at one extreme or the other of the overprotective-rejecting spectrum.

Dirks, Paley, and Fross (1978), in a retrospective study with 68 adult intractable asthmatics, found that those who scored high on the Kinsman panic-fear assessment inventory grew up in family environments which were perceived as unstable and chaotic with a constant threat of separation. The child experienced the family as

overprotective and was not allowed to confront and successfully resolve challenging problems in his/her life by his/her own efforts. In contrast, those at the low end of the panic-fear spectrum were found to have experienced overt rejection and many real parental separations. This environment resulted in helping to produce a counterdependent asthmatic who downplays symptoms and refuses medical care.

In a multicorrelational study, Steinhausen, Schindler, and Stephan (1983) examined the significance of family disturbance in a group of asthmatic, cystic fibrotic, and matched controls (N = 36 each). The investigators found that, in the asthmatic group only, the most powerful item in the multiple correlation proved to be disturbances in normal family functioning, particularly family problems, and disturbed parental behavior and marital relationship.

Much has also been written in the asthma literature about the "asthmato-genic" mother. Jessner (1955) describes the asthmatic child's mother as a woman who herself has not resolved her own conflicts about individuality and dependence with her own mother and repeats the same relationship with her child. The still active conflict between dependence and independence and closeness and distance is transferred to the child. She rejects him/her when he/she attempts to be autonomous and overprotects him/her when he/she becomes ill and dependent.

Purcell (1960), studying two groups of children sent to a residential treatment center for chronic, intractable asthma, found that mothers of the rapidly remitting children (those whose symptoms immediately abated upon admission to the hospital) score significantly higher in authoritarian control and hostility-rejection.

Rees's (1963) studies, too, showed, in more than half the families of 160 examined asthmatic children, an "unsatisfactory" parental attitude toward the children, which included overt rejection, demand for perfection, and overprotection.

Block, Jennings, and Harvey (1964), in a study of 62 asthmatic children, found that, in low APS children (those not found to be allergic), mothers tended to be more fearful, vulnerable, anxious, insecure, and felt uncomfortable in their relationship with other people. These mothers were described as more competitive with their children, more perfectionistic, more angry with their child, and more rejecting and depriving.

Davis (1977), in a controlled population study of 111 families of children with asthma and a group of normal controls, found a significant difference in the level of depression--45.4% in mothers of asthmatic children, versus 27.5% in controls.

The newer approach, however, is not to single out the mother, but to focus on the dynamics of the family as a

whole and the role of dysfunctional characteristics of the family system. Various studies have identified the following family dynamics as typical in intractable asthmatic families (Peshkin & Tuft, 1975; Liebman, Minuchin, & Baker, 1974; Onnis, Tortolani, & Caveroni, 1986):

1. A high degree of enmeshment, with family members being overinvolved and overresponsive to one another, decreasing the autonomy and privacy of each individual;
2. A high degree of parental overprotectiveness resulting in a decrease in extrafamilial relationships and activities for the asthmatic child;
3. Rigidity, where the family presents itself as being completely normal without problems and denies the need for change;
4. A low threshold for overt conflict. Confrontations involving differences of opinion and issues of autonomy are avoided, resulting in a chronic state of submerged unresolved conflict.

The dysfunctional set often noted in asthma families is a strong alliance between mother and patient with an excluded angry, peripheral father. When the father disciplines or criticizes his child, the patient becomes upset and develops an asthma attack, which results in driving the father away and calling the mother and siblings in to protect the child. In a review of childhood deaths due to asthma, Fritz, Rubenstein, and Lewiston note that the

lack of a supportive family environment, where asthma often gets entwined with other conflicts, is especially significant as a bad prognostic indicator for possible morbidity when associated with severe asthma.

Aside from familial factors, other environmental considerations have also been examined. Of prime importance is the "somato-psychic" component of asthma; in other words, the impact of the illness itself on causing psychological disturbance in the individual and family. Asthma can have a negative effect on development as it influences many aspects of a child's life. Significantly asthmatic children are subject to levels of extraordinary stress that are unprecedented in the life of a healthy child. The fear and discomfort of difficulty breathing and trips to the emergency room can lead to pervasive anxiety in the child and parents. Many medical procedures and drugs are painful and uncomfortable. Sedative side-effects of some medications can impair learning even when a child is not actually absent from school. Steroids may alter physical appearance, so important to the adolescent's self-image. Periodic illness may cause school absences and impair academic performance. Physical activity and athletic participation may be restricted and the individual may be excluded from social activities of peers because of their illness. The asthmatic child may also have difficulty with other family members who resent the attention and the

economic burdens that asthma entails (Fritz, 1983; Thompson & Thompson, 1985).

Several studies have corroborated the role of illness-produced life stressors in exacerbating asthma both physically and emotionally (Araujo, Arsdale, Holmes, & Dudley, 1973; Teiramaa, 1981).

Summary

This section has reviewed socio-environmental factors implicated in asthma. This was broken down into research looking at the parent-child relationship in terms of conflict over separation and dependence versus independence, and particular family dynamics identified in asthmatic families. The particular profile of the mother of an asthmatic child was also discussed. Finally, the role of the life stressors, particularly the effects of the illness itself on emotional development, was examined.

Treatment Issues

While drugs are the mainstay of therapy for asthmatic children and adults, there are a number of treatment approaches available to deal with psychologic factors which may cause, maintain, or be associated with asthma. The treatments currently available range from psychoanalysis and psychotherapy to family or group therapy, to behavior therapy.

Psychotherapy and psychoanalysis were the earliest primary forms of treatment available. This form of therapy makes sense from the point of view of dealing with mother-child relationships and intrapsychic conflicts. However, results have been, on the whole, quite disappointing. Goodman and Turpin (1986) suggest that in a large number of cases this may not be the right treatment modality. Meta-analysis of studies of asthmatic patients in individual psychotherapy have been unable to document the efficacy of the procedure.

Another procedure often used is hypnosis and suggestion. Treatment usually consists of four to eight sessions where trance is induced, followed by either direct or indirect suggestion tailored to the particular asthma precipitants experienced by the patient. Usually, the patient will be taught to employ self-hypnosis and learns to hypnotize him- or herself employing autosuggestion while in the trance state whenever asthma symptoms occur. Hypnosis and suggestion have been found to be one-half as effective as medication alone in alleviating bronchoconstriction (Goodman & Tupin, 1986).

The most utilized treatment modality today is different forms of behavior therapy. These include relaxation training, biofeedback, systematic desensitization, and assertiveness training. While there are many individual reports of excellent results using these interventions, a

comprehensive review of the literature by King (1980) does not corroborate this. The lack of positive findings in relation to the behavioral treatment of asthma seems to suggest that behavior intervention strategies have produced a questionable level of relief, and the author concludes that the behavioral management of childhood asthma is not encouraging.

In a different vein, Kingsman, Dirks, Jones, and Bablem (1980) suggest that anxiety reduction through relaxation, biofeedback, etc., may actually be contraindicated in certain segments of the asthma population. Decreasing illness-specific anxiety or vigilance toward symptoms may actually make the patient worse by encouraging him/her to disregard his/her physical symptoms.

It is both surprising and puzzling to note that, in a review of the literature on therapeutic interventions for asthma, only one cognitive-restructuring study could be found. Gaes and Schlosser (1988) recently undertook a pilot intervention study to examine the effects of a combination of health education and rational-emotive therapy in attempting to alter coping behavior in adult asthma patients and to influence emotional distress and use of medical resources. The results of this study are quite promising. It was found that patients who received the program became less preoccupied with their asthma and reported significantly less emotional distress (anxiety and anger) in

daily life. In addition, they used less maintenance medication, i.e., corticosteroids.

Summary

This section has briefly reviewed some of the treatment modalities currently used in conjunction with medication for the treatment of asthma. The efficacy of behavioral interventions such as relaxation training, biofeedback, or assertiveness training has proved to be questionable. Anxiety reduction in and of itself may even be counterproductive. A promising, but as yet relatively untried, modality for the treatment of asthma is a cognitive restructuring approach which focuses on altering appraisal and coping styles. The cognitive view, that only long-term modification of cognitive processes will achieve a lasting elimination of psychosomatic stress and emotional suffering, is much more likely to get results than other modalities.

CHAPTER III

METHODS

This chapter presents the methods implemented to conduct this research. It includes: (1) research questions and theoretical hypotheses, (2) research design and statistical procedures, (3) selection of subjects, (4) selection of instruments, and (5) a summary.

RESEARCH QUESTIONS AND THEORETICAL HYPOTHESIS

This study was based on Tosi's (1974) Cognitive Experiential Therapy's (CET) dynamic systems model, which describes the reciprocal influences of social and physiological forces in the production of behavior. CET research has empirically demonstrated statistical relationships among cognitive, affective, and physiological factors in adults with migraine, ulcer, lower back pain, and hypertension. The present study attempted to extend this research by exploring the cognitive-emotional complex present in a new population--adolescents with asthma.

The following research questions were investigated:

1. Is there a difference in the cognitive-emotional complex related to asthma in adolescents identified as

having different levels of severity of illness when examined in relation to each other and to a nonasthma comparison group?

2. Is there a difference in the cognitive-emotional complex associated with male and female adolescents?

3. Is there a difference in the cognitive-emotional complex associated with early (12 to 14 years) and late (15-18 years) adolescents?

4. Is there an interaction effect between:

- a) group and sex of subjects;
- b) group and age of subjects;
- c) sex and age of subjects?

5. Is there a difference in the cognitive-emotional complex associated with SES in adolescents identified as having different levels of severity of illness when examined in relation to each other and to a nonasthma comparison group?

Based on the description of asthmatic populations of children and adults found in the literature, it was hypothesized that adolescents who differ along the line of severity of illness would also differ in the way in which they endorse irrational beliefs and self-descriptors of anxiety, depression, and hostility.

RESEARCH DESIGN AND STATISTICAL PROCEDURE

The research design for this study was developed as a result of the theoretical framework as described in the Review of Literature. Treating asthma as a heterogeneous disease and placing it within the framework of the multidimensional Cognitive Experiential Therapy model, a multifactorial design and analysis approach was chosen.

All subjects were assigned to groups according to the presence and severity of asthma. The six factor scores of the CBS-RC (Perfectionism, Self-Downing, Blame Proneness, Importance of the Past, Importance of Approval, Control of Emotions) and the three scale scores of the MAACL (Anxiety, Depression, Hostility) were examined across treatment groups, sex, and age. The design was a 4 x 2 x 2 factorial design (Figure 2).

A Chi-Square test was conducted to examine how the asthma sample group compared to the national asthma population as a whole to ascertain representativeness of the sample. A Chi-Square statistic was also used to determine whether demographic differences between the groups were statistically significant. A test of homogeneity of treatment groups was conducted (Bartlett Test) in order to verify the comparability of groups prior to the MANOVA. The main statistical analysis involved a 4 x 2 x 2 multivariate

- A_1 Subjects with mild asthma symptoms
- A_2 Subjects with chronic asthma
- A_3 Subjects with severe, chronic asthma corticosteroid dependent
- A_4 Non-asthma comparison group
- B_1 Sex = male
- B_2 Sex = female
- C_1 Early adolescence (12-14)
- C_2 Late adolescence (15 -18)

Figure 2: A 4 x 2 x 2 Factorial Design

factorial analysis of variance (MANOVA) using Statistical Analysis System (SAS).

A multivariate factorial analysis was judged as the most appropriate form of analysis for this study because of its ability to simultaneously investigate main effects and interaction effects for the three factors involved, namely treatment group, sex, and age. It was decided to conduct a discriminant function analysis, including classification and Jack-Knife procedure, if the MANOVA indicated significant "group" effect. The purpose of the discriminant analysis and classification was to investigate the effectiveness of the selected weighted dependent variables in predicting group membership. Following this, univariate analyses of variance (ANOVAs) and Tukey's post hoc pairwise comparisons were conducted to identify the specific pairs of treatment groups that were different.

A separate factorial MANOVA (4 x 4) was conducted. This analysis identified four levels for SES and the four treatment groups.

SELECTION OF SUBJECTS

Asthma Group

The asthma subjects for this study were referred by Dr. Roger Friedman, 5977 Cleveland Avenue, Columbus, Ohio. Dr. Friedman is a pediatric allergy specialist in private

practice. A private practice population was selected because it was felt to be more representative of the asthma population as a whole in that it would include subjects representing the entire spectrum of asthma ranging from the most mild cases to the most severe. Previous asthma research has been criticized for using highly biased clinic or hospital study samples. The present researcher hoped to avoid this pitfall. All subjects participating in this study were between the ages of 12 and 18 and had been previously diagnosed by Dr. Friedman as having bronchial asthma. Diagnosis was made on the basis of three criteria: patient's descriptive history of wheezing, a physical exam, and a pulmonary function test which measured airway flow obstruction.

To ensure privacy and prior parent consent, a letter was initially sent to each patient's parents by Dr. Friedman describing the study and asking parent permission to participate (Appendix A). Those parents interested in having their children participate were asked to sign and send back an enclosed post card indicating consent. Initially, 176 letters were sent to prospective subjects. Of these, 141 postcards (80%) were returned indicating interest in participating in the study. Each subject was then sent a test packet consisting of a cover letter (Appendix B), a standard consent form (Appendix C), an Adolescent Information Questionnaire requesting information

about the subject's age, sex, grade level, education and occupation of parents, and asthma symptoms (Appendix D), a copy of the CBS-RC (Appendix E), a copy of the MAACL (Appendix G), and a stamped addressed envelope with which to return the test material. Four weeks following the mailing, a second letter was sent out to those subjects who had not yet returned the material (Appendix H). Of the 141 packets originally mailed, 129 (91%) were eventually returned.

Each subject was then assigned by the researcher to asthma groups based on level of severity of illness. Criteria for assignment to groups were chosen to provide an overall index of asthma severity and were selected on the basis of a review of the current asthma research (see Literature Review, Chapter II). Criteria used in classifying subjects included the following:

- 1) Type of medication used;
- 2) Frequency of medication used;
- 3) Number of medications used;
- 4) Number of asthma attacks experienced in the past 12 months;
- 5) Prior and current history of hospitalization and emergency room visits;
- 6) Prior history of cortico-steroid medication use;
- 7) Number of weeks of school missed due to asthma in the past 12-month period.

Classification of subjects yielded the following groups (degree of severity increases from group A₁ to A₃):

A₁ asthma group. This group (n = 41) was composed of 25 (61%) males and 16 (39%) female subjects (see Table 6a and 7a). Twenty-five (61%) were between 12 and 14 years old (early adolescence) while 16 (39%) were between 15 and 18 years old (late adolescence). The subjects ranged from upper-middle class to lower-lower class. In terms of their asthma, all subjects in this group had either indicated that they had not used any medication in the last 12 months or only used it occasionally when necessary. The majority (31/41) had not suffered any asthma episodes in the last year and none had been hospitalized or received emergency room treatment in the past 12-month period. Nearly all subjects (38/41) indicated that they had missed less than 2 weeks of school due to asthma in the past year. However, almost half the subjects had a previous history of hospitalization or emergency room visits and nearly 25% reported using cortico-steroid medication in the past. This suggests that a substantial portion of the A₁ group had, at one time, suffered from more serious forms of asthma.

A₂ asthma group. This group (n = 34) was composed of 16 (47%) males and 18 (53%) females (see Table 6b and 7b). Twenty-three (68%) were classified as early adolescents while 11 (32%) were classified as late adolescents. The

TABLE 6
Descriptive Data on the Subject Samples

DEMOGRAPHIC DATA

A₁ ASTHMA GROUP

Variable	Code	Frequency	Percent
N	41	--	
Sex*	1	25	61
	2	16	39

Age**	1	25	61
	2	16	39

SES***	1	19	46
	2	9	22
	3	11	27
	4	2	5

* 1 = male; 2 = female

** 1 = 12 -14; 2 = 15 - 18

*** 1 = upper middle class; 2 = lower-middle class
 3 = Upper-lower class 4 = lower-lower class

(Adler, 1973, used two formal criteria to determine an individual's social position - education level and occupation. Based upon Adler's formal criteria, Upper-middle class includes, 13 years of school or over and professional or managerial occupations. Lower-middle class includes high school and trade occupations. Upper-lower class includes 6 - 9 years or less and laborer occupations. Lower-lower class includes less than 6 years and unskilled labor or unemployed.)

TABLE 6, Continued

A₂ ASTHMA GROUP

Variable	Code	Frequency	Percent
N		34	--
Sex	1	16	47
	2	18	53

Age	1	23	68
	2	11	22

SES	1	11	32
	2	16	47
	3	6	18
	4	1	3

A₃ ASTHMA GROUP

Variable	Code	Frequency	Percent
N		54	--
Sex	1	34	63
	2	20	37

Age	1	33	61
	2	21	39

SES	1	29	53
	2	16	30
	3	8	15
	4	1	2

TABLE 6, Continued

A₄ COMPARISON GROUP

Variable	Code	Frequency	Percent
N		74	--
Sex	1	32	43
	2	42	57

Age	1	52	70
	2	22	30

SES	1	47	64
	2	17	23
	3	9	12
	4	1	1

TABLE 7
 ASTHMA VARIABLES
A₁ ASTHMA GROUP

Variable	Code	Frequency	Percent
N		41	--
Medication & Frequency*	1	41	
	100.0		
	2	0	--
	3	0	--

Number of Medications Used**	1	14	34.1
	2	18	43.9
	3	9	22.0

Number of Asthma Attacks in Past 12 Months***	1	31	75.7
	2	8	19.5
	3	2	4.9

History of Hospi- talization and/or Emergency Room Visits #	1	23	56.1
	2	18	43.9
	3	0	--

Previous History of Cortico-Steroid Medication ##	1	41	75.9
	2	13	24.1

Number of Weeks of School Missed Due to Asthma in Last 12 Months ###	1	38	92.7
	2	3	7.3
	3	0	--

*1=none; 2=daily (non-cortico-steroid); 3a=occasional use;
 3b=daily use

**1=none; 2=one medication; 3=two or more medications

***1= 0-2 asthma attacks; 2=3-9 attacks; 3=10 or more

1=never; 2=not in last 12 months; 3=at least 1 visit in
 last 12 months

##1=never; 2=taken previously

1=0-2 weeks; 2=3-5 weeks; 3=more than 5 weeks

TABLE 7, Continued

A₂ ASTHMA GROUP

Variable	Code	Frequency	Percent
N		34	--
Medication & Frequency	1	0	--
	2	34	
	100.0		
	3	0	--

Number of Medications Used	1	0	--
	2	12	35.3
	3	22	64.7

Number of Asthma Attacks in Past 12 Months	1	23	67.6
	2	7	20.6
	3	4	11.8

History of Hospi- talization and/or Emergency Room Visits in Past 12 Months	1	21	61.7
	2	5	14.7
	3	8	23.6

Previous History of Cortico-Xteroid Medication	1	26	77.5
	2	8	23.5

Number of Weeks of School Missed in Last 12 Months Due to Asthma	1	27	79.4
	2	5	14.7
	3	2	5.9

TABLE 7, Continued

A₃ ASTHMA GROUP

Variable	Code	Frequency	Percent
N		54	--
Medication & Frequency	1	0	--
	2	0	--
	3 _a	12	22
	3 _b	42	78

Number of Medications Used	1	0	--
	2	6	11.1
	3	48	88.9

Number of Asthma Attacks in Past 12 Months	1	23	42.6
	2	24	44.4
	3	7	13.0

History of Hospi- talization and/or Emergency Room Visits	1	17	31.5
	2	17	31.5
	3	20	37

Previous History of Cortico-Steroid Medication		N/A	

Number of Weeks of School Missed in Last 12 Months Due to Asthma	1	43	79.6
	2	8	14.8
	3	3	5.6

subjects again ranged from upper-middle class to lower-lower class. All subjects were on a daily regimen of 1 or more non-corticosteroid medications. The majority (23/34) had had less than 2 asthma episodes in the last year. However, unlike group A₁, 7 subjects (21%) had experienced 3 to 9 asthma attacks, and 4 (12%) had experienced 10 or more in the past year. Almost one-quarter of the group (3/34) had been hospitalized or received emergency room treatment in the past year, and a larger proportion as compared to A₁ (21%) had missed more than 2 weeks of school. Because of the frequency of medication and the increased number of asthma attacks, current history of hospitalization and days of school missed, this group may be characterized as containing chronic, drug-dependent, and more seriously ill asthma subjects than group A₁.

A₃ asthma group. This group (n = 54) was composed of 34 (63%) males and 20 (37%) female subjects (See Table 6c and 7c). Thirty-three (61%) were early adolescents and 21 (39%) were late adolescents. The majority (29/34) were upper-middle class. All subjects were on cortico-steroid medication, usually in combination with other drugs. Most (78%) were on these medications 1 or more times a day. The majority (31/54) had experienced 3 or more asthma attacks in the past 12-month period. Seven of these subjects had experienced at least 10 and as many as 250 attacks over the

past year. Over one-third (20/54) reported current hospitalization or emergency visits and twenty percent (11/43) reported missing over 3 weeks of school due to asthma in the past year. Because cortico-steroid medication can present considerable side effects, it is only prescribed for the most severe, chronic asthmatics. Further indications of greatest severity for this group as compared to groups A₁ and A₂ include the larger number of asthma attacks, hospital and emergency room visits, as well as days of school lost due to illness.

Comparison Group

The comparison sample consisted of adolescent dental patients, ages 12 to 18, presenting for routine preventive or orthodontic care in the office of Dr. David Silverglade, 5320 E. Main St., Columbus, Ohio (see Tables 6d and 7d). Dr. Silverglade is a pediatric dentist in private practice. This particular population was selected because it was convenient, accessible, and would approximate the experimental group's demographic variables. It was important to exclude any subjects who might suffer from chronic medical problems and yet to have immediate access to medical records. It was also important to have a situation where the parent was present with his or her adolescent so immediate prior consent could be given. This dental

population met these conditions. During the dental visit, each patient's parent was asked to read a letter (Appendix I) describing the study. If the parent agreed, each interested patient was given a test packet which was filled out in the office following the dental appointment. All comparison group subjects were briefly interviewed and their medical records checked to eliminate any prospective subjects with asthma, other respiratory disorders (cystic fibrosis, infantile emphysema), as well as other chronic illnesses including migraine, diabetes, heart disease, ulcerative colitis, lower abdominal pain syndrome, or eczema. Final (n) for the comparison group was 74.

All data for both asthma and comparison group was collected between March and May, 1989.

SELECTION OF INSTRUMENTS

To test the model that formed the rationale for the study, two instruments were selected. The Common Beliefs Survey--Revised for Children was chosen to measure irrational beliefs and the Multiple Affect Adjective Checklist was chosen to measure three affective variables commonly identified in the asthma literature as characteristic of asthmatics--anxiety, depression, and hostility.

CBS-RC

Few scales have been developed to measure irrational beliefs in children and adolescents. The scales currently available offer limited reliability and validity data, and information related to norms is nonexistent. The CBS-RC, developed by Wise and Schultz (1987), on the other hand, while a new instrument, is based on Bessai's (1978) Common Beliefs Survey-III (Appendix F), which has been utilized quite extensively in the CET literature and has been found to be sensitive to changes in irrational beliefs following cognitive interventions. In addition, the CBS-RC, like its parent instrument, the CBS-III, is a rationally constructed test in which items selected are based on a theoretical framework which attempts to explain behavior. A primary advantage of the rationally constructed test is its utility in providing implications for intervention based on the underlying theory upon which the test is built (Kline, 1986). This was an important consideration for the present study since one of its goals was providing findings which could be used for formulating intervention strategies with asthmatics. A replication study of the factor structure of the CBS-III by Tosi, Forman, Rudy, and Murphy (1986) concluded that the instrument has strong factorial validity that provides evidence for its theoretical structure.

Description

The Common Beliefs Survey--Revised for Children is a self-administered, objectively scored diagnostic instrument designed to measure the general belief patterns of children and adolescents (Appendix E). In addition to a total score, which indicates general level of irrationality, the CBS-RC has the added advantage of measuring specific levels of irrational thinking on six separate scales.

Developed by Wise and Schultz (1987), the CBS-RC is based on Bessai's (1978) Common Beliefs Survey-III. The CBS-III was chosen as a basis for revision because it was developed to address weaknesses in other instruments used to assess irrationality and appears to have statistical and theoretical validity. Bessai pooled and refined nine already existing attitude surveys into one 54-item inventory. CBS-III items are scaled on a five-point format ranging from strongly agree to strongly disagree. The CBS-III contains two scales and six factors, each scale consisting of three factors. The Evaluation scale consists of three factors: Blame Proneness, Self-Downing, and Perfectionism. The Locus of Control scale consists of three factors: Importance of the Past, Importance of Approval, and Control of Emotions.

The second order factor, "evaluation," can be defined as a tendency to evaluate self, others, and life, and to place great importance on the evaluations of others. This

factor corresponds to the belief that a general sense of self-worth and worth of others can be rated based on specific performance. The second order factor, "locus of control," reflects the belief that individuals can do little to control their emotions, that the past will continue to affect a person's feelings and action in the present, and that support and approval from others is necessary. The summation of both second order factors provides a total score which is considered to be a general estimate of irrationality.

The six primary factors which are part of the two higher order factors reported by the CBS-III are:

perfectionism - This factor represents four of Ellis's irrational belief statements: the belief that one should be completely competent, the belief that one should be able to find good solutions to life's difficulties quickly, the belief that everything should always go the way an individual wants them to go, and the belief that people should turn out better than they do.

self-downing - This factor reflects an individual's tendency to feel guilty, depressed, or anxious about perceived personal failure.

blame proneness - This factor corresponds to the belief that people can be rated based on their actions.

importance of the past - this factor corresponds to the

belief that those things which have happened in the past are all important and that past events which have influenced a person will continue to have an effect on the way that person currently feels and behaves.

importance of approval - This factor reflects the belief

that approval is not only desirable but it is a necessity.

control of emotion - this factor corresponds with the belief

that unhappiness comes from external sources and that individuals have little control over the way they feel.

The CBS-RC has been developed, in part, to deal with the question of how and to what extent the relationship between irrational beliefs and disturbances in adults is replicated in a child/adolescent population. According to Schultz (1988), the CBS-RC was revised according to Cattell's considerations for age adaptation of a psychological test. Following rewriting of items, the Dale-Chall readability was reduced from tenth-grade reading level for the CBS-III to fifth-grade reading level for the CBS-RC. Due to reduced attention span, test length was reduced to 42 items from 54 items. The likert response format was retained with higher numbers associated with stronger degrees of belief. Although Bessai's (1978) CBS-III had approximately equal numbers of rationally and irrationally

stated items, each factor was not evenly divided between items stated one way or the other. This resulted in some factors being comprised of almost all rational or irrational statements on each of the factor scales. In contrast, the CBS-RC has approximately equal numbers of rational and irrational statements on each of the factor scales. Each of the factor scales is composed of seven items, three or four of which are stated irrationally.

Attention was also devoted to rewriting items to be as clear and unambiguous as possible. Examples from Bessai's (1978) CBS-III (a) and related items from the CBS-RC (b) are provided.

- 1 (a). There is invariably a right, precise, and perfect solution to human problems and it is terrible when this perfect solution isn't found.
(b). For most questions, there is one right answer.
- 2 (a). One can't help getting down on oneself when one fails at something.
(b). People don't have to put themselves down when they fail.
- 3 (a). Human unhappiness is not externally caused and people have the ability to control their sorrows and disturbances.
(b). People cannot control their feelings.

The new CBS-RC was then administered to a group of 400 middle school children. Children were able to comprehend

and respond to the items with minimal assistance. Responses gathered from the pilot study were submitted to the item homogeneity method of analysis. Pearson correlation coefficients were also obtained. Results from item homogeneity analysis and correlation coefficients supported the six-scale structure of the CBS-RC. Items were found to load on the anticipated factor scales, and scales appeared to be reasonably independent from one another. The structure which emerged based on analysis of the educational group data replicated Bessai's (1978) CBS-III. Item loadings and correlation coefficients can be found in Appendices J and K.

A multivariate analysis of variance (MANOVA) was completed on the responses from the middle school sample examining scores on the six scales of the CBS-RC across age, race, grade, and sex. No significant differences emerged based on grade or race. Effects were found for age and sex, with level of endorsement declining with increasing age. Means and standard deviations for the middle school group can be found in Appendix L.

The CBS-RC appears to have retained the positive qualities which made the CBS-III an advantage over other available measures of irrationality. Results of the pilot study suggest the instrument is appropriate for use with children and adolescents.

In order to evaluate the generalizability of the data collected in the present study with asthmatic and nonasthmatic adolescents, the GENOVA (General Purpose Analysis of Variance system) program was utilized. This program, based on the theory of generalizability, calculated a Cronbach's alpha for the data. Cronbach's alpha is a measure of internal consistency, which is a form of reliability. With a total of 42 items, seven per scale, a generalizability coefficient of .78 was obtained. Such a level of reliability is considered acceptable, and indicated participants responded to the items in a consistent manner.

MAACL

The Multiple Affect Adjective Check List--In General (MAACL) was selected to examine the relationship between beliefs and three major concomitants of irrationality: anxiety, depression, and hostility (Appendix G). The MAACL was chosen because of its low reading level, which would accomodate the younger subject, its ease in administration, and its brevity, which was an important feature, again keeping in mind the shorter attention span of the early adolescents. As a research tool, the MAACL has been used extensively in hundreds of investigations which have established construct validity for the instrument. It has

also been found to have good split-half and re-test reliability.

Description

The MAACL--In General is a brief self-report trait measure of three negative affect conditions. Originally designed by Zuckerman and Lubin (1965), it consists of 132 adjectives at or below eighth-grade reading level, listed alphabetically. Scores are obtained when subjects check how they "generally" feel.

The MAACL is an extension of the Affect Adjective CheckList (1960). The present form includes 21 items which measure anxiety (i.e., afraid, nervous, shaky), 40 items which measure depression (i.e., blue, sad, unhappy), 28 items which measure hostility (i.e., angry, disagreeable, mad), and 43 buffer items which are not scored on any of the three scales. The Anxiety and Depression scales were empirically derived by contrasting criterion samples of anxious and depressed psychiatric patients with normals. The Hostility scale was derived by selecting those adjectives endorsed significantly more often by a group of female subjects placed in a hypnotically-induced state of hostility than by female subjects not in a hostile state.

These include studies of stress and stress reduction, diagnosis and treatment of psychological disorders, and in basic research on personality and emotions. According to

the *Seventh Mental Measurements Yearbook* (1972), the three scales of the MAACL appear to have sufficient differential validity to reflect meaningful changes in affect for groups of subjects subjected to different types of stresses and stress-reducing manipulations. Studies have also been performed to relate the MAACL scales to clinical observations and other psychological tests. By and large, the results of these investigations indicate that the Anxiety and Depression scales do correlate with clinical ratings and other objective personality test measures. The convergent validity of the Hostility scale, however, appears to be less adequate.

In regard to reliability, split-half reliabilities for the General form range from .17 to .92 (median .72) for different groups of subjects. Re-test reliabilities (7-8 days) tend to be moderate, with .70, .65, and .54 for the Anxiety, Depression, and Hostility scales, respectively.

SUMMARY

Chapter III has presented a review of the research questions and theoretical hypotheses, the research design and statistical analysis used in this study, a description and method of selecting the sample, the process of data collection, and a description and rationale of the use of the two psychometric instruments: Common Beliefs Survey--

Revised for Children and the Multiple Affect Adjective
CheckList. Chapter IV will present the analysis of the data
and the findings of the study.

CHAPTER IV

ANALYSIS OF THE DATA

This chapter presents a discussion of the analysis of the data based on the hypotheses stated in Chapter III. Of primary concern were how mean vector scores on the Common Beliefs Survey--Revised for Children and the Multiple Affect Adjective Checklist change across three experimental asthma groups and one nonasthma comparison group. Possible main effects for sex, age, and socio-economic status (SES), and interaction effects were also considered.

STATISTICAL PROCEDURES

The following statistical analyses were conducted: 1) a Chi-square statistic to test representativeness of the sample; 2) a Chi-square statistic to assure comparability of groups; 3) a Homogeneity of Variance to ascertain if the variances of the observations in the populations of all four groups were equal; 4) a 4 x 2 x 2 multivariate analysis of variance (MANOVA) examining group, sex, age, and interaction effects on the criterion variables; (5) follow-up discriminant function analysis, classification, and Jack-Knife procedure to investigate effectiveness of classifying

subjects by group according to the predictor variables; 6) univariate analyses (ANOVAs) and Tukey's post hoc pairwise comparisons; 7) a 4 x 4 multivariate analysis of variance examining the effect of SES on group differences.

CRITERION VARIABLES

CBS-RC (Beliefs) - These variables assessed the cognitive domain. The following six subscales compose this cognitive measure:

- Factor 1 - Perfectionism
- Factor 2 - Self-Downing
- Factor 3 - Blame Proneness
- Factor 4 - Importance of the Past
- Factor 5 - Importance of Approval
- Factor 6 - Control of Emotion

MAACL (Emotions) - These variables assessed the affective domain. The following three subscales composed this affective measure:

- Factor 7 - Anxiety
- Factor 8 - Depression
- Factor 9 - Hostility

DESCRIPTION OF THE SAMPLE

Data was collected from a non-random purposive sample composed of 203 subjects who met the criteria of the study

and agreed to participate. All participants were from Columbus, Ohio, or the nearby vicinity. The study consisted of 107 males and 96 females. One hundred thirty-three were categorized as early adolescents (ages 12 to 14), 70 were categorized as late adolescents (ages 15 to 18). One hundred six subjects were categorized as upper-middle class; 58 subjects were categorized as lower-middle class; 34 subjects were categorized as upper-lower class; and 5 subjects were categorized as lower-lower class.

To investigate the representativeness of the sample as compared to the asthma population as a whole, a Chi-Square test was done. National statistics were derived from the latest Current Estimates from the National Health Interview Survey (1987), which is provided by the U.S. Department of Public Health. This procedure had several limitations. No statistics on demographic variables were provided on adolescents per se. The figures therefore represent all asthmatics 45 years old or younger. No statistics were available on the composition of asthma patients being seen in a private practice setting as opposed to asthma patients who use a hospital for their primary care or who do not receive regular care for their asthma at all. Statistics derived from the present National Study are simply based on the question asked by the interviewer, "Has anyone in your family ever been told by a physician that he/she had asthma

and/or frequent problems with wheezing in the past 12 months?"

The demographic variables used to investigate comparability were limited to sex and SES (see Table 8). Results show that the asthma sample group is comparable to the national group on sex $X^2 (1, n = 129) = .208, p > .05$ but is significantly different from the national figures on SES $X^2 (1, n = 129) = 40.68, p < .001$. The sample population is overrepresented in the middle-class categories and is underrepresented in the lower-class categories. This may be expected in a group of patients seeking services from a specialist. These differences may somewhat limit generalizability of findings of this study to asthmatics as a whole.

A Chi-square statistic was computed on demographic variables (Table 9) and found no significant differences between the groups on the variables sex, age, and SES.

A Homogeneity of Variance analysis found that the variances of the observations in the populations of all four groups were equal (Bartlett $F = .83, p = .64$).

MULTIVARIATE ANALYSIS OF VARIANCE

A $4 \times 2 \times 2$ MANOVA was used to evaluate the null hypotheses of the study.

TABLE 8
FREQUENCY DISTRIBUTION OF NATIONAL AND STUDY SAMPLE
SEX BY GROUP

	1	2
MALES	3,654,000 53%	75 56%
FEMALES	3,241,000 47%	54 44%
Total	6,895,000	129

Chi square = .208 (p > .05)

SES by Group

	1	2
Uppper Middle	2,222,000 36%	59 46%
Lower Middle	1,574,000 26%	41 32%
Upper Lower	1,302,000 21%	25 19%
Lower Lower	1,004,000 17%	4 3%
TOTAL	6,895,000	129

Chi Square = 40.679 (p < .001)

Group

The multivariate analysis of variance for differences in group main effects was found to be significant. $F(3, 187) = 1.71$; $p < .05$. A post hoc pairwise comparison of groups using Tukey's Studentized Range (HSD) statistic found significant differences ($\alpha = .05$) between group means for groups A_2 and A_4 (M difference = 4.28); A_3 and A_4 (M diff. = 4.48); A_1 and A_2 (M diff. = 2.99); and between A_1 and A_3 (M diff. = 3.19). Therefore, null hypothesis 1 was rejected. These results indicate that subjects characterized by more chronic, severe asthma are significantly different from subjects who suffer from a milder constellation of symptoms and are also significantly different from nonasthmatic subjects. Those subjects suffering from milder forms of asthma were not significantly different from the normal comparison group. This finding supports the current trend of asthma research in treating asthma as a heterogeneous disorder and subdividing subjects on the basis of severity of illness.

Sex

The multivariate analysis of variance for differences in sex main effects was not found to be significant. $F(1, 187) = 1.41$, $p > .05$. The null hypothesis for sex was therefore accepted. This finding, that there are no differences in irrationality between males and females, is corroborated by the majority of research which has examined

TABLE 9
FREQUENCY DISTRIBUTION OF GROUPS BY
AGE, SEX, AND SES

AGE BY GROUP*

	1	2	3	4	TOTAL
early adolescence	25	23	33	52	133 65.5%
late adol.	16	11	21	22	70 34.5%

Chi-Square = 1.647 (p > .05)

SEX BY GROUP

	1	2	3	4	TOTAL
Male	25	16	34	32	108 53.0%
Female	16	18	20	42	95 47.0%

Chi Square = 6.497 (p > .05)

SES BY GROUP

	1	2	3	4	TOTAL
Upper Middle	19	11	29	47	106 52.2%
Lower Middle	9	16	16	17	58 28.6%
Upper Lower	11	6	8	9	34 16.8%
Lower Lower	2	1	1	1	5 2.4%

Chi Square = 15.210 (p > .05)

gender differences and irrational beliefs. While it has been documented that women in Western cultures have higher rates of affective and anxiety disorders in both clinical and nonclinical populations, this does not appear to be the case with the present sample of adolescents.

Age

The multivariate mean vector differences of groups for the age main effect was not significant and could be accounted for by chance alone. $F(1, 187) = .88, p > .05$. Null hypothesis 3 was therefore accepted. The data suggests that, for this sample, age is not an important factor in irrational thinking as measured by the CBS-RC or emotionality as measured by the MAACL.

This finding is not entirely consistent with developmental theory or the existent empirical research which suggests that irrational ideas in childhood are largely the product of cognitive limitations and that most children and adolescents discard many of these irrational beliefs as they grow older. It is possible that the division of the present sample into "early" and "late" adolescent categories was too broad and not sufficiently sensitive to age differences. Results may have been different if the age of subjects was examined by grade level. It is also possible, however, that, since most adolescents have already reached the formal operational

period, no significant differences in irrationality were found because none exist at this stage of cognitive development.

Interaction

Multivariate analysis of variance of overall difference for an interaction effect between group and sex was not significant and could be accounted for by chance alone. $F(3, 187) = 1.41, p > .05$. Similarly, no significant interaction effect was found between group and age. $F(3, 187) = .91, p > .05$; or between sex and age, $F(1, 187) = 1.22, p > .05$. Therefore, null hypothesis (4), for interaction effects, was accepted. Any differences found between the four groups was not the result of the sex or age of the subject.

DISCRIMINANT ANALYSIS

Following the MANOVA, a discriminant analysis was conducted to construct discriminant functions. One discriminant function was found to be statistically significant and accounted for 100% of the variance. Table 10 presents the standardized coefficients related to the nine factors for this discriminant function, as well as the correlations between the dependent and canonical variables.

TABLE 10
STANDARDIZED COEFFICIENTS FOR
SIGNIFICANT DISCRIMINANT FUNCTION AND CORRELATIONS
BETWEEN DEPENDENT AND CANONICAL VARIABLES

Factor	Name	Coefficient	r
1	Perfectionism	-.27	-.26
2	Self-Downing	.48	-.06
3	Blame Proneness	.09	-.04
4	Importance of the Past	-.23	-.35
5	Importance of Approval	-.59	-.59*
6	Control of Emotions	-.25	-.38
7	Anxiety	-.43	-.66*
8	Depression	-.45	-.59*
9	Hostility	.26	-.40

Function 1 is a bi-polar dimension with a high score in Importance of Approval at the negative end and a low score in self-downing at the positive end. This seems to be a maladaptive/dysfunctional versus adaptive/functional dimension describing cognitive-emotional processes.

The Structure Matrix, which identifies the scales most correlated with the discriminant function, reveals a significant relationship for Factor 5, Importance of Approval; Factor 7, Anxiety; and Factor 8, Depression.

These appear to be the variables which best describe Function 1.

Figure 3 plots the centroids of the four treatment groups. Centroids are multivariate mean vectors and are analagous to the means utilized in a univariate analysis of variance. The centroid is obtained by averaging scores across all variables.

Figure 3. 4 Treatment Groups in 1-D Discriminant Function Space

The comparison group (A₄) is highest on this discriminant function whereas the two chronic asthma groups (A₂, A₃) are at the lowest and at the extreme negative end. Figure 3 shows that A₂ and A₃ are characterized by a decidedly dysfunctional cognitive-emotional complex. They are distinctly different from A₁ and A₄, which are characterized by an adaptive cognitive-emotional pattern. Figure 3 also indicates that A₁ and A₄ are most like each other.

The discriminant equation was then used to derive the probabilities of membership for each responder in the four

sampling groups. This procedure attempted to classify (based on highest probability of membership) each individual responder to one of the four groups based purely on his/her performance on the CBS-RC and MAACL. The purpose of this procedure was to test the power and accuracy of the discriminant function derived from the instruments to predict group membership. Table 11 presents the outcome of this classification and tests how significant this predictive capability is in a statistical sense.

The following statistical conclusions can be drawn based on Table 11:

i) Group A₄ (nonasthma) is the most predictable (54.1%). It is most unique and best differentiated.

ii) Group A₃ (chronic, corticosteroid-dependent) is also very predictable (51.9%) and most like itself.

iii) Group A₁ (mild) is hard to predict and looks more like A₄ than like itself.

iv) Group A₂ (chronic, drug-dependent but not corticosteroids) is also hard to predict and looks most like the other chronic asthma group (A₃) but is also somewhat similar to the A₄ nonasthma group.

v) The total percent of responders classified correctly is 40.9%. By chance alone, this percentage would be 25%. The discriminant function is therefore significantly effective in classifying responders. This

TABLE 11

Classification Matrix for discriminant analysisPredicted Group Membership¹

GROUP	Number of Cases Classified into Group				
	# of cases	A ₁	A ₂	A ₃	A ₄
A ₁	41	8 19.5%	5 12.2%	10 24.4%	18 43.9%
A ₂	34	2 5.8%	7 20.6%	14 41.2%	11 32.4%
A ₃	54	7 13.0%	7 13.0%	28 51.9%	12 22.1%
A ₄	74	15 20.3%	13 17.6%	6 8.0%	40 54.1%

¹Percent of Cases correctly classified: 40.9%. If classified by chance alone, this percentage would be 50.1/203 or 25%

corroborates the statistical significance obtained in the MANOVA for the sampling groups effect.

The Jack-Knife procedure was then used to cross-validate the discriminant analysis and produced identical results.

Practically speaking, the classification matrix indicates that two groups, A_1 and A_2 , are far less distinct than may be expected. There are a substantial proportion of mild asthmatics who respond in the same way as the nonasthma group (43.9%). This finding is in the expected direction and corroborates previous research which has found mild asthmatics to have little significant psychopathology. However, a substantial proportion also responded in the same way as the chronic, drug-dependent asthma groups (36.6%). On closer inspection of individual subjects in A_1 incorrectly classified as A_2 or A_3 , we find that 73% (11/15) had a history of previous hospitalizations, emergency care, and drug regimens involving corticosteroid therapy. This indicates that these subjects at one time suffered from asthma of much greater severity than they do at present. A possible explanation for the divergent scores may be offered. The asthma literature suggests that adolescence is very often a period of transition for many asthmatics, where some patients improve dramatically while others become significantly worse. The argument can be made that the majority of A_1 subjects incorrectly classified in A_2 or A_3

are displaying a maladaptive cognitive-emotional pattern which is characteristic of the more severe asthmatic. This suggests that, while asthma symptoms may abate (as is evidenced by their A₁ membership), irrational beliefs which have already formed, and the resulting dysphoric effect, remain unchanged. This interpretation is supported by cognitive theory which suggests that beliefs are enduring cognitive structures which, once formed, are usually held without any reference to evidence and are difficult to challenge or change without therapeutic intervention.

The opposite interpretation may hold true for the A₂ subjects incorrectly classified. Table 11 indicates that 41.2% of chronic, non-corticosteroid drug-dependent asthmatics responded in the same way as the most severe A₃ group. This is, again, to be expected since the MANOVA and Discriminant analysis established that both chronic groups are quite similar to each other. However, a substantial proportion also responded in the same way as the A₄ nonasthma comparison group (32.4%). On closer inspection of those subjects, it was found that 54.5% (6/11) showed no history of previous hospitalization, emergency room visits, or corticosteroid treatment. While insufficient information is available concerning the validity of this hypothesis, it may be conjectured that these subjects represent asthmatics who develop serious symptoms in later life (adolescence or later) and may have already developed more adequate

cognitive sets and coping styles to deal with their illness and the world in general. While corroboration of these two interpretations goes beyond the scope of the present study, it could be an important subject for future research.

UNIVARIATE ANALYSIS OF VARIANCE

Following the MANOVA and discriminant analysis, univariate analyses (ANOVAs) were conducted to determine which factors on the CBS-RC and MAACL were responsible for group differences. Table 12 presents complete univariate F-tests for groups across each of the dependent variables following the significant MANOVA F-ratio. These data revealed a significant F-ratio for two of the six CBS-RC factors and all three of the the MAACL factors.

Factor 5 - Importance of Approval

This factor reflects the belief that approval is not only desirable but is a necessity in life, i.e., "People need to be loved by others to like themselves." The univariate F-ratio for Importance of Approval was significant at the .001 level across all groups. $F(3, 187) = 5.07, p < .001$. Table 13 presents the total mean scores for subjects' performance on the Importance of Approval scale.

TABLE 12
UNIVARIATE F TESTS OF GROUP MAIN EFFECTS FOR CBS-RC
AND MAACL FACTORS

(df = 3, 187)

Variable	SS	MS	F	P <	
Perfectionism	68.71	22.90	1.38	.249	
Self-Downing	16.13	5.38	.37	.773	
Blame-Proneness	3.98	1.32	.06	.979	
Importance of the Past	125.08	41.69	1.98	.118	
Importance of Approval	296.33	98.77	5.07	.001	**
Control of Emotions	115.12	38.37	2.27	.025	*

Anxiety	255.80	85.26	6.23	.0000	***
Depression	608.63	202.88	5.76	.001	**
Hostility	166.06	55.35	2.92	.035	*

TABLE 13
MEAN SCORES FOR SUBJECTS PERFORMANCE ON FACTOR 5 -
IMPORTANCE OF APPROVAL

Group	Mean	SD
A1	19.56	4.84
A2	20.79	3.94
A3	21.76	4.34
A4	18.94	4.52

Inspection of these mean scores by group revealed that the A₄ nonasthma comparison group had the lowest mean score ($M = 18.94$) for Importance Of Approval as measured by the CBS-RC, followed by groups A₁ ($M = 19.56$), A₂ ($M = 20.79$), and A₃ ($M = 21.76$). Follow-up post hoc pairwise comparison using Tukey's Studentized Range (HSD) statistic revealed a significant difference ($\alpha = .05$) between the A₃ chronic, cortico-steroid-dependent asthma group and the A₄ nonasthma comparison group.

This finding was in the expected direction and is clearly supported by a number of clinical and empirical studies which have identified dependency and a high need for approval from others as a core issue for some asthmatics.

Factor 6 - Control of Emotions

This factor corresponds with the belief that unhappiness comes from external sources and that individuals

have little control over the way they feel, i.e., "Feelings are caused by things that happen, people can't decide how they feel." The univariate F-ratio for Control of Emotion was significant beyond the .05 level across groups. $F(3, 187) = 2.27, p < .05$. Table 14 presents the total mean scores for subjects' performance on the Control of Emotion scale.

TABLE 14
MEAN SCORES FOR SUBJECTS PERFORMANCE ON FACTOR 6 -
CONTROL OF EMOTIONS

Group	Mean	SD
A1	18.56	3.84
A2	20.24	4.19
A3	20.24	3.17
A4	19.32	3.34

Inspection of the mean scores by group revealed that the A₁ asthma group ($M = 18.56$) had the lowest mean score for Control of Emotion as measured by the CBS-RC, followed by the A₄ nonasthma comparison group ($M = 19.32$), and then followed by the two chronic, drug-dependent asthma groups A₂ and A₃ ($M = 20.24$).

This finding suggests that severe, chronic asthma sufferers believe that they have little control over their feelings while mild asthmatics do not. This may be an

example of the strong reciprocal relationship between cognitive, emotional, and physiological factors. Asthmatics learn from an early age that emotional excitement, whether positive or negative, can precipitate attacks. Yet, try as they may to control their feelings, many chronic sufferers continue to experience wheezing or full-blown asthma episodes on a regular basis. This results in continuous feedback from the environment that they are powerless to control their feelings and the consequent physiological responses which result.

Factor 7 - Anxiety

The univariate F-ratio for Anxiety was significant beyond the .0001 level across all groups. $F(3,187) = 6.23$, $p < .0001$. Table 14 presents the total mean scores for subjects' performance on the Anxiety scale by groups.

TABLE 15
MEAN SCORES FOR SUBJECTS PERFORMANCE ON
FACTOR 7 - ANXIETY

Group	Means	SD
A ₁	5.88	4.05
A ₂	7.41	4.18
A ₃	7.15	3.81
A ₄	4.55	2.96

Inspection of the mean scores by group revealed that the A₄ nonasthma comparison group ($M = 4.55$) had the lowest mean score on the Anxiety scale as measured by the MAACL, followed by groups A₁ ($M = 5.88$), A₃ ($M = 7.15$), and A₂ ($M = 7.41$). Follow-up post hoc pairwise comparison using Tukey's Studentized Range statistic revealed a significant difference ($\alpha = .05$) between both chronic asthma groups (A₂, A₃) and the nonasthma comparison group.

The finding that many children and adults with asthma are significantly anxious has received extensive support in the asthma literature. The present study corroborates that a significant portion of asthmatic adolescents tend to be more anxious than nonasthmatics as well.

Factor 8 - Depression

The univariate F-ratio for the Depression scale was significant at the .001 level across all groups. $F(3, 187) = .001, p < .001$. Table 16 presents the total mean scores for subjects' performance on the Depression scale by groups.

TABLE 16
MEAN SCORES FOR SUBJECTS PERFORMANCE ON
FACTOR 8 - DEPRESSION

Group	Means	SD
A1	8.37	6.18
A2	11.32	8.06
A3	10.35	6.05
A4	6.80	4.30

Inspection of mean scores by group again revealed the same trend, with the A₄ nonasthma comparison group ($M = 6.80$) earning the lowest mean score for Depression as measured by the MAACL, followed by the A₁ ($M = 8.37$), A₃ ($M = 10.35$), and A₂ ($M = 11.32$) groups, respectively. Follow-up post hoc pairwise comparisons using Tukey's Studentized Range statistic revealed a significant difference ($\alpha = .05$) between both chronic asthma groups (A₂, A₃) and the A₄ nonasthma group.

The presence of depression in children and adults with asthma has been well documented in the asthma literature. The current finding of this study supports the presence of depression in a substantial proportion of adolescent asthmatics as well.

Factor 9 - Hostility

The univariate F-ratio for the Hostility scale was significant beyond the .05 level across groups. $F(3, 187) = 2.92, p < .05$. Table 17 presents the total mean scores for subjects' performance on the Hostility Scale by groups.

TABLE 17
MEAN SCORES FOR SUBJECTS' PERFORMANCE ON
FACTOR 9 - HOSTILITY

Group	Means	SD
A1	6.83	5.41
A2	8.12	4.50
A3	7.63	4.30
A4	5.62	3.78

Inspection of the mean scores by group revealed that the A₄ nonasthma comparison group ($M = 5.62$) had the lowest mean score on the Hostility scale as measured by the MAACL, followed by groups A₁ ($M = 6.83$), A₃ ($M = 7.63$), and A₂ ($M = 8.12$). Follow-up post hoc pairwise comparison using Tukey's Studentized Range statistic revealed a significant difference ($\alpha = .05$) between the chronic, non-corticosteroid asthma group (A₃) and the nonasthma comparison group (A₄).

The finding that the A₂ group scored significantly higher than the comparison group on hostility while the more severe A₃ group did not may superficially appear counterintuitive. There is, however, empirical support for this finding. A key theme frequently cited in the asthma literature is the asthmatic's fear of or difficulty in expressing anger to others. It follows that, for some asthmatics, it may also be difficult to acknowledge the presence of angry feelings as well. A number of studies suggest that asthmatics exhibit a repressive defense style. Straher and Taremin (1974), for instance, have found that the degree of repression of anger/aggression increases with the severity of asthma. It is therefore likely that the A₃ group had a lower mean score than the A₂ group on this factor because of this tendency to repress anger.

SECONDARY MULTIVARIATE ANALYSIS -- SES

Since SES could not be dealt with in the main analysis because of sample size, a separate 4 x 4 MANOVA was run comparing groups on SES. No significant SES main effect was found. $F(3, 199) = .61, p > .05$.

SUMMARY

The results were summarized according to the seven statistical analyses used for this study.

The 4 x 2 x 2 MANOVA for group effects showed significance beyond the .05 level and null hypothesis 1 was therefore rejected. A discriminant analysis, classification and Jack-Knife procedure corroborated the results of the MANOVA. Univariate analyses and Tukey's post hoc pairwise comparison of groups determined significant group differences with respect to endorsement of the Importance of Approval scale on the CBS-RC, with the A₃ asthma group scoring significantly higher than the nonasthma comparison group on this factor. Significant group differences were also found with respect to endorsement of the Control of Emotions scale, with both chronic, drug-dependent asthma groups (A₂, A₃) scoring significantly higher than the A₁ asthma group. Similarly, significant differences were also found on the Anxiety and Depression scales of the MAACL, with both chronic asthma groups (A₂, A₃) scoring significantly higher than the nonasthma comparison group on these factors. On the Hostility scale, the non-corticosteroid, chronic asthma group (A₂) was found to be significantly higher than the comparison group. A discussion of each of these findings was presented.

No significant main effects for sex, age, or interaction effects between group and sex, group and age, or sex and age were demonstrated. Null hypotheses 2, 3, and 4 were therefore accepted. Similarly, no main effect for SES

on a secondary 4 x 4 MANOVA was found. Null hypothesis 5 was therefore accepted.

In conclusion, the major finding of this study is that a significant proportion of asthmatics, those with more chronic, severe asthma, has been found to possess a dysfunctional cognitive-emotional complex characterized by a high need for approval, a belief that they are not in control of their emotions or the events around them, and, consequently, the tendency to experience high levels of anxiety, depression, and hostility as compared to mild asthma sufferers and nonasthmatic healthy subjects.

CHAPTER V

CONCLUSIONS

This final chapter is presented in the following order:
(a) summary of the research study; (b) findings; (c) discussion of the findings and their implications; (d) recommendations for future research; and (e) a summary.

SUMMARY OF METHODOLOGY

The purpose of this study was to examine the existence of possible differences in the cognitive-emotional complex characteristic of asthmatic and healthy adolescents. This study was based on Tosi's (1974) Cognitive Experiential Therapy's (CET) multidimensional dynamic systems model, which describes the reciprocal influences of social and physiological forces in the production of behavior.

The review of the literature included an historical overview of the mind-body relationship; the theoretical foundations of cognitive approaches to stress and disease; the theoretical and empirical basis for the CET model; possible developmental trends and sex differences in rational thinking; and a comprehensive review of the bio-physiological, psychological, and socio-environmental

factors implicated in asthma. The search of the pertinent literature revealed a continued need for exploring and understanding psychological factors that may lead to effective interventions as adjuncts to the traditional medical care of the asthma patient. While the literature reported numerous studies examining psychological variables with adult and child asthmatics, few had systematically studied adolescent asthmatics, and none had examined the role of cognitive variables (i.e., irrational beliefs) in the production of asthma. This gap in the literature provided a rationale for the present study.

This study was a non-random purposive sample and consisted of 203 upper-middle-class to lower-lower-class adolescents (ages 12 to 18) referred by a pediatric allergist and a pediatric dentist from Columbus, Ohio. The subjects were divided into four groups on the basis of presence and severity of illness. Criteria used to determine group membership included type of medication used, frequency of medication used, number of medications used, number of asthma attacks experienced in the past 12 months, prior and current history of hospitalization, emergency room visits and corticosteroid medication, and number of weeks of school missed due to asthma in the past 12 months. This classification yielded the following groups:

A₁ - subjects with mild asthma symptoms, little or no medication used;

- A₂ - subjects with chronic asthma symptoms, drug-dependent, but not corticosteroid medication;
- A₃ - subjects with chronic and severe asthma symptoms, corticosteroid dependent;
- A₄ - nonasthmatic healthy subjects with no chronic conditions.

All subjects volunteered to participate in this study and had received prior parental consent. Three questionnaires were used. The Adolescent Information Questionnaire was used to gather demographic information and information about asthma symptoms. The CBS-RC was used to assess level of irrational thinking, the MAACL was used to assess degree of emotionality.

The research design for the main analysis consisted of a 4 x 2 x 2 multivariate factorial analysis of variance (MANOVA). Independent variables included group membership as determined by presence and severity of illness (A₁, A₂, A₃, A₄); sex (male, female); and age (early adolescence 12-14, late adolescence 15-18). The dependent variables included psychological factors considered to be indicators of irrational thinking (perfectionism, self-downing, blame proneness, importance of the past, importance of approval, control of emotions) and emotionality (anxiety, depression, hostility). A separate factorial MANOVA (4 x 4) was also conducted. The analysis identified four levels of SES

(upper-middle, lower-middle, upper-lower, lower-lower) and the four treatment groups.

The following statistical analyses were conducted: 1) a Chi-Square statistic to test representativeness of the sample; 2) a Chi-Square statistic to determine whether demographic differences between the four groups were statistically significant; 3) a Homogeneity of Variance to ascertain whether variances of the observations in samples of all four groups were similar; 4) a $4 \times 2 \times 2$ multivariate analysis of variance (MANOVA) examining group, sex, age, and interaction effects on the criterion variables; 5) follow-up discriminant function analysis including classification and Jack-Knife procedure; 6) univariate (ANOVAs) and Tukey's post hoc pairwise comparisons; and 7) a 4×4 MANOVA examining the effect of SES on group differences.

The null hypotheses of this study stated:

1. There is no difference in the multivariate mean vectors reflecting dimensions of irrationality on the CBS-RC and emotionality on the MAACL in adolescents identified as having different levels of severity of illness when examined in relation to each other and to a nonasthma comparison group.

2. There is no difference in the multivariate mean vectors reflecting dimensions of irrationality on the CBS-RC and emotionality on the MAACL associated with male and female adolescents.

3. There is no difference in the multivariate mean vectors reflecting dimensions of irrationality on the CBS-RC and emotionality on the MAACL associated with early (12 to 14) and late (15 to 18) adolescence.

4. There is no interaction effect between group and sex, group and age, or sex and age of subjects.

5. There is no difference in the multivariate mean vectors reflecting dimensions of irrationality on the CBS-RC and emotionality on the MAACL with respect to the socioeconomic status (SES) of the subjects.

Based on the description of asthmatic populations of children and adults found in the literature, it was hypothesized that adolescents who differ along the line of severity of illness would also differ in the way in which they endorsed irrational beliefs and self-descriptors of anxiety, depression, and hostility.

SUMMARY OF FINDINGS

1. The Chi-Square test comparing the study sample with the asthma population as a whole indicated that the asthma sample group was comparable to the national group on sex ($p > .05$) but was significantly different from the national figures on SES ($p < .001$). The sample group was overrepresented in the middle-class categories and underrepresented in the lower-class categories. While this

distribution may be expected in a group of patients seeking services from a specialist, these differences do limit the generalizability of findings of this study to asthmatics as a whole.

2. The Chi-Square statistic computed on demographic variables found no significant differences between the four groups ($p > .05$) on sex, age, or SES, thereby establishing that the groups were comparable on these demographic variables.

3. The Homogeneity of Variance analysis found that the variance of the observations in the sample populations of all four groups were similar (Bartlett $F = .83$, $p = .64$).

4. In the main MANOVA analysis, a significant main effect was found for group, $F(3, 187) = 1.71$, $p < .05$ and null hypothesis 1 was rejected. Tukey's post hoc pairwise comparison statistic found significant differences between group means for A_2 and A_4 , A_3 and A_4 , A_1 and A_2 , and between A_1 and A_3 . These results indicated that subjects characterized by more chronic and severe asthma are significantly different from subjects who suffer from a milder constellation of symptoms and are also significantly different from nonasthmatic, healthy subjects.

The MANOVA analysis did not find significant main effects for sex, $F(1, 187) = 1.41$, $p > .05$; age, $F(1, 187) = .88$, $p > .05$; or interaction effects between group and sex, $F(3, 187) = 1.41$, $p > .05$; group and age, $F(3, 187) =$

.91, $p > .05$; and between sex and age, $F(1, 187) = 1.22$, $p > .05$. Null hypotheses 2, 3, and 4 were therefore rejected.

5. The discriminant analysis corroborated the statistical significance obtained in the MANOVA for the sampling groups effect. One discriminant function was found to be significant and was best defined by factors 5, 7, and 8: Importance of Approval, Anxiety, and Depression. This dimension was labeled maladaptive/dysfunctional versus adaptive/functional cognitive-emotional pattern. Plotting the four group centroids demonstrated that the two chronic asthma groups (A_2 and A_3) were very similar and were characterized by a distinctly dysfunctional cognitive-emotional complex. In contrast, A_1 and A_4 were also found to be like each other but were characterized by a decidedly adaptive or functional cognitive-emotional complex. A classification matrix was then derived and revealed that a total of 40.9% of responders were classified correctly, a proportion significantly greater than would be expected by chance alone. Groups A_3 and A_4 were both found to be very predictable and well differentiated. Groups A_1 and A_2 , on the other hand, were found to be much less distinct than expected and tended to look like other groups rather than like themselves.

6. Results of the univariate ANOVAs across the four groups for each of the dependent variables yielded significant F-ratios for factor 5, Importance of Approval, F

(3, 187) = 5.07, $p < .001$; factor 6, Control of Emotions, $F(3, 187) = 2.27$, $p < .05$; factor 7, Anxiety, $F(3, 187) = 10.23$, $p < .0001$; factor 8, Depression, $F(3, 187) = 5.76$, $p < .001$; and factor 9, Hostility, $F(3, 187) = 2.92$, $p < .05$.

Tukey's post hoc comparisons yielded the following group differences:

Factor 5, Importance of Approval = Group A_3 (severe asthma) was found to score significantly higher than the (A_4) nonasthma comparison group.

Factor 6, Control of Emotions = Both chronic drug dependent asthma groups (A_2 , A_3) were found to score significantly higher than the (A_1) mild asthma group.

Factor 7, Anxiety = Both chronic, drug-dependent asthma groups (A_2 , A_3) were found to score significantly higher than the (A_4) nonasthma comparison group.

Factor 8, Depression = Both chronic, drug-dependent asthma groups (A_2 , A_3) were found to score significantly higher than the (A_4) nonasthma comparison group.

Factor 9, Hostility = The chronic, non-corticosteroid-dependent group (A_2) was found to score significantly higher than the (A_4) nonasthma comparison group.

7. The secondary 4 x 4 MANOVA analyzing group differences according to SES found no significant main

effect for SES, $F(3, 199) = .61, p > .05$. Null hypothesis 5 was therefore rejected.

DISCUSSION AND IMPLICATIONS

Cognitive theory suggests that few stresses that adversely affect health are inherently stressful. Whether a stress response is triggered by an event and whether it will present a health threat depends on how we choose to think about and interpret the event. Lazarus and Folkman, in their book Stress, Appraisal & Coping (1984), suggest that vulnerability to the stresses which lead to illness involves interpreting an event as a threat to one's well-being. This appraisal is based on firmly held beliefs or commitments. It is this appraisal which initiates emotions and their biological concomitants. The findings of the present study suggest that the irrational beliefs which may place certain asthmatics at risk for developing stress responses which exacerbate disease and lead to anxiety, depression, and/or hostility are a belief in the importance of approval and a belief in the inability to control one's emotions.

One way to think about the findings of this research is to place them within the framework of an elaborated ABCDE Cognitive Experiential Therapy model. This study supports the theoretical framework of the model and suggests we look at cognition, emotion, and somatic responses as operating as

an integrated network of relationships. The CET model defines the self as a complex set of cognitive, affective, physiological, and behavioral functions occurring within a social environment which may be real, symbolized, or imagined. The model also proposes that these functions be viewed in terms of concepts of time (past, present, future) and awareness (conscious, unconscious processes). The way one responds to a situation in the present time is a function of how the person responded to similar situations in the past and how one will be likely to respond to similar situations in the future. Furthermore, while A's (events), C's (emotions), D's (physiological processes), and E's (behavior) are often being experienced directly in the person's awareness, B's, the appraisal of the event and the beliefs they are based on, are usually experienced outside of the person's awareness. The B's, C's, D's, and E's set on this continuum of time and awareness become experiential themes, integrated and internalized relationships which have emerged over the developmental span of the person and have endured for relatively long periods of time. Experiential themes define the experiential life space of the self system. They can be adaptive or functional if they preserve the person's life, minimize stress, and facilitate the achievement of reasonable life goals. On the other hand, they can be maladaptive or dysfunctional when the self

system is characterized by incongruity, emotional and physiological distress, and self-defeating behavior.

Findings of the present study suggest that a dysfunctional experiential theme for the chronic drug-dependent asthmatic adolescent may include a high need for approval and belief that he/she is incapable of controlling his/her emotions, which subsequently lead to dysphoria (anxiety, depression, and/or hostility), asthma symptoms, and maladaptive behavior. A hypothetical example of the pattern of system interactions and situational sequences which may be included in an asthma attack is depicted in Figure 4.

Explication of the hypothetical experiential theme involved in the asthma process may become clearer if we use the example of Joan referred to in Chapter II (see Table 5). Joan finds out she received a "C" on her final exam in biology <A>. Remembering past instances of her mother's dissatisfaction with her when she has performed poorly in school, she appraises the present situation as a threat to her high need for approval and reacts with <C> anxiety, "Mother will be so angry with me"; depression, "What a stupid worthless person I am"; and possibly with hostility,

Figure 4: Example of Experiential Theme Present in Adolescents with Chronic Bronchial Asthma

"Why must mother always treat me this way. It's so unfair!"

These unpleasant emotions are accompanied by <D> catecholamine-cholinergic deregulation and parasympathetic involvement, which result in bronchoconstriction and wheezing. While Joan is unaware of her appraisal process or irrational beliefs, and possibly her emotional responses (particularly feelings of anger), she readily focuses on her physical symptoms. As she experiences difficulty breathing <D>, she once again engages in cognitive processing , including remembering past asthma attacks and fearing a future attack. Her anxiety <C> rises. She tries to control her feelings but at the same time remembers other similar occasions where trying to control her emotions has not yielded positive results. This triggers an appraisal of the current situation as one where she is helpless to control her feelings. Heightened anxiety over her physical symptoms <C> leads to increased bronchial symptoms <D> until a full-blown asthma attack is initiated <E>. Instead of telling mother about her school performance, Joan is rushed by mother to the hospital. Joan unconsciously diverts attention to her asthma symptoms, gains her mother's sympathy, and avoids a potentially unpleasant situation (gaining mother's disapproval). Joan has also reinforced a cognitive-emotional-physiological-behavioral pattern which calls for the avoidance of other unpleasant situations (or emotions) with a physiological response. It is important to

note that, paradoxically, illness behavior in asthma can reduce some elements of interpersonal threat even though the bronchoconstriction threatens physical health and contributes to subsequent psychological distress. It is equally important to note that a similar sequence can be initiated by an environmental stressor such as an allergen, infection, or exercise. In such a case, physical symptoms form the environmental trigger which brings back memories of past attacks and leads to an appraisal of current helplessness in controlling emotions, particularly anxiety, which in turn exacerbates the fear and perpetuates the cycle.

The findings of this study also draw implications for clinical practice and the creation of new intervention strategies in the treatment of asthma. Since chronic, drug-dependent asthmatics have been found to exhibit a greater need for approval and a stronger belief that they are unable to control their emotions, a broad-spectrum cognitive-behavioral therapy approach appears to be a viable treatment modality. As the review of literature suggested, although there are a number of treatment approaches currently available to deal with the psychological factors which may cause, maintain, or be associated with asthma, outcome studies have been uniformly disappointing. In fact, some researchers (Stoudemire, 1985) have even used these poor results as proof that psychological factors are not

important in the production of asthma symptoms. The present findings suggest that a better approach to the attenuation of asthma symptoms and emotional distress would be Cognitive Experiential Therapy, which utilizes a variety of cognitive, affective, physiological, and behavioral techniques to focus on all relevant elements of the system as well as the external world. Basic to CET is its potential for developing, reinforcing, and maintaining logical-critical thinking relative to affective, physiological, behavioral, and situational processes. The client not only develops effective coping skills but also becomes more rational, and competent in self-management. The use of cognitive restructuring with hypnosis would appear to be particularly useful with an asthmatic population.

The finding of significant differences between groups provides evidence of construct validity for the CBS-RC. The CBS-RC appears to be sensitive to differences in irrationality in asthmatic and nonasthmatic adolescents as well as between asthmatic adolescents with differing levels of severity of illness. This instrument should prove to be a valuable tool in identifying asthmatics who would most benefit from psychotherapy as well as in assessing progress during and after treatment.

The finding of heightened irrationality and emotionality in chronic, drug-dependent asthmatic adolescents also lends support to the current trend of

asthma research in treating asthma as a heterogeneous disorder and subdividing subjects on the basis of severity of illness. Severity has been shown to be an important factor in maladaptive patterns of interaction and psychologic symptoms. Relatively low levels of psychopathology have been found in mild asthmatics but considerable difficulties have been found in more severely affected children and adults (Mrazek, 1986). The current findings substantiate this for adolescents as well.

The data identifies the most severe, chronic asthmatic group, those on corticosteroid medications (A₃), as significantly higher on the irrational belief "importance of approval" than nonasthmatics (A₄). This particular irrational belief may be viewed as generating dependency. Dependency can be defined as the feeling that you must have the support or approval or love of most people you know, or at least of the people whom you value, i.e., "I can't stand it when Mom, Dad, Boss, Mate, Friend...doesn't like something about me or rejects me" (Judah, 1982). When this need for approval is threatened, stress results, which generates a number of physiological and emotional consequences. This finding supports the large body of asthma literature which regards dependency as a core issue for asthmatics (Alexander, 1950; Dirks, Paley, & Fross, 1980; Fine, 1963; Harris, 1950; Knapp, 1960; Panides & Ziller, 1981; Williams, 1975). This finding is

particularly reminiscent of earlier specificity views such as Alexander's and Graham's. Alexander (1950) believed the psychological origin of asthma to be conflict centering in an excessive, unrelenting dependence on the mother or mother substitute along with fear of separation, which made situations of loss or disappointment particularly distressing for the asthmatic. In terms of attitude, Graham and associates (Grace & Graham, 1952; Graham, Stern, & Winokur, 1958; Graham, Lundy, Benjamin, & Kabler, 1962) had come to a very similar conclusion. After questioning patients concerning events that had occurred prior to the onset or exacerbation of their diseases, Graham, et al., found attitudes of asthmatics included "felt left out, felt unloved, rejected, disapproved of." However, the present findings also differ from earlier specificity models in several important respects. Alexander and Graham focused on dependency as the central psychological problem for asthmatics. This research suggests that, along with dependency, a feeling of helplessness generated by a pessimistic belief in the inability to control emotions is also prominent. Alexander and Graham believed that the issue of dependency was important to all individuals with asthma. The present findings identify only a subgroup of asthmatics, those with the most severe symptoms, as significantly affected by a high need for approval. Finally, and most importantly, Alexander and Graham

attempted to establish conflicts over dependency as the etiology for asthma. The present study, being descriptive in nature, makes no inferences regarding causality.

This study has also identified chronic, pharmacotherapy-dependent asthmatics (A_2 , A_3) as significantly higher on the irrational belief concerning "control of emotions." This corresponds with the belief that unhappiness comes from external sources and that individuals have little control over the way they feel. Beliefs about personal control have to do with feelings of mastery and confidence. Lazarus (1983) and Antonovsky (1980) have noted that a sense of control (or lack of it) can effect health outcomes. This pessimistic sense of helplessness may be a learned phenomenon and an example of the strong reciprocal relationship between cognitive, emotional, and physiological factors. Asthmatics learn from an early age that emotional excitement, whether positive or negative, can precipitate attacks. Yet, try as they may to control their feelings, many chronic sufferers continue to experience asthma symptoms or full-blown asthma episodes on a regular basis. This may result in continuous feedback from the environment that they are powerless to control their feelings or the consequent physiological responses which result. The issue of control appears to be an important problem for asthmatics which can initiate as well as exacerbate asthma attacks.

The present research also corroborates that emotionality is important to asthma in adolescents as well as in children and adults. A number of studies have identified asthmatics as particularly susceptible to anxiety (Baron, Tamerine & Lapierre, 1986; Dirks, Fross & Paley, 1978; Kinsman, O'Banion & Kesnikoff, 1973; Thompson & Thompson, 1985) and depression (Fritz, Rubenstein & Lewiston, 1987; Knapp, 1960; Strunk, Mrasek, Fehrmann & LaBecque, 1985; Thompson & Thompson, 1984). These findings are supported by the present study, which identified chronic, pharmacotherapy-dependent asthmatics (A₂, A₃) as significantly higher on anxiety and depression than nonasthmatic subjects.

The literature also suggests that asthmatics often experience anger and hostility but have difficulty expressing these feelings and tend to replace these emotions with an abnormal respiratory pattern (Chiari, Barbaro, Nuzzo, & Ross, 1987; French & Alexander, 1950; Hahn & Clark, 1967; Hollaender & Florin, 1983; Mathes & Knapp, 1971; Strather & Taremin, 1974). Both theory and research suggest that repression of anger is particularly characteristic of individuals who also display high dependency needs since such individuals fear that expressing true beliefs, emotions, and behaviors would cause the person upon whom they are dependent to reject them or withdraw their love or approval. Hollaender and Florin (1983) have found that

repression of anger is significantly correlated with high dependency needs and fear of losing significant others. Strather and Tamermin (1974) have, in fact, found that the degree of repression of anger/aggression increases with the severity of asthma. The present data, which identify the less severe, non-corticosteroid-dependent chronic asthma group (A₂) as highest in hostility, support this conclusion.

The cognitive-emotional complex characteristic of severe asthmatics identified by this study suggests a personality profile which includes anxious dependency coupled with a pessimistic view that one is unable to control one's feelings. This finding is strikingly similar to Kinsman's "panic-fear" research. Kinsman's group (Dirks, Fross, & Paley, 1978; Dirks, Jones, & Kinsman, 1977; Kinsman, Dahlem, Spector, & Stoudenmayer, 1977; Kinsman, O'Banion, & Resnikoff, 1973) has found that a high panic-fear personality characterized by high anxiety, dependency, and helplessness in the face of symptoms (pessimistic about their ability to control and cope with asthma) is significantly associated with a higher intensity of prescribed medication; in particular, corticosteroids. A high panic-fear personality is not regarded as an emotional reaction to the illness but, rather, as predisposing personality traits which influence the patient to react in certain ways in response to breathing difficulties. Such a personality, Kinsman suggests, may contribute to chronicity,

incapacitation, and dependency on medication and overutilization of medical services. If the present findings are describing the same personality constellation, then cognitive interventions with a focus on reducing irrational beliefs about importance of approval and the control of emotions may prove to be particularly beneficial in reducing chronicity and overdependence on medication and medical services in asthmatics.

RECOMMENDATIONS

Issues raised in this dissertation lend themselves to recommendations for future research. The following are suggested areas of research:

1. Of key importance to the understanding of psychological factors involved in asthma is establishing to what extent the cognitive-emotional complex identified by this study is present in other groups. Replication of the present study with other sample populations is necessary. Research with asthmatics at different life stages (i.e., elementary school, adults) will help establish whether the present findings are typical of all asthmatics or only adolescent asthmatics. Research utilizing adolescents with different psychosomatic problems or chronic disorders as well as other respiratory problems may help establish whether the present findings are more indicative of a

specificity view or a general "disease personality" model. Since the generalizability of the present study was limited because of its overrepresentation of middle-class subjects, it would also be useful to replicate this study with asthmatics from the lower social classes.

2. There is a need for further studies utilizing the CBS-RC as a measure of irrational thinking to further test its validity and utility in experimental research. Because of the many similarities between the results of the present study and the Kinsman panic-fear research, it would be worthwhile to establish concurrent validity between the CBS-RC and the panic-fear scales utilized by the Kinsman group. If such concurrent validity exists, the CBS-RC may be a helpful additional tool in identifying "at risk" child and adolescent patients for the psychomaintenance of asthma.

3. The findings of the discriminant analysis suggest that, while classifying subjects into groups by present severity of illness is a useful approach, it does not account for the entire explanation of which asthmatics are most vulnerable to developing maladaptive cognitive-emotional patterns. Further research needs to look at other possible contributing factors such as age of onset of asthma, whether symptoms have increased or decreased with puberty, family dynamics, and cognitive style.

4. It is difficult to know to what extent the present findings are indicative of a "cause-effect" relationship or

to what extent they may be considered as merely reactive to the illness itself. Establishing causality would be important in dealing with and eliminating many of the risk factors associated with asthma. Future research needs to consider the possibilities of implementing longitudinal, prospective studies with asthma populations.

5. The present study has identified a cognitive-emotional complex associated with severe asthma which should be helpful in designing a CET treatment for the chronic asthmatic. Such an intervention program is essential if asthmatics are to receive help in changing appraisals which lead to dysphoria and physical symptoms. The CET model has been shown to be successful with other psychosomatic groups (ulcer, hypertension, migraine). It would be important to establish that CET can be successful with this population as well.

SUMMARY

In Chapter V, the researcher presented a summary of the research study. Implications were offered based on the findings. Also presented were recommendations for future study based upon these implications and findings.

The original hypothesis, that adolescents who differ along the line of presence and severity of illness would also differ in the way in which they endorse irrational

beliefs and self-descriptors of anxiety, depression, and hostility was supported. The data identified a distinct cognitive-emotional complex for severe, chronic asthmatic subjects who are dependent on corticosteroid medication. Their personality profile may be characterized by a high need for approval, a pessimistic belief in their helplessness in controlling emotions, and high levels of anxiety and depression. Chronic asthmatic subjects who are dependent on other forms of medication were found to be similarly high on the control of emotions factor, anxiety, depression, and, in addition, hostility. In contrast, the asthmatic subjects who suffered from a mild constellation of symptoms with little or no medication use were found to be most similar to the nonasthma group, with no indications of maladaptive cognitive-emotional patterns. These findings provide empirical support for the multidimensional Cognitive Experiential Therapy model and corroborate the importance of taking a multivariate approach to understanding the interaction of cognition and emotional factors in the production of disease.

Results of this study may be of benefit to individuals from a number of orientations. To the psychosomatic researcher this study has lent support to a number of previous findings implicating psychological factors in physiological processes. To the behavioral psychologist in the psychotherapeutic setting this study has made a number

of suggestions for developing cognitive intervention strategies which may achieve a lasting elimination of maladaptive appraisal/coping patterns that create emotional stress and exacerbate chronicity and overdependence on medication. This study also has applicability for the physicians of asthmatic adolescents. More than 2,000 years ago, Plato admonished the medical profession of his day that the greatest mistake physicians make is to separate the body from the mind (Clark & Godfrey, 1983). Yet, sadly, this practice continues to the present day. The findings of this study suggest that the current trend of medical practitioners to focus almost exclusively on physiological variables and ignore psychological variables is unfortunate and should be reassessed. Primary care physicians who treat adolescent asthmatics need to be aware that a significant portion of asthmatic adolescents are at risk for developing maladaptive cognitive-coping patterns which can lead to serious emotional problems as well as exacerbate asthma symptoms already present.

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APPENDIX A

Preliminary Letter to Parents of
Prospective Asthma Subjects

HERBERT A. BRONSTEIN, M.D., INC.
GARRY H. RUPP, M.D., INC.
ROGER A. FRIEDMAN, M.D.

5877 CLEVELAND AVENUE
COLUMBUS, OHIO 43229
PHONE: 891-0550

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ROGER A. FRIEDMAN, M.D.

PEDIATRIC AND ADULT ALLERGIC DISEASES

APPENDIX A

(Letter to Parent of Asthma Patient)

Dear Parent,

I'd like to tell you about a study that your son or daughter will have the opportunity to participate in. Laura Silverglade is a Doctoral Candidate at Ohio State University under the supervision of Dr. Donald Tosi (principal investigator). She is doing a survey examining the beliefs and characteristics of different groups of adolescents ages 12 to 18. One of the groups selected for study is adolescents with asthma. Results from this study will be of benefit in aiding our understanding of asthma and leading to better preventive treatment programs for the control of asthma symptoms in adolescents. Each teen will be asked to respond to three questionnaires: 1) a Common Beliefs Survey, 2) a Multiple Affect Adjective Check List, and 3) an Adolescent Information Questionnaire. Together they will take about 15 to 20 minutes to fill out.

Your son or daughter's identity will not be revealed in any publication, document, computer storage, or in any other way which related to this research. All data will be handled confidentially.

Enclosed is a postcard. If you decide to allow your child to participate in this study and he or she has indicated an interest to do so, please mail it back with your signature. This will signify that you are giving your permission to have Laura Silverglade contact you.

Sincerely,

Roger Friedman, MD.

APPENDIX B

Cover Letter to Teenage Participant

**Department of Educational
Services and Research**

356 Arps Hall
1945 North High Street
Columbus, OH 43210-1172
Phone 614-292-8787

Program Areas:

Counselor Education	292-8936
Rehabilitation Services	292-8148
Research and Evaluation	292-4872
School Psychology	292-8148
Special Education	292-8787

APPENDIX B

(Cover letter to teenage participant)

Dear ,

Thank you for agreeing to participate in this research project which will investigate personal beliefs and characteristics of teens, ages 12 to 18. Results from this study will be of benefit in aiding our understanding of asthma and leading to better preventive treatment programs for the control of asthma symptoms in adolescents.

Enclosed you will find three questionnaires: 1) the Common Beliefs Survey, 2) the Multiple Affect Adjective Check List, and 3) the Adolescent Information Questionnaire. These should take you about 15 to 20 minutes to complete.

To indicate your agreement to participate in this study, please have you and your parent sign the enclosed permission form (HS-027). This form will need to be signed and returned with your test materials in the self-addressed, stamped envelope I will provide you with in your test packet.

All information regarding this study will be treated confidentially. Further information regarding the outcome of this study will be made available upon your request. Finally, you are free to withdraw your consent and discontinue participation at any time. If you have any further questions, or would like to get in touch with me for any reason, you may call me at 252-1144.

Thank you again for your participation.

Sincerely,

Laura Silverglade

Donald Tosi, Ph.D.
Principal Investigator

APPENDIX C
Consent Form

THE OHIO STATE UNIVERSITY

Protocol No. _____

APPENDIX C

CONSENT FOR PARTICIPATION IN
SOCIAL AND BEHAVIORAL RESEARCH

I consent to participating in (or my child's participation in) research entitled:

Belief Patterns and Attitudes in Adolescents with and
without Bronchial Asthma

Dr. DONALD TOSI or his/her authorized representative has
(Principal Investigator)

explained the purpose of the study, the procedures to be followed, and the expected duration of my (my child's) participation. Possible benefits of the study have been described as have alternative procedures, if such procedures are applicable and available.

I acknowledge that I have had the opportunity to obtain additional information regarding the study and that any questions I have raised have been answered to my full satisfaction. Further, I understand that I am (my child is) free to withdraw consent at any time and to discontinue participation in the study without prejudice to me (my child).

Finally, I acknowledge that I have read and fully understand the consent form. I sign it freely and voluntarily. A copy has been given to me.

Date: _____

Signed: _____
(Participant)

Signed: _____
(Principal Investigator or his/
her Authorized Representative)

Signed: _____
(Person Authorized to Consent
for Participant - If Required)

Witness: _____

APPENDIX D

Adolescent Information Questionnaire

APPENDIX D**Adolescent Information Questionnaire
(second page for asthma subjects only)**

PLEASE ANSWER ALL QUESTIONS AFTER YOU HAVE COMPLETED THE COMMON BELIEFS SURVEY AND MULTIPLE AFFECT ADJECTIVE CHECK LIST. ALL ANSWERS TO THIS QUESTIONNAIRE WILL REMAIN STRICTLY CONFIDENTIAL. IT IS ALL RIGHT TO ASK YOUR PARENT(S) FOR HELP WITH THIS FORM, BUT PLEASE DO THE OTHER FORMS ON YOUR OWN.

- 1) Male_____ Female_____
- 2) Age_____
- 3) School grade _____7th grade
 _____8th grade
 _____9th grade
 _____10th grade
 _____11th grade
 _____12th grade
- 4) My mother has had _____ years of school.
- 5) My father has had _____ years of school.
- 6) Is your mother employed? If so, please fill in her job
title

- 7) Is your father employed? If so, please fill in his job
title

- 8) How many asthma attacks have you had in the last year? ____
- 9) Have you ever been hospitalized for asthma? ____Yes ____No
- 10) Approximate times you have been hospitalized in last year ____
- 11) Have you ever needed to come to the emergency room for asthma? ____Yes ____No
- 12) Approximate number of visits in last year. _____
- 13) How much school have you missed in the past year (12 month period) due to problems with asthma?
- ____0 to 2 weeks
- ____3 to 5 weeks
- ____ more than 5 weeks

PLEASE PLACE A CHECK MARK IN THE BOX THAT BEST DESCRIBES HOW FREQUENTLY YOU USE THE FOLLOWING MEDICATIONS:

	Daily	Often	Occasionally	Never	Not within last year
Slo-bid					
Theo-dur					
Ventilin					
Azmacort					
Beconaze					
Tancenaze					
Prednisone					

APPENDIX E

Wise & Schultz's Common Beliefs Survey --
Revised for Children

APPENDIX E
Common Beliefs Survey-RC
Schultz and Wise (1987)

Instructions:

The following statements will be used to help us learn about the kinds of beliefs students have.

For each statement you need to decide how strongly you believe it. The more strongly you believe the statement, the higher the number you will circle.

Here is an example:

Statement - "Getting good grades is important."

Remember to ask yourself - How strongly do I believe this statement? - before circling a number.

There are no right or wrong answers. We are only interested in what you think.

Please be sure to answer every item.

CBS-RC Survey
Schultz and Wise 1987

not at all	not very strongly	somewhat strongly	strongly	very strongly
1	2	3	4	5

1. There is a right way to do all things.

1	2	3	4	5

2. Bad feelings are not caused by what happens, people can decide how they feel.

1	2	3	4	5

3. People can't help feeling down on themselves when they fail at something.

1	2	3	4	5

4. Criminals are bad people and should be punished.

1	2	3	4	5

5. No person is bad, even if he/she does bad things.

1	2	3	4	5

6. People's actions must be influenced by their past.

1	2	3	4	5

-----	-----	-----	-----	-----
not at	not very	somewhat	strongly	very
all	strongly	strongly		strongly
1	2	3	4	5

7. The way people think about an event does not affect how they feel.

-----	-----	-----	-----	-----
1	2	3	4	5

8. Being approved of by others is very important.

-----	-----	-----	-----	-----
1	2	3	4	5

9. Mistakes make people feel guilty.

-----	-----	-----	-----	-----
1	2	3	4	5

10. A person can overcome the influence of things that happened in the past.

-----	-----	-----	-----	-----
1	2	3	4	5

11. People need to be loved by others to like themselves.

-----	-----	-----	-----	-----
1	2	3	4	5

12. It is not awful to make mistakes when trying to find answers to problems.

-----	-----	-----	-----	-----
1	2	3	4	5

-----	-----	-----	-----	-----
not at	not very	somewhat	strongly	very
all	strongly	strongly		strongly
1	2	3	4	5

13. People who are unhappy or upset have usually made themselves feel that way.

-----	-----	-----	-----	-----
1	2	3	4	5

14. A person's enemies can be forgiven.

-----	-----	-----	-----	-----
1	2	3	4	5

15. The present is more important than the past for how a person acts today.

-----	-----	-----	-----	-----
1	2	3	4	5

16. People don't have to put themselves down when they fail.

-----	-----	-----	-----	-----
1	2	3	4	5

17. It is not important to always handle things in a perfect way.

-----	-----	-----	-----	-----
1	2	3	4	5

18. People can not control their feelings.

-----	-----	-----	-----	-----
1	2	3	4	5

not at all	not very strongly	somewhat strongly	strongly	very strongly
1	2	3	4	5

19. Past events are so strong that they must still bother a person.

1	2	3	4	5

20. If a person wants to, he/she can be happy most of the time.

1	2	3	4	5

21. Some people are bad and should be blamed and punished for the things they do.

1	2	3	4	5

22. People can't help feeling guilty about things they have done wrong.

1	2	3	4	5

23. People do not have to be good at all the things they do to feel good about themselves.

1	2	3	4	5

24. If someone treats us wrong, we should think less of that person.

1	2	3	4	5

not at	not very	somewhat	strongly	very
all	strongly	strongly		strongly
1	2	3	4	5

25. The past is over and doesn't have to bother a person now.

1	2	3	4	5

26. People can like themselves even when many others don't like them.

1	2	3	4	5

27. A person doesn't have to think less of themselves if they don't do something well.

1	2	3	4	5

28. If friends ignore a person, that person doesn't have to be upset.

1	2	3	4	5

29. For most questions there is one right answer.

1	2	3	4	5

30. Having the respect of others is important but not necessary.

1	2	3	4	5

-----	-----	-----	-----	-----
not at all	not very strongly	somewhat strongly	strongly	very strongly
1	2	3	4	5

31. People who do wrong deserve what they get.

-----	-----	-----	-----	-----
1	2	3	4	5

32. Past mistakes must greatly affect the present.

-----	-----	-----	-----	-----
1	2	3	4	5

33. If people don't meet their goals, they will think less of themselves.

-----	-----	-----	-----	-----
1	2	3	4	5

34. People pretty much cause their own moods.

-----	-----	-----	-----	-----
1	2	3	4	5

35. It is awful when things are not the way a person would like them to be.

-----	-----	-----	-----	-----
1	2	3	4	5

36. It is better for a person to get respect from others than to respect themselves.

-----	-----	-----	-----	-----
1	2	3	4	5

-----	-----	-----	-----	-----
not at	not very	somewhat	strongly	very
all	strongly	strongly		strongly
1	2	3	4	5

37. It's not true that some people are just bad and should be blamed and punished.

-----	-----	-----	-----	-----
1	2	3	4	5

38. The past is important to how a person acts today.

-----	-----	-----	-----	-----
1	2	3	4	5

39. Feelings are caused by things that happen.

-----	-----	-----	-----	-----
1	2	3	4	5

40. Any job should be done perfectly or else don't do it.

-----	-----	-----	-----	-----
1	2	3	4	5

41. It is not necessary to be loved or approved of by every important person.

-----	-----	-----	-----	-----
1	2	3	4	5

42. People don't have to feel guilty when they make a mistake.

-----	-----	-----	-----	-----
1	2	3	4	5

APPENDIX F

Bessai's Common Beliefs Survey III

PLEASE NOTE:

Copyrighted materials in this document have not been filmed at the request of the author. They are available for consultation, however, in the author's university library.

These consist of pages:

219-222, Common Beliefs Survey III

224-225, Multiple Affect Adjective Check List

U·M·I

APPENDIX G

Multiple Affect Adjective Checklist

APPENDIX H

Follow-up Letter to Asthma Subjects

HERBERT A. BRONSTEIN, M.D., INC.
GARRY H. RUPP, M.D., INC.
ROGER A. FRIEDMAN, M.D.

APPENDIX H

5877 CLEVELAND AVENUE
COLUMBUS, OHIO 43229
PHONE: 691-0550

6350 FRANTZ ROAD
DUBLIN, OHIO 43017
PHONE: 766-4903

ROGER A. FRIEDMAN, M.D.

PEDIATRIC AND ADULT ALLERGIC DISEASES

April 24, 1989

Dear:

Just to let you know -- I must have all my data collected by
May 8, 1989.

If you are still interested in participating in my study,
please send your test packet back as soon as possible.

Thanks !

Sincerely,

Laura Silverglade

APPENDIX I
Letter to Dental Parents

Department of Educational
Services and Research

356 Arps Hall
1945 North High Street
Columbus, OH 43210-1172
Phone 614-292-8787

Program Areas:

Counselor Education	292-8936
Rehabilitation Services	292-8148
Research and Evaluation	292-4872
School Psychology	292-8148
Special Education	292-8787

APPENDIX I
(letter to dental parents)

Dear Parent,

I'd like to tell you about a study that your son or daughter will have the opportunity to participate in. I am a Doctoral Candidate at Ohio State University under the supervision of Dr. Donald Tosi (principal investigator). I am doing a survey examining the beliefs and characteristics of adolescents (ages 12 to 18) with and without bronchial asthma. Results from this study will be of benefit in aiding our understanding of asthma and leading to better preventive treatment programs for the control of asthma symptoms in adolescents. Each teen will be asked to respond to three questionnaires: 1) a Common Beliefs Survey, 2) a multiple Affect Adjective Check List, and 3) an Adolescent Information Questionnaire. Together they will take about 15 to 20 minutes to fill out.

Your son or daughter's identity will not be revealed in any publication, document, computer storage, or in any other way which related to this research. All data will be handled confidentially.

We are asking your child to serve in the group of subjects without bronchial asthma or any other chronic disease. If you would be interested in allowing your son or daughter to participate in this study, please show him/her this letter and then contact the receptionist. (Remember! In order to participate in this part of the study, your son or daughter must not have asthma or any other chronic illness.)

Sincerely,

Laura Silverglade

Donald Tosi, Ph.D.
(Principal Investigator)

APPENDIX J

Results of Item Homogeneity Analysis

Summary Table by Scale

APPENDIX J

Results of Item Homogeneity Analysis
Summary Table by Scale

Scale 1 - Perfectionism						
items	loadings					
	1	2	3	4	5	6
1	.44					
12	.43					
17	.39					
23	.43					
29	.51					
35	.54	.37				
40	.62	.35				
Scale 2 - Self Downing						
items	loadings					
	1	2	3	4	5	6
3		.51				
9		.53				
16		.37				
22		.50				
27	.33	.42				
33	.33	.54		.30		
42		.41				
Scale 3 - Blame Proneness						
items	loadings					
	1	2	3	4	5	6
4			.60			
5			.54			
14			.41			
21			.61			
24			.55			
31			.61			
37			.42			

Table 1. cont'd.

items	Scale 4 - Importance of the Past					
	loadings					
	1	2	3	4	5	6
6				.50		
10				.42		
15				.45		
19				.61		
25				.58	.30	
32	.30	.33		.56		
38				.66		

items	Scale 5 - Importance of Approval					
	loadings					
	1	2	3	4	5	6
8					.53	
11					.56	
26					.37	
28					.46	
30					.45	
36	.30	.31			.39	
41					.46	

items	Scale 6 - Lack of Control of Emotions					
	loadings					
	1	2	3	4	5	6
2						.52
7						.32
13						.49
18						.51
20						.48
34						.54
39			.32			.42

APPENDIX K
Pearson Coefficients,
Middle School Group

APPENDIX K
 Pearson Correlation Coefficients
 Middle School Group

Scale	1	2	3	4	5	6
1	1.000	0.389	0.150	0.187	0.100	-0.040
2	0.389	1.000	0.121	0.246	0.233	0.041
3	0.150	0.121	1.000	0.131	0.082	-0.029
4	0.187	0.246	0.131	1.000	0.188	0.161
5	0.100	0.233	0.082	0.188	1.000	0.069
6	-0.040	0.041	-0.029	0.161	0.069	1.000
Total	0.553	0.618	0.494	0.633	0.516	0.349

APPENDIX L
Means and Standard Deviations,
Middle School Group

APPENDIX L
Means and Standard Deviations
Middle School Group

Scale	Mean	Standard Deviation
1	19.17	3.58
2	19.28	3.40
3	22.89	4.15
4	10.08	4.20
5	20.94	3.59
6	19.98	3.33
Total	121.35	11.84