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I am submitting herewith a dissertation written by Joanna Rife Williams entitled "The Relationship between Self-Management Competencies and Illness Outcome in Asthmatic Children." I have examined the final copy of this dissertation for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Doctor of Philosophy, with a major in Psychology.

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AN EXAMINATION OF THE RELATIONSHIP BETWEEN
SELF-MANAGEMENT COMPETENCIES AND ILLNESS
OUTCOME IN ASTHMATIC CHILDREN

A Dissertation
Presented for the
Doctor of Philosophy
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DEDICATION

This dissertation is dedicated to my family. To my parents, who were my first models of competence, strength and understanding, I am indebted for their examples of courage and patience. I have had many teachers along this path but my Mother and Father remain the wisest. To my sister and two brothers, who were my first friends, I also dedicate this work. They have always offered me a strong sense of "belonging" in this wonderful, wacky family and I continue to value their friendship.

I make a special dedication to my children: Randi, Robb, and Kris. They have lived with a "wild" mom for low these many months as the dissertation has come to completion. Their patience and sense of humor have kept me on course in the midst of chaos. They will be happy to return to hot meals and trivial pursuits.

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ABSTRACT

The purpose of the present study was to examine the relationship between asthma self-management competency skills and illness control in a sample of asthmatic children. Previous research has found that there is generally an increase in measures of illness control following asthma self-management programs. However, these programs have not identified reliable or standardized competencies and the research suffers from a lack of consensus on which self-management competencies are critical to the control of asthma.

The subjects were 37 asthmatic children and their parents who were recruited from pediatric allergy clinics. The asthmatic children ranged in age between 6 and 13 years old. Asthma self-management competencies were measured by (1) a child self-report in a structured interview format called the Self-Management Competence Inventory; (2) a parent report of the child's self-management competencies called the Parent Enrollment Questionnaire. Illness control was measured by : (1) number of physician office visits; (2) number of school absenteeisms; and (3) activity ratings by the parent. A correlational design was employed to test for the relationship between asthma self-management competencies and illness control.

Results indicated that the self-management competencies as defined by the Self-Management Competence Inventory were moderately to highly related to successful illness control.

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GENERAL INTRODUCTION

The current increase in investigations of children who are demonstrably resilient under stress underscores the need for the development of research which studies competencies and strengths as opposed to weaknesses and pathological processes. The conceptualization of competencies in the presence of adversities requires a different set of questions and a different set of norms than does the conceptualization of traditional psychological investigations from the deficit model.

As Garmezy (1987) has pointed out, there are some standard questions which researchers need to address in the early stages of identifying variables related to successful adaptation under stressful conditions. First is the issue of identifying cohorts of stress-resistant children whose lives are marked by exposure to some reliably defined stressor. A second question has to do with identifying within that sample of cohorts a subset of children characterized by certain patterns of competence-related behaviors which are different from those of their less adaptive counterparts. Two key problems arise: obtaining valid and reliable definitions and measures of adaptive or successful outcome, and identifying specific and measurable competence-related behaviors.

Various populations of children under stress have been identified and studied in an attempt to understand

competence, coping and adaptation (Garmezy, 1987; Rutter, 1985). Some of these have included studies of chronic conditions such as physically handicapped children (Silverstein, 1982) and infants who survived heart defects (O'Dougherty, 1983). Recently attention has been focused on chronically ill children and their adaptive resources in combating the long-term effects of a medical illness. The interest in chronically ill children comes largely from an awareness that the medical means are available to achieve illness control in many disorders, and yet that control is not being achieved by a high proportion of affected persons (Bergner & Bergner, 1976).

The most common chronic disease of childhood is asthma (Davis, 1972). Children suffering from asthma experience significant functional disability not only in terms of physical restrictions, but also, social and emotional constraints. Medical control of asthma is generally thought to be within reach of all but a small percentage of cases (McNabb, Wilson-Pessano & Jacobs, 1986). Yet, medical management of asthma has not been achieved in many cases of mild to moderate severity (Dolovich & Hargreave, 1981).

A question of interest is what accounts for the successful management of asthma in a group of children who have approximately the same level of severity. Recent studies have emphasized the importance of the asthmatic child's active and effective involvement in self-management

of illness as a crucial factor in successful illness control (Creer, 1980; McNabb, Wilson-Pessano & Jacobs, 1986; Rakos, Grodek & Mack, 1985;). Relying on cognitive social learning theory (Bandura, 1977) studies have generally shown that to the extent a child understands that he/she is in control of the symptoms, feelings of dependence and helplessness are reduced while independence and mastery feelings are augmented (Seeman & Seeman, 1983; Steinhausen, 1982). Investigations of self-management programs with asthmatic children have targeted specific self-care competencies thought to be important in illness control. Programs have been developed to enhance children's feelings of self-control through active mastery of management skills (Evans, et al., 1987; Parcel, Nader & Tiernan, 1980).

Essentially, the present study is an exploration of how chronically ill children achieve some measure of self-control over their illnesses. Self-management skills provide one possible means of achieving some level of self-control. This study examines types of self-management skills and levels of illness control. The methodologic research incorporated in the present study is of interest because measurement tools and procedures to assess self-management behaviors are in need of standardization and validation.

One significant problem in evaluating studies which claim to increase illness control through greater self-control is the lack of consistent identification and

measurement of specific behavioral skills necessary to control the condition. An instrument designed for this purpose is the Critical Self-Management Competencies for Children with Asthma which is being developed (Wilson-Pessano, 1987). The present study attempted to extend the validation of this instrument, in modified form. This modified form is referred to as the Self-Management Competence Inventory. This study collected data from parents and children and assessed the presence or absence of competency behavior in a sample of children in relation to the degree of demonstrated illness control.

Obtaining agreement, i.e. consistency across studies, on criteria for successful illness control is another obstacle to research in the area of self-management behavior. One criticism of previous studies is the lack of multiple measures to indicate adaptive or successful outcome (Creer, 1979). Studies generally use either medical outcome (days in hospital; medical compliance) or quality of life (days absent from school). It is reasonable to assume that the successful control of illness involves not only medical management but also quality of life factors. The present study included both medical outcome and quality of life measures to ensure comprehensive definitions of outcome.

CHAPTER 1

REVIEW OF THE LITERATURE

The literature review is divided into three broad sections. The first section presents an overview of chronic illness and asthma, focusing on empirical research and issues in illness control. The second section presents an overview of self-management psychology, focusing on the defining characteristics and conceptual models. The third section relates self-management to the treatment of asthma, focusing on self-management competencies.

Chronic Illness in Childhood

Chronic illness in children represents one type of stressful situation which requires significant demands and adaptations over time. For many children who are afflicted with illnesses that are chronic in nature, sickness is a way of life; cure is often impossible and exacerbation of symptoms is a constant concern. Maintaining a stable condition may require the adaptation to a lifestyle that deviates from what is "normal". The imposition of this illness-related lifestyle is often stressful for those affected and frequently leads to deviance in psychological and social functioning which may or may not be healthy for

the child Mattsson, 1972).

Dependency may be one such deviance. Exaggerated dependency, especially on the mother, has traditionally been targeted as contributing to maladjustment in general, and to asthma in particular (Abramson, 1954; Meijer, 1979; Travis, 1976). With asthmatic children, dependency has frequently been mentioned as an emotional factor which impedes normal growth and interferes with independence strivings. Asthma is an unpredictable and sometimes life threatening disease. Difficulty in breathing presents an obvious threat to the vital function of living and can be viewed as a strong motivator for seeking some action which relieves the condition (Voorhorst-Smeenk, 1977). An asthma attack often triggers panic and immediate reactions of helplessness in the child leading to realistic dependency on others as a source of relief from symptoms.

A prominent characteristic of the development of a normal lifestyle in childhood is the gradual increase in independent and self-reliant behaviors and attitudes. Conversely, there is a gradual decrease in dependent and other-reliant behaviors and attitudes as the child comes to use his/her own self-determination and judgements. Indications are that as development progresses naturally from infancy to adolescence, the child's world broadens and experiences reinforce a sense of mastery, independence, and

self-management resulting in a greater control over the environment (White, 1963).

Chronic illness in childhood impacts on this unfolding of independence strivings and self-management abilities, creating a unique situation where dependence upon others is often a necessary adaptation for healthy existence. Reid (1984) studied locus of control in chronically ill children and concluded that becoming more external (perceiving events as a consequence of chance or powerful others) may be an adjustive strategy reflecting real limitations in instrumental control in one's world. Perhaps through experience the child observes that when the parents or doctor step in to intervene, symptoms recede and control of illness is re-established. This would be a powerful reinforcer, inducing the child to remain dependent on others for illness control.

Meijer (1979) investigated levels of dependency in thirty-one asthmatic children and twenty-nine controls, ages 6-11. Dependency was found to be associated with emotional disturbances in distinct patterns for the two groups. In normals, high-dependency children evidenced significantly more defiance, and tended to have greater depression, anxiety and hostility than low-dependency children. Conversely, in asthmatics, high-dependency children evidenced significantly less defiance and hostility and tended to have less

depression and anxiety than low-dependency asthmatics. Meijer concluded that asthmatics tend to show less emotional disturbance when they can be dependent.

Dependency in asthmatic children has been studied extensively in regard to psychopathology (Khampetikit, 1983; Meijer, 1979; Travis, 1976). Personality configurations of children with asthma fall along a continuum which ranges from mild to severe psychopathology. Prugh and Eckhardt (1975) have reported that the personality patterns of chronically ill children range from overdependent, overanxious and passive or withdrawn patterns to overly-independent, aggressive modes of behavior, with strong associated tendencies to deny illness, even to markedly unhealthy extremes. Mattsson (1972) has noted that there are some children who develop realistic conceptions and acceptances of their illnesses with subsequent capabilities to master their apparent limitations. There is a lack of research examining these children who develop adequate coping skills and adequate social outlets. There is also a lack of research examining how dependence versus independence relates to illness control and whether dependence may be a successful coping skill in the overall management of asthma.

Asthma as Illness

Asthma is one of the common chronic illnesses beginning in and observed during childhood. Chai (1975) has defined asthma as an intermittent, variable, and reversible airway obstruction. Each of these terms is important in any comprehensive understanding of asthma because they emphasize the unpredictability of the illness. "Intermittent" refers to the fact that an asthma attack usually occurs on an aperiodic basis which interferes with both prediction and prevention of the attack. "Variable" indicates that the attacks vary in severity from mild episodes to severe, within the same patient and across patients. "Reversible" highlights that airways may return to their normal or near-normal state either spontaneously or with proper therapeutic efforts.

The American Lung Association (1975) estimated that between 5% and 15% of children eleven years of age and younger suffer from asthma. Males below the age of 5 years are affected approximately 1.5 to 2.0 times as often as females. This trend drops off during middle childhood and in several reports it has been noted that in adolescence more boys than girls cease to have asthma (Evans, 1979; Jones, 1976). The age of onset reported is variable. One study cited in Jones (1976), based on a review of approximately 12,000 asthmatics, found that 24% of the cases had an age of

onset before 5 years of age, while 16% had onset of 5 to 14 years of age. Generally, better prognosis is related to earlier age of onset of asthma, the exception being in infants. When onset occurs under age 2, the prognosis is poor (Creer, Renne & Chai, 1982). Studies have typically excluded information on age of onset and there is a need to include this variable in subject descriptions in order to make valid statements about coping with illness over time. Interpretations of findings may differ depending on whether the child has established long-term coping strategies versus acute management attempts.

The mortality rate of asthma during childhood remains constant at about 1% (Jones, 1976); it is estimated that asthma claims between 2,000 and 3,000 victims each year in the United States (Creer, Renne & Chai, 1982). Gordis (1973) has argued that the number of asthma-related deaths is likely to be an underestimation because asthma is frequently a contributing cause rather than the underlying cause. The standard policy of coding cause of death in the United States is to record only the underlying cause. The contributing cause is generally not reflected in official mortality figures.

An attack of asthma involves a narrowing of the large and/or small airways. Its causes include any or a combination of: smooth muscle spasms, swelling of tissue,

excessive mucus secretion and dried or wet mucus plug. As Creer (1979) pointed out, there are various proportions of these conditions in each patient. Smooth muscle spasm of large airways is an important factor in asthma. If not accompanied by secretory plugging of small airways, it accounts for the dreamitic onset and remission of attacks; however, when small airways are obstructed by secretion, the reversal of symptoms will be much slower. During an attack, the chest becomes over-inflated and exhalation is forced and prolonged. If the attack is severe, normal amounts of oxygen and carbon dioxide are not maintained in the blood or tissues.

Diagnosis of asthma is generally based on both subjective and objective measures. Clinical characteristics include wheezing, dyspnea (difficult, labored breathing) and sometimes coughing. Clinical symptoms vary as to intensity and duration. By themselves, symptoms do not confirm the presence of asthma. Chevrier Jackson made the oft repeated statement, "all is not asthma that wheezes", referring to foreign bodies in the airway and to other diseases which may cause wheezing (Jackson, 1931). In a longitudinal study, Goodall (1958) reported that of the 22% of children who had a history of wheezing, only 5% were ultimately diagnosed as having asthma.

examined hospital admissions for acute asthma in 110 children, ages 8 months to 14 years, with onset of wheezing as the primary diagnosis, found that 32% of these children with previous wheezing had not been diagnosed as asthmatic. They concluded that had these children received the correct diagnosis of asthma earlier and been treated with effective medication, hospitalization could have been prevented.

Creer (1979) noted that there is a need for valid diagnosis by behavioral scientists and that many researchers fail to obtain an accurate diagnosis, accepting instead the parent's word without additional confirmation. There are several reliable procedures available which physicians and researchers may use to improve the accuracy in diagnosing asthma. Chai (1975) has enumerated several: bronchial challenges, where the patient is exposed to stimuli thought to provoke asthmatic attacks; pulmonary physiological tests, including the spirometer and the peak flow meter; blood eosinophil counts; skin testing; and the RAST test, an acronym for the radioallergosorbent test which establishes the presence of elevated levels of specific antibodies, IgE immunoglobulin in the blood of some asthmatics. Studies which fail to include a confirmation of the diagnosis omit a necessary link in the investigative process. As Creer (1979) noted, it is the

confirmation of the diagnosis which provides validity for the dependent variables.

Emotional factors have long been associated with asthma. Studies investigating the influence of emotional factors on asthma illness control have generally viewed it from one of three perspectives: as an antecedent condition, as a concurrent condition or as a consequence. First, a number of researchers consider that the incidence of asthmatic attacks precipitated by purely emotional factors is small (Dolovich & Hargreave, 1981; Travis, 1976). However, psychological factors are likely a secondary contributing factor, triggering an attack when other precipitators are present (Creer, 1982). Purcell (1975) reported that both positive affects such as excitement and laughter, as well as negative affects, such as crying, precipitated attacks in some of the children in his studies.

Second, emotional factors have been examined from the perspective of concurrent influence on the management of an attack. A behavioral pattern common to asthmatics has been labeled "panic-rear" (Dirks, Jones & Kinsman, 1977). It is a pattern of responding with extreme emotionality when an attack occurs and results in exacerbation of ongoing attacks. Patients identified as high panic-fear respond to attacks by emphasizing their distress and dependence in an

anxious maladaptive manner. In contrast, patients identified as low panic-fear respond to attacks by extreme counterphobic independence which often precludes appropriate medical intervention (Kinsman, Dirks & Jones, 1976). There is strong evidence that patients can learn to respond to attacks with an appropriate level of anxiety which enables them to implement appropriate interventions (Creer, 1974; Knpp & Wells, 1978; Miklich et al., 1977).

Third, emotional factors have been studied as consequences of asthma. In terms of emotional response to the illness, Mattsson (1972) noted that well-adapted children characteristically express anxious, sad and angry feelings during exacerbations of the illness while showing confidence and guarded optimism during times of remission. Typical psychological defenses of this group include (1) denial, of both physical pain and of future uncertainty which enables them to hope for reasonable recovery; (2) isolation of emotional distress; and (3) identification with others who are successful in dealing with similar problems. Numerous studies have identified emotional factors which distinguish asthmatics from other chronically ill groups and from normal controls. A recent study by Roberts and Strayer (1987) using asthmatic preschool youngsters, found parental encouragement of emotional expressiveness was positively associated with child

competence as measured by teachers' ratings.

Studies investigating emotional expression have generally noted the suppression of affect in asthmatics and have related that to psychopathology. French and Alexander (1941) were the first to propose that asthmatics may be less able to express anxiety, grief and anger than nonasthmatics. Tests of their hypothesis have produced conflicting results. Hilliard, Fritz & Lewiston (1982) found that asthmatics did not differ from diabetic or healthy children in expressiveness of feelings. Viney and Westbrook (1985) compared a sample of 53 asthmatic children with a sample of 42 nonasthmatic children. The psychological reactions of children were assessed using open-ended questions covering nine areas of emotionality. Results indicated that asthmatics did exhibit greater levels of uncertainty and anxiety when compared to the control group. However, when the total pattern of responding was examined, asthmatics evidenced expression of both positive and negative emotions. Positive emotional expression and competence was in fact greater for the asthmatic children than for the controls. Prognostically, the ability to express emotions has been found in adult asthmatics to be a predictor of successful illness outcome (Viney & Westbrook, 1982). Although these findings were not related to outcome measures, the implication, based on

the adult findings, is that greater emotional expression of both positive and negative feelings is a predictor of effective treatment.

The findings may be limited to fairly high functioning and actively involved asthmatics who evidence moderate to severe asthma and less relevant for asthmatics not fitting that description. The sample was taken from a group of asthmatics who were enrolled in a health prevention swimming program which indicates an active commitment to control of illness. All of the children were taking daily medications so that severity level was likely moderate to severe.

Severity as a Variable

Severity of asthma refers to physiological parameters, such as levels of airway obstruction of a pulmonary function test, frequency of acute attacks and functional impairments, such as sleep loss and exercise tolerance. Generally asthma is classified as mild, moderate or severe on the basis of history, physical examinations, pulmonary function tests and medication response. Chai, Purcell, Brady & Falliers (1968) examined several types of asthma severity measurements and concluded that clinical and physiological information by the physician is the most reliable and valid severity measure. Verbal reports by

parents were the least valid measures. As indicated, it is important that researchers report level of severity and source of severity measure.

Medication requirements are often used in assessing the level of severity. Briefly, the course of medications prescribed for asthma begins with bronchodilators. If this is unsuccessful in control of symptoms, theophylline and/or cromolyn sodium are added to the regimen and taken prophylactically on a long-term basis. For patients whose symptoms still persist, steroids are the last treatment of choice (Weinstein, 1987). Since particular medications are associated with levels of severity, medications have been used in a number of studies as measures of severity (Bernstein, 1978; Godfrey, 1977).

Wilson-Pessano (1983) has noted that issues of medication adherence complicate the use of medications as the only measurement index of asthma severity. For example, the frequency of attacks, which is judged as an index of severity, will depend greatly on whether the medication is taken as directed. There is a difference between the severity of the asthma as a physiological management problem and the severity of the self-management problem. For example, a child with moderately severe asthma may be noncompliant with the medication regimen, and therefore appear more severe by virtue of frequent

physician office visits, frequent attacks and limited activities. Whereas a child with severe asthma who is compliant with medication may appear less severe based on the above criteria. Accordingly, when severity of asthma is measured by number of doctor's visits or school absenteeisms, there is likely a confounding between severity as a physiological problem and severity as a self-management problem. As discussed, it is likely that compliance impacts on compliance. Deaton (1985) found that compliance with medication was positively related to the physicians' ratings of severity, such that when physicians rated asthma as more severe, medications were more likely to be taken as prescribed.

The assumption has been that compliance to medical regimens is essential to successful illness control, especially with the chronically ill. Efforts to design interventions which increase compliance have generally resulted in better illness control (Eney & Goldstein, 1976). However, there is also evidence that compliance alone may not be a sufficient condition for successful medical outcome. A recent study by Deaton (1985) examined the issue of compliance to medical regimes and her results indicate that degree of compliance with medications and with behavioral recommendations were not significantly related to the medical outcome variables of amount of

hospitalization or number of physician contacts during a 9-month period.

These findings suggest that other factors may mediate successful outcome, such as parental adaptiveness and variability in making decisions about adherence to the prescribed treatment. Information concerning compliance to the medical regimen may be necessary but not sufficient in assessing illness control. Additional factors for self-management competencies associated with medication include: (1) that preventive medications be the responsibility of the patient; (2) that the patient recognize undesirable side-effects and report the same; and (3) that the patient cooperate with the regimen even when it is restrictive (McNabb, et al., 1986). These issues go beyond the notion of collecting straight-forward compliance data and include medication competencies which support the successful self-management scheme.

Severity of asthma has been shown to correlate moderately with activity restriction and school absenteeism (Parcel, Gilman, Nader & Bunce, 1979). Severity has been related to behavioral and emotional deviance by a number of investigators (Graham, Rutter, Yule & Pless, 1967; McNichol et al., 1973; Pinkerton, 1970). Norrish, Tooley and Godfrey (1977) investigated the relationship between severity and behavioral deviance in 63 asthmatic children

between 8 and 15 years of age. Behavioral deviance was measured by three personality inventories and included exaggerated dependence and emotional reliance on others as elements of deviance. Level of severity was assessed by type of medication rather than physician rating. Findings did not support the correlation previously noted between severity and deviance. Results did indicate that illness outcome, as measured by a 5-point scale to indicate adequacy of control by medication, was related to deviance. The implication is that poor control of asthma appears to be related to, among other things, exaggerated dependency and behavioral problems and not to medical severity. This is an important finding in terms of making a clear distinction between severity, illness outcome and emotional adjustment.

Previous research has tended to confound severity as a physiological problem and severity as a self-management problem. For example, in a study by Graham et al., (1967) severity was measured by number of school absenteeisms and amount of activity restrictions. As Wilson-Pessano (1983) has noted, these measures represent self-management problems and not physiological problems.

Self-Management Psychology

Defining Characteristics

The study of self-control within psychology is generally referred to as self-management or self-regulatory processes. Thoresen & Kirmil-Gray, (1983) have postulated three defining characteristics of self-management: (1) conscious effort; (2) conflict of choice; and (3) focused attention. Conscious effort refers to the individual's level of determination and conscious motivation for health maintenance or illness control. Studies have shown that active involvement can increase conscious effort and result in better outcome. Recent studies have shown that increasing the patient's participation in decision-making about treatments choice, and personal contact with health care workers result in improved outcome (Maiman, 1979; Levy, 1979). Implications are that since one aspect of self-management involves conscious effort from the patient, possible ways to establish, maintain and even increase that effort in prevention and intervention are to give the patient a more active role in health care.

Conflict of choice is the second defining characteristic of self-management which Thoresen & Kirmil-Gray (1983) identified, and refers to the need to

overcome well-established habits or patterns of behavior in seeking resolution. For example, an asthmatic child might find it difficult to avoid certain precipitants of attacks in learning good prevention skills because the precipitant offers an attractive pull (picking up a kitten when cat dander is a precipitant). Especially for children, delay of gratification has been shown to be a determining factor in the ability to make good choices when there are competing situations (Mischel, 1973). If the "good" choice yields little or no immediate gratification as compared to other available choices, then self-control is called into play. Typically, younger children make choices that permit them to "enjoy now and pay latter." The self-control task for them is to help others and themselves to restructure the environment, and the way they think about the problem, to offset the conflict of choice and the efforts of competing against conflicting consequences. In one study the investigators found that when the child was taught to cover up the desirable but "wrong" choice item and to mentally attend to less desirable aspects of the item, delay was increased and the "right" item was chosen (Mischel & Mischel, 1983). The "right" item permitted the child to gain more tokens in the long run, so it was a choice of immediate gratification and less reward versus delay of gratification and more reward. Self-management

competencies which involve conflict of choice and delay of gratification are difficult tasks for the asthmatic child.

The final determining characteristic of self-management is focused attention. This refers to the requirement that the individual be consciously aware, at a detailed level, of actions as well as immediate environmental context. For example, the asthmatic child must be vigilant to the environmental precipitants and to internal cues of symptoms in order to prevent an attack. Some kind of internal arousal or external disruption generally merits conscious attention for several short moments (Pribram & McGuiness, 1975). However, in self-management the task necessitates the creation and the maintenance of sustained conscious attention, usually focused on several aspects of the internal and external environment, over an extended time period (Thoresen & Kirmil-Gray, 1983).

The implication of this review of self-management psychology is that self-management is multi-factorial and its measurement must include measures of behavioral, affective, cognitive, social, physiological and environmental variables.

Conceptual Models

Historically, the predominant model which has guided self-management research in the past 10 years was introduced by Kanfer and Karoly (1972). It is a three-stage model of self-control: self-monitoring, self-evaluation, and self-reinforcement. Briefly, the investigators view self-control as a broad descriptive term which refers to specific actions individuals make in particular situations to influence certain behaviors. Three sources of influence are posited: environmental, cognitive, and physiological variables. The self-control behavioral chain includes: (1) self-monitoring (e.g. the child records daily asthma attacks); (2) self-evaluation (e.g. the child makes judgements about the severity of attacks in order to know what action to take); and (3) self-reinforcement (e.g. the child takes specific action which results in symptom relief). This model is appealing because of its parsimony, its reliance on well accepted behavioral formulations and its testability. However, the model is limited in providing a range of strategies for behavioral/cognitive intervention (Thoresen and Mahoney, 1974). For example, there is no procedure for identifying specific influences or skills which might increase either cognitive or behavioral self-control. More importantly, the model appears inadequate at integrating complex

situational, perceptual, cognitive and emotional factors. As Thoresen & Kirmil-Gray (1983) suggest, "models of self-control have generally failed to move beyond the dichotomous thinking encouraged by a self versus environment position (self-control versus external control)".

One of the most compelling models in current self-management research is the cognitive social learning model. This interactive model suggests that cognitive, physiological, environmental, and behavioral sources of influence should be studied in concert. Variables in the system never function autonomously. Interventions focused on one variable may be less effective immediately and over time compared to treatments that concurrently consider multiple sources of influence (Schwartz, 1982).

Bandura (1982) has recently focused on the cognitive influences and has postulated that the "self-referent cognitive processes" may be at the heart of self-control. Self-referent processes involve the individual's perceptions and beliefs about himself in relation to the environment. An important self-referent process is personal self-efficacy. As Bandura has defined it, self-efficacy refers to the person's level of conviction that he or she is capable of doing certain things successfully, for example being able to avoid precipitants

which lead to an asthma attack. Expectations of self-efficacy determine whether coping behaviors will be initiated, how much effort will be expended, and how long it will be sustained in the face of difficulties (Bandura, 1977). For example, studies have found that children who expect to be successful (high self-efficacy) persist longer on difficult cognitive tasks than those who believe they will fail (Ames, 1978; Fry, 1977).

Bandura has described four ways to influence a patient's self-efficacy: (1) enactive: successful performance of the behavior itself increases a person's confidence in his/her ability to repeat the behavior; (2) vicarious: observation of a credible role model performing the behavior can augment self-efficacy; (3) persuasive: exhortations and encouragement can alter feelings of self-efficacy; and (4) emotive: high states of emotional arousal can impair self-efficacy. The enactive, vicarious, and persuasive elements represent influences of decreasing strength and suggest different educational/behavioral strategies. The impact of this model on current self-management programs has been tremendous. In summary, perceived self-efficacy influences the self-control of behavior. What people believe themselves capable of doing greatly influences their decisions and choices about what to do.

Parent-Child Agreement of self-management skills

In the past, self-management research has tended to rely on parents and teachers as informants of self-control behaviors. For example, the Self-Control Rating Scale for children (Kendall & Wilcox, 1979) was developed to aid behavioral therapists in the study of generalized effects of self-control training of children. The scale was administered to adults (teachers and parents) who were considered reliable informants of the child's behavior. Relying on the conceptual framework of Kanfer and Karoly (1972) the authors selected self-control competency items based on (a) active cognitive factors of self-monitoring and self-evaluation such as deliberation, problem solving, planning and evaluation (e.g. Does the child work for long range goals?); and (b) behavioral self-control factors such as ability to execute the chosen behavior or ability to inhibit behaviors which are cognitively rejected (e.g. Does the child jump or switch from activity to activity?).

Adults' reports correlated in the expected directions with behavioral observations in the classrooms, behavioral problems, and children's social perspective-taking abilities (Kendall, Zupan, & Braswell, 1981). Sex comparisons found that boys were rated as less self-controlled than girls which was expected in light of previous data concerning the general incidence of

behavioral problems and impulsivity in boys. Age was found to be a significant factor, supporting the developmental concept of self-control that there was an increase in self-control with increasing age (Kendall & Wilcox, 1979).

The Self-Control Rating Scale represents a valid instrument with which to measure children's self-control and supports the accepted view that adults are reliable informers of children's self-control and self-management behavior. Humphrey (1982) noted the absence in self-management research of the child's perception of his/her own self-management performance. In an effort to examine convergence of child and adult perspectives of the child's self-control behavior, Humphrey (1982) developed the Children's Self-Control Scale to parallel the parent's form. Self-control competency items were selected on the basis of subjective judgment by the author that the items were "well suited to the present purpose" (p.625).

Results indicated that adults' rating of children's self-control was not highly correlated with children's perceptions of their own self-control. Psychometrically, the adult's scale was stronger in terms of a more stable factor structure, higher test-retest reliabilities, and more significantly related to criteria measures (Humphrey, 1982). Humphrey interpreted the finding of non-significant correlation between adult report of self-control

competencies and child's report of self-control competencies as reflecting differences between adults' and children's cognitive and emotional development which impact on the child's accuracy in self-observing and reporting.

The question of whether children are reliable informers of their own behavior and/or whether there are areas best served by having an adult be the reporter of symptoms is especially relevant to asthma research where self-monitoring and self-evaluation skills are necessary to take corrective action. Duffy (1981) found that parents of asthmatic children assume responsibility for monitoring their child's symptoms of illness more frequently than parents of non-asthmatic children. The asthmatic children appeared to rely on parents for symptom recognition more frequently than children of non-asthmatics.

The implication is that parents may be more reliable informers by virtue of enactive processes; that is, if the pattern is that the parent more frequently takes responsibility for symptom recognition, then the parent has likely developed better recognition skills. Children who are competent in symptom recognition (ie. have practiced the skill of symptom recognition and have ability to take action when needed) may be better reporters of their own behaviors because they have successfully performed the behavior than children who are incompetent in

self-management skills.

Parent-child agreement in the area of behavioral incompetence or deviance (i.e. depression and conduct disorder) has received more attention than parent-child agreement in the area of behavioral competencies. Generally research in clinical populations has demonstrated a low correlation between child and parent reports of behavioral and ideational symptoms (Herjanic & Reich, 1982; Kazdin, Esveltdt-Dawson, Unis & Rancurello, 1983). One source of the low correlation is the general finding that parents rate the presence of more symptoms and a greater severity of symptoms than do children (Mokros, Poznanski, Grossman, & Freeman, 1987). Verhulst, Althaus & Berden (1987) studied the relationship between parents' reports of behavioral and emotional problems with children's reports of the same in a clinical and non-clinical population. The results indicated that the majority of discrepancies were due to higher parents' scores; that is, parents generally rated behavioral-emotional problems more severe than did the children. One exception was that better-functioning children scored higher than parents on reports of fears. The interpretation was that a child's reports of fears may be related to better adaptive functioning rather than to psychopathology.

Studies have suggested that children are likely to be better reporters of behavior that is ideational (private and internal experiences) while parents are better informers of overt behaviors (Edelbrock, Costello, Dulcan, Conover, & Kalas, 1986; Mokros, Poznanski, Grossman, & Freeman, 1987). The implication of these studies is that despite weak relationships between parent and child reports, each may contribute to an understanding of behavior in selected areas.

Self-Management and the Treatment of Asthma

The development of self-management in psychology is a manifestation of the recognition that patient involvement and personal responsibility result in better outcome (Bartlett, 1983). Chronic illness in general and asthma in particular offer testing ground for self-management theory and techniques. Success in the medical management of asthma is currently thought to be within reach of all but the most severe and intractable cases. However, there is a high proportion of patients who do not achieve successful control (Dolovich, Hargreave & Wilson, 1975). The goal of therapy in asthma is to provide the child with the means for reducing symptoms so that he/she will be able to attend school regularly, engage in play activities without limitations and sleep through the night uninterrupted. In

other words, if therapy is successful, the child will lead a normal life and not be subject to the unpredictability and variability of asthma.

Based upon self-management theory, several clinical programs have been designed to increase the child's control over symptoms and reduce his/her dependence on others. Evidence from these asthma self-management programs lends further support for the tangible benefits for children who learn self-management skills and who practice these skills at home and at school. The programs share the theory that a child's active and effective involvement in health care will result in successful management of illness and that persistent dependence on adults is counterproductive. The programs differ to the extent they rely on behavioral, cognitive or affective components. A review of these programs reveals that they suffer from the need to utilize behavioral analysis in the identification of self-management competencies and to develop valid and reliable instruments with which to measure those competencies.

The American Lung Association has developed a program for asthmatic children and their families. The Family Asthma Program in Buffalo, New York, is an exemplary project which includes a multimodality of treatments including exercises, recreation and relaxation training for

children. Specific self-management competencies identified and taught in this program included (1) self-monitoring of physical symptoms, which is necessary for prevention and intervention and (2) self-relaxation through repeated practice sessions. The strength of the program appeared to be that six sessions were devoted to acquisition and rehearsal of the skills (Thoresen & Kirmil-Gray, 1983). A 1-year follow-up that included 60% of the participants indicated that there were significant increases in attendance to physical education classes, decreased school absenteeisms and decreased number of emergency treatments as reported by parents (Wilson-Pessano & McNabb, 1985). The weakness of the program is that the identification of competencies was not based on a behavioral analysis of skills which reduce asthma attacks. The study does highlight the effectiveness of having family involvement in asthma programs and of the success in repeated practice of newly learned skills.

A self-management program delivered in elementary schools was described by Evans et al., (1987). The self-management competency skills were identified through family interviews and included dealing with feelings about asthma, medications, decision-making, intervention skills, prevention skills and communicating with the physician. The program focused on the child's independent actions as

self-managers, emphasizing the child's responsibility for recognizing asthma symptoms and initiating appropriate treatment. The program was designed to enhance children's feelings of self-efficacy through enactive mastery of self-management skills. Methods included games to practice decision-making, role playing to rehearse asthma management skills and encouragement to believe in their own ability to manage wheezing episodes. The program was a six-session group format (classroom). The sample studied was low-income, predominantly Hispanic and black children from inner-city New York.

A 1-year follow-up that included 85% of the participants indicated that intervention skills increased and self-efficacy index scores increased. However, school absenteeism was not affected. The investigators explained the low impact of the program on school attendance as reflecting the mild nature of asthma in this sample. The investigation did not include a measure of severity; infrequent use of emergency health care services was used as the measure of "mild" asthma. Other studies indicate that samples of children with asthma selected from school populations average only three to five absences per year due to asthma (Parcel, et al., 1979) which may be less than for children selected from clinic populations.

The two programs discussed above employ health care

workers as the providers. Rakos, Grodek & Mack, (1985) investigated the utility of a totally self-administered program in terms of outcome. A self-help program for asthmatic children ages 7 to 12 called "Superstuff" was developed by Weiss and his collaborators at the American Lung Association (1981). The program was aimed at making self-management training more cost-effective by eliminating experts in the instructional process. "Superstuff" is a totally self-administered self-management package for pediatric patients with moderate to severe asthma. Forty-three patients participated and were assigned to either the "Superstuff" condition or the control condition. Severity was measured by the referring physician on a Likert-type scale. Self-management competency training emphasized teaching intervention skills, enhancement of self-esteem and increasing feelings of control. An Asthma Self-Control Inventory was developed for the study to measure the child's sense of control of asthma and asthma related behaviors. Normative, reliability and validity data were not available.

Results indicated that "Superstuff" enhanced asthma self-management skills as reported by the child; decreased interruptions due to asthma as reported by parents; but did not affect medical contact measures or school absenteeisms. The investigators concluded that the self-administered

format has limited benefits. One problem with self-administered programs in general and with "Superstuff" in particular is the lack of compliance with instructions and failure to complete the program. Only 50% of the parents reported that they completed all the exercises.

These three programs are representative of self-management approaches to asthma. Generally they show progress in self-management training and adequate attempts to use multiple outcome measures. However, they do not demonstrate valid and reliable measurement of the self-management competencies which they teach.

Self-Management Competencies

In an early effort to define asthma self-management competencies, Parcel and Nader (1977) outlined five skill areas which their work with asthmatics had led them to identify. The skills included: (1) observation: being aware of situations which might lead to an attack; (2) discrimination: being aware of physiological changes associated with asthma attacks; (3) decision-making: being able to make sound decisions about interventions and to seek help when needed; (4) communication: being able to inform others of impending attacks; and (5) self-reliance: being able to have confidence in the ability to manage asthma. Parcel and Nader (1977) developed an educational

program based on these competencies but were unsuccessful in effecting a change in health status of the participants.

Creer and his colleagues at the National Asthma Center in Denver have identified as important competencies for asthma control: experience, relaxation and rehearsal (Creer, 1987). Experience in performing self-management skills serves to strengthen expectations of success. Renne and Creer (1985) noted that expectations of success or efficacy is a powerful determinant of a child's ability to initiate a treatment plan to manage asthma. Competency in relaxation is a management tool to aid in avoiding an attack and in bringing the attack under control. Creer and his colleagues have effectively taught asthmatic patients biofeedback as an adjunct to relaxation training and have noted improvement in asthma severity and medication use (Creer, 1987). Rehearsal of self-management skills through use of imagery was found by this group to be an effective self-management technique (National Heart, Lung & Blood Institute, 1986).

These competencies represent the result of years of work with asthmatic patients. Through experience these investigators have identified important competencies which have guided their clinical work as well as research. Clinical judgement can be useful in exploratory identification of competencies; however, the field of

self-management competencies has progressed beyond this point, to a position of requiring more scientific analysis of the critical self-management competencies.

Critical Self-Management Competencies

In an effort to identify which self-management skills are essential to the control of asthma, McNabb, Wilson-Pessano & Jacobs, (1986) used the "critical incident technique" to identify the full range of behaviors which would define self-management competencies. Basically this technique, which is generally used in occupational analyses, treated asthma self-management by a child as a job; accordingly, the task was to define the critical performance requirements of that job (Wilson-Pessano & McNabb, 1985). The importance of behavioral analysis has been underscored in behavioral medicine research as necessary in understanding and changing behavior (Keefe & Blumenthal, 1982).

The technique was to ask parents, asthmatic children and health care workers questions about the specific actions which a child would take in dealing with an asthma attack and whether those actions were effective or ineffective. A total of more than 1,300 descriptions of effective and ineffective actions affecting children's asthmatic conditions were obtained from 565 respondents.

Each incident was reviewed and analyzed by medical and nursing staff to ensure that the incident described was complete and would have a resultant effect on the asthmatic condition. The behavioral incidents were then analyzed by the research team to develop a typology of critical self-management competencies for children that included 66 specific competencies within 21 more general competencies. Thus, McNabb et al. have developed an instrument which identifies 66 specific self-management competencies which asthmatic children successfully use in controlling their asthma.

The general competencies were subsumed under four broad competency areas: (1) prevention of attack; (2) intervention when symptoms begin; (3) compensating for having asthma; and (4) dealing with external controlling factors. Prevention competencies include eight content areas of behaviors which are critical in avoiding an asthma episode or in preventing its occurrence. Examples include avoiding precipitants of an attack and taking preventive medicine. Intervention competencies include five content areas which are critical to the control of symptoms after they begin. Examples include taking corrective action to lessen the attack, such as drinking water and remaining calm during an attack. Compensatory competencies refer to emotional adjustment and include six content areas.

Examples include discussing asthma with peers and not using asthma in a manipulative manner. The fourth category, dealing with external controlling factors refers to actions which adults might take to lessen the child's self-management efforts. Examples include adult denial of asthma attack and overprotection from a parent.

As Wilson-Pessano has noted, this typology of asthma self-management competencies defines in a comprehensive manner what it means for a child to be competent in asthma management. Criteria for acceptable or unacceptable responses have been developed for each content area. For example, to assess a child's knowledge of personal precipitants, one item in the scale is: "Do you know what causes you to have asthma attacks? Can you name three specific things?" Adequate responses consist of listing at least three precipitants, which are substantiated by the parent's report.

The construction of a criterion-reference instrument to assess self-management competencies allows the researcher or clinician to interpret items in relation to clearly defined domains of behavior as opposed to norm-referenced measurements which compare the individual to other examinees (Popham & Yalow, 1983). Thus, for example, there are five critical competencies for intervention. If a child demonstrates knowledge and

understanding of three of these, the score represents percentage of the domain mastered and is not relative to norms or percentiles.

Another feature of criterion-referenced instruments is that reliability may be quite different than for other types of instruments. Anastasi (1976) noted that internal reliability with criterion-referenced tests deserves a different consideration because rejecting items to increase the alpha may be compromising external validity in order to homogenize the test. Anastasi pointed to the need of examining items in relation to item correlation and in relation to criterion coverage. Wilson-Pessano (1983) argues for a more sophisticated conceptualization of instrument reliability than that which is commonly applied to instruments which health providers use. For an instrument which has a small number of items, where each item is designed to measure a different objective, the standard of high internal reliability is not appropriate. For example, in the area of prevention, a child who has mastered the task of avoiding precipitants may or may not have mastered the task of using mental control techniques to prevent an attack. Thus, there may be different statistical methods needed or different interpretations required when criterion-referenced instruments are used.

The validity of the self-management competencies is

currently being investigated and has been demonstrated indirectly through the development and evaluation of educational programs which teach these competencies.

In one study, subjects in the treatment groups who attended four 1 hr. sessions where they were given information about self-management, had group discussions and were taught relaxation training, showed an increase in intervention competencies but this did not affect health outcome measures as predicted (Wilson-Pessano, et al., 1987). Prevention competencies were not changed and compensation behaviors were not reported.

In another study using subjects whose illness control was judged to be very poor, as opposed to the above study where illness control was judged to be well controlled, intervention aimed at teaching the self-management competencies resulted in a reduction of emergency room treatments (McNabb, Wilson-Pessano, Hughes & Scamagas, 1985). These exploratory studies point to the need for understanding how each of the areas of self-management competencies contribute to the overall outcome of illness control.

Statement of the Problem

Direct validation of the asthma self-management competencies has not been demonstrated and that is one of the purposes of the present study. By assessing the presence or absence of these competencies in children with either successful or unsuccessful control of their asthma, one can determine their validity. If the competencies are valid and the child perceives that he/she is practicing self-management skills, then the degree of asthma control should be higher, other factors such as severity and age at onset being controlled. A second purpose of the present study is to explore the concurrence of asthma self-management competencies as reported by parents and by children. The following hypotheses will be evaluated:

1. It is hypothesized that asthma self-management competency subscale scores, as measured by the child Self-Management Competency Inventory, and the Parent Enrollment Questionnaire, will correlate negatively with the outcome measures: number of hospitalizations; number of emergency room visits; number of physician office visits; number of school absenteeisms; number of activity restrictions; and activity ratings.

2. It is hypothesized that asthma self-management competency subscale scores in combination will significantly predict asthma outcome measures.

3. It is hypothesized that there will be moderate or stronger agreement between the child Self-Management Competency Inventory subscale scores and the Parent Enrollment Questionnaire subscale scores, supporting convergence between scales.

CHAPTER 2

METHOD

Subjects

The participants in the present study were thirty-seven asthmatic children and their parents. The children were chosen from a population of asthmatics attending pediatric allergy outpatient clinics in Knoxville, Tennessee. The children included eight females and twenty-nine males. Child criteria for inclusion in the study included the following:

1. Age. Males and females ranging in age from 6 to 13 years old. Children younger than 6 year-olds were excluded based on the necessity of subjects in the current study being able to recognize and interpret cause and effect relationships between a behavior and its outcome. Mean age for the sample was 9.2 years.

2. Diagnosis of asthma for at least two years. The purpose of this criterion was to insure that the measured effects would reflect long-term coping and competence styles and not short-term effects. The majority of the sample received their diagnosis at a relatively young age (mean = 2.6 years). Age at onset ranged from 5 months to 8 years old. Thirteen percent of the sample had age of onset

before 12 months of age; eighty-one percent had age of onset before 5 years of age.

3. Diagnosis of asthma based on at least one physiological measurement. The referring allergists used peak flow meters, skin testing and bronchial challenge tests in their determinations of diagnosis.

4. Daily medication for control of symptoms. Because of the wide range of asthma severity, this criterion insured that the sample was in fact composed of children with moderate to severe asthma. Medication requirements for the sample ranged from daily doses of two medications ($n = 12$) to daily doses of 7 medications ($n = 2$). Eight children (22% of the sample) were on maintenance levels of corticosteroids.

5. Peabody Picture Vocabulary Test scores of 85 or above. Because the subjects were required to give fairly lengthy descriptions of their illness, this criterion insured minimum verbal capacity. PPVT scores for the sample ranged from 89 to 132 (mean = 112).

6. Attendance and enrollment in school. The subjects ranged in grade placement from 1st grade ($n = 9$) through 8th grade ($n = 3$). Both public ($n = 31$) and private ($n = 6$) schools were represented in the sample.

The parent responsible for overseeing the majority of the child's daily care was asked to be the informant and

the identified "Parent" in completing the Parent Enrollment Questionnaire. The parent sample consisted of three fathers and thirty-four mothers. Socioeconomic levels for the participating families ranged from 1 to 4 (Hollingshead, 1975) with the majority in classes 2 and 3, which represents a well-educated, mid- to upper-middle class population. Race distribution was as follows: Caucasians (n = 31); Blacks (n = 4); and Native Americans (n = 2).

Instruments

Physician Questionnaire

This 7-item data form (Appendix A) was constructed for the present study. It was a shorter version of a form developed by Rakos, Grodek & Mack (1985). Physicians recorded outcome data and evaluation of asthma severity on a Likert-type scale from 1 to 5, with 1 representing mild asthma and 5 representing very severe asthma.

The form was completed by each referring physician on all children referred, both those participating and those not participating. The forms were completed by the physician without his knowledge of which referrals were participating. An examination of the means for two items on the physician questionnaires points to near equivalence in severity ratings for participants ($x = 3.0$) and

non-participants ($x = 2.8$) but to slightly higher number of office visits by participants ($x = 2.8$) than non-participants ($x = 2.0$). Medical outcome data was recorded by the physician's nurse (Appendix B).

Self-Management Competency Inventory

The Self-Management Competency Inventory has been devised for the present investigation from The Critical Self-Management Competencies for Children with Asthma which is an interview questionnaire used in the evaluation of an asthma education program at the Institute for Health Care Research at Palo Alto, Ca. Four areas of self-management competencies have been identified: prevention, intervention, compensatory behaviors and external controlling factors. Interclassifier reliability using Cohen's Kappa was 0.73 on the area level; at the more specific category level reliability was 0.67. Both Kappa values were significantly different from zero ($p < .01$). For purposes of the present study, only the first three areas will be investigated. A brief description of the content tapped by the areas is in order.

Prevention. This category of behaviors emphasizes competencies the child has in avoiding an asthmatic episode or in preventing its occurrence. There are eight specific content areas covering the following: avoids allergens,

avoids irritants (temperatures, dampness,), controls emotions that trigger attack, takes action on exposure to allergen or irritant, takes preventive medicine, ensures that medications are accessible, uses some form of mind control to prevent attacks; and cooperates in treatment of upper respiratory infections.

Intervention. Behaviors classified as interventions are actions taken by the child after a symptom begins. There are five specific content areas: takes ameliorative action when attack start, practices a variety of intervention strategies, develops individually adaptive intervention, uses medicine correctly and remains calm during attack.

Compensatory Behaviors. Included in this category are actions demonstrating the child's adaptation or adjustment to the illness. It includes 6 content areas: discusses asthma with peers, accepts primary responsibility for managing own condition, exhibits determination to overcome limitations of asthma, denies, resents or blames self for asthma, accepts medical regimen, even if painful, and avoids using asthma to manipulate others.

The Self-Management Competency Inventory or SMC I is untimed and required between 30 to 45 minutes for subjects to complete. Younger subjects generally required more time. The SMC I was administered individually to each

subject by the investigator, in an interview format. Frequent probing was sometimes necessary, especially for the younger asthmatics. The test contains 22 questions, 18 of which were evaluated in the present study. The three subscales contain the following number of items: Prevention: 7 items; Intervention: 5 items; and Compensatory: 6 items. Each item has two parts, the first establishes the existence of a particular self-management competency and the second estimates the frequency of utilizing that competency.

Items were scored from 1 to 5 with 1 reflecting low frequency of self-management behavior and 5 reflecting high frequency of self-management behavior as estimated by the subject. Scores for each of the three subscales were based on the frequency ratings and were summed and then averaged for each subscale individually.

Because of the recency of the questionnaire development, there are no published validity or reliability data available on the questionnaire in its present form. Wilson-Pessano is in the process of obtaining reliability and validity data from a sample of 300 subjects who were administered this test in late 1987 (personal communication with Wilson-Pessano). Wilson-Pessano has provided information on scoring and her procedures and methods were replicated in the present study. Since her purposes are to

evaluate clinical programs, there is much information in the questionnaire which is not relevant to the purposes of the present study. Generally the format for interviewing the subjects has been maintained; however, several questions have been reworded to focus on the critical asthma self-management behaviors. The original questionnaire, which had 31 items, has been reduced to 18 items which address each of the clusters or content areas discussed above.

Peabody Picture Vocabulary Test, Version B

The PPVT consists of a series of 150 plates, each containing four pictures. The test covers an age range of from 2.5 to 18 years. Raw scores can be converted to mental ages, deviation IQ's or percentiles. Validity coefficients are in the .60's. There is evidence of moderate concurrent and predictive validity against academic achievement tests. The PPVT is untimed and required from 10 to 15 minutes to administer. It was administered individually to each child and served to insure minimal verbal comprehension.

Parent's Enrollment Questionnaire

This questionnaire is also based on the parent form developed for program evaluation at the American Institute

for Research and parallels the child's version in that it has three subscales (Prevention, Intervention and Compensatory) containing 18 items. It is a paper and pencil questionnaire which the parents completed. All items refer to the child's frequency of demonstrating self-management behaviors. The parents were asked to indicate on a scale of 1 to 5 how often the child demonstrates competency behavior, with 1 reflecting low frequency and 5 reflecting high frequency of self-management competence.

Demographic Questionnaire

This questionnaire (Appendix C) was included at the end of the Parent's Enrollment Questionnaire. In addition to SES and information about age at onset, several outcome measures were included: number of hospitalizations; number of school absenteeisms; physician office visits; and number of emergency room visits. The parents rated their perception of severity of child's asthma on a 5-point Likert-type scale.

Activity Rating Scale

This scale is included in the Parent's Enrollment Questionnaire. The parent rated the child's participation in eight physical activities ranging from swimming, running

and hard play to team sports. The scale values range from 1 which indicates "cannot participate due to asthma" to 5 which indicates "full participation, no restrictions due to asthma". The items were summed and averaged over all activities so that the score represents credit for participation as well as restrictions.

Child Log Data Form

This form is a 16-item log which the parents were asked to keep over a four-day period (Appendix D). The observations were made at home and represent a measure of self-management in the natural environment. The items were taken from the original Parent's Enrollment Questionnaire and relate to specific behaviors which the experimental group rated after participating in the self-management intervention program. The items were used in the present study as a pilot measure of concurrent validity and to aid in interpreting correlational data. All three subscales are represented in the log in the following numbers: Prevention (3 items); Intervention (11 items); and Compensatory (2 items).

Observed behavior was recorded for three possible outcomes: (1) positive outcome, meaning that the child does ellicit the behavior; for example the parent observes an incident of the child avoiding a precipitant; (2) negative

outcome, meaning that the child elicits behavior counter to the item; for example the parent observes an incident of the child picking up a cat when cat dander is a precipitant of attacks; or (3) no chance to observe, meaning that the child was not exposed to a situation where the parent could observe the behavior. Scores were summed across days for positive and negative outcomes.

Procedure

Letters describing the proposed study (Appendix E) were sent to ten area pediatricians and pediatric allergists. Five physicians subsequently agreed to participate (four pediatric allergists and one pediatrician). A total of 54 refereals were made. Refereals by the pediatrician ($n = 6$) were not included in the study because the subjects did not meet criteria for age and enrollment in school. A total of 48 appropriate referrals were received.

Parents of the referrals were sent letters (Appendix F) describing the study and requesting permission for their child to participate. Of the 48 asthmatic subjects who were referred by the four pediatric allergists, 11 were excluded based on the following: (1) 2 referrals were homebound students, not attending school and were excluded because one of the dependant variables was school

absenteeism; (2) 3 referrals returned the informed consent forms declining to participate because of time constraints; and (3) 6 referrals did not return the informed consent forms and could not be contacted to determine the reasons for not participating.

Upon receipt of a positive response form, the investigator called the parent to confirm their participation and to schedule an interview. The parent was asked to bring specific information to the scheduled interview: (1) list of medications currently taken; (2) school absenteeisms data, validated by calling the school for an exact number of days missed in the six-month period under investigation; and (3) calculation of number of physician office visits related to asthma for the six-month period. A description of the behavioral observation portion of the project was given to the parent during this initial contact. For one-half the sample, the log data form was mailed to the parent so that it could be completed prior to the interview; for the other half, the log data form and a pre-addressed, stamped envelope were given to the parent at the conclusion of the interview and the parent was asked to return it the following week. The parent was given a choice of interview sites: either at an office at the University of Tennessee or at the child's home. Approximately 40% of the sample ($n = 15$) requested that

the interview be conducted at the child's home.

At the scheduled interview, informed consent forms were signed (Appendix G) at the beginning of the procedures. The interview session was structured as follows: after a brief introduction and explanation of the purpose of the study, the parent left the room to complete the Parent's Enrollment Questionnaire in a separate room, while the child remained with the investigator who administered the PPVT and the Self-Management Competency Inventory. While the administration of instruments adhered to the above clearly structured format, at the conclusion of the formal testing, the child and parent were encouraged to give their general impressions of asthma management issues. All participants appeared eager and interested in talking about their experiences in this informal conclusion to the interview. Summaries of these observations will be included in the Discussion Section.

At the conclusion of the interview, the child was given a small edible reward for participating. Before leaving, the parents were reminded of the log data form and given time to discuss any questions pertaining to the interview or to the log form. The length of time for completion of the interviews varied from one-hour to nearly two hours.

CHAPTER 3

RESULTS

Subscale Reliability

Subscale reliability was examined using Cronback's Alpha coefficient, providing an index of internal consistency for the child Self-Management Competency Inventory (SMCI) and for the Parent Enrollment Questionnaire (PEQ). Table 1 summarizes these initial results. Item analysis was lowered by problematic items in each subscale and will be discussed below.

Self-Management Competency Inventory

For the Prevention subscale, item analysis indicated that one item was lowering alpha level. The item was frequency of cooperation with adults in avoiding respiratory infections. The deletion of this item increased alpha from .46 to .51. For the Intervention subscale, item analysis indicated that one item was lowering alpha level. The item was frequency of being responsible for medical compliance. The deletion of this item increased alpha from .51 to .63. For the Compensatory subscale, item deletion made no difference in the alpha of -.30. All items in the subscale should correlate

TABLE 1

Cronbach alpha coefficients for Prevention, Intervention, and Compensatory Subscales and Composite for SMCi and PEQ

Subscales	Coefficient Alpha	
	SMCI	PEQ
Prevention	.46	.74
Intervention	.51	.84
Compensatory	-.30	.48

SMCI: Self-Management Competency Inventory
PEQ: Parent Enrollment Questionnaire

negatively with the outcome measures. In this subscale of 6 items, there were four items which correlated positively, two significantly so, with the outcome measures. The two items which correlated significantly positive with outcome measures were: frequency of expressing worries related to asthma and frequency of discussing asthma with peers. The two items which correlated positively but non-significantly with outcome measures were: frequency of cooperation with adults when the treatment regimen is difficult and frequency of using asthma to manipulate situations. The negative alpha represents spurious subscale item correlations, therefore the Compensatory subscale was deleted from further statistical analyses.

In order to increase reliability, the revised Prevention and the revised Intervention subscales were combined to form a composite. Table 2 summarizes the revised and composite alphas. Alpha for the composite subscales (.74) was higher than the revised Prevention subscale (.51) and higher than the revised Intervention subscale (.63). The two subscales are highly correlated with each other ($r = .78$) and suggestive of a single homogeneous scale. Further evaluation of the subscales using the Spearman-Brown formula supported the idea that the subscales are measuring a single competency. The Spearman-Brown formula was used to estimate reliabilities

TABLE 2

Cronbach alpha coefficients for Prevention, Intervention,
and Compensatory Subscales and Composite for SMC I and PEQ

Subscales	Coefficient Alpha	
	SMC I	PEQ
Prevention	.51	.77
Intervention	.63	.84
Compensatory	-.30	.57
Composite	.74	.89

SMC I: Self-Management Competency Inventory
PEQ: Parent Enrollment Questionnaire

of the subscales Prevention and Intervention if the items of the subscales were doubled. The estimated Spearman-Brown reliability for Prevention was .77 and for Intervention was .68. The mean of the obtained reliabilities was .73. If the subscales are measuring different competencies, then the Spearman-Brown coefficient (.73) would be greater than the composite (.74). Despite such evidence that the subscales are measuring a single competency, the subscales will be analyzed both separately and in composite forms due to the early phase of instrument development.

Parent Enrollment Questionnaire

For the Prevention subscale, initial alphas indicated that one item was answered by only two parents. The item was frequency of child's use of mind control techniques to prevent asthma attacks. The remaining thirty-five parents reported that they did not know if their child used mind control techniques. Therefore, this item was deleted, resulting in an increase in alpha from .74 to .77. For the Compensatory subscale one item was deleted. The item deleted was frequency of expressing worries related to asthma. All items in the subscales should correlated negatively with the outcome measures. The item in question correlated positively, but non-significantly, with two of

the outcome measures, and was, therefore, an inappropriate item. Item analysis revealed that alpha level could be increased from .48 to .57 by deleting this item. One other item from the Compensatory subscale had a positive, but non-significant, correlation with all three outcome measures. The item is frequency of discussing asthma with peers. This item was not deleted because its deletion would increase alpha by only .02 points. In criterion related tests such as the PEQ, which have a relatively small number of items, the removal of items lowers criterion coverage. These two items are the only two items in the entire scale which represent verbalization of feelings. To delete both items would eliminate this criterion. Limiting criterion coverage probably reduces the validity of the scale and decreasing item number may reduce the test-retest reliability.

In order to increase reliability, the revised Prevention, Intervention and revised Compensatory subscales were combined to form a composite. Table 2 summarizes the revised and composite alphas. Alpha for the composite subscales was .89 which was somewhat higher than the revised Prevention subscale (.77) and the Intervention subscale (.84). The composite reliability was much higher than the revised Compensatory subscale (.57). Both single subscale alphas and composite alphas indicate a high degree

of internal consistency across all items and are suggestive of a single homogeneous rating scale. The Spearman-Brown formula was applied to the alphas as described in the SMCII section above. The estimated Spearman-Brown reliability for Prevention was .90, for Intervention was .94, and for Compensatory was .79. The mean of the obtained reliabilities was .87. If the subscales were measuring different competencies, the Spearman-Brown coefficient (.87) would be greater than the composite (.89). The higher composite coefficient supports the claim that the scale measures a unitary competency. However, due to the phase of development of this instrument, scales will be analyzed both separately and in composite forms.

Outcome Data and Moderator Variable Data

Means, standard deviations, and ranges were tabulated for all outcome variables and moderator variables and are summarized in Table 3. The mean number of office visits due to asthma for the child was 2.8 during the six months reported and ranged from 0-10. School absenteeisms averaged 4.8 days with a wide range from 0-30 days for the reported six month period. Activity level rating averaged 4.5 and ranged from 2.1-5.0. Activity rating was recoded so that the higher score would represent greater restriction in physical activities and would be in the same direction

TABLE 3
Means, Standard Deviations and Range for
Outcome Measures and Moderator Variables

Outcome Measure	M	S.D.	Range
Office Visits	2.8	2.09	0-10
School Absenteeism	4.8	6.80	0-30
Activity Rating	1.62	0.71	1-4.2
Hospitalizations	0.03	0.16	0-1
Emergency Room Visits	0.27	0.65	0-2
Activity Restrictions (Parent)	0.78	1.22	0-4
Activity Restrictions (Doctor)	0.10	0.31	0-1
Moderator Variables	M	S.D.	Range
Severity	3.00	0.91	1-5
Age	9.21	2.00	6-13
SES	2.87	0.89	1-4

as the other outcome measures. The recoded means was 1.62 where 1 indicates no restrictions and 5 indicates maximum restrictions.

Four of the outcome variables were extremely low; hospitalizations averaged 0.03 and ranged from 0-1. Emergency room visits averaged 0.27 and ranged from 0-2. Activity restrictions as reported by the parent averaged 0.78 and ranged from 0-4 and activity restrictions as reported by the physician averaged 0.10 and ranged from 0-1. Ninety-seven percent of the sample reported no hospitalizations due to asthma for the six month period, 84% of the sample reported no emergency room visits for this period, and 62% of the parents reported no activity restrictions due to asthma while 89% of the doctors reported no activity restrictions. Owing to the rare occurrence of these events in this sample, these variables were eliminated from future analyses.

For the moderator variable severity, the mean severity rating by physicians was 3.00 on a scale of from 1 to 5 and the range was 1-5. The average age for the sample was 9.2 years with a range from 6-13. The average SES for the sample was 2.87 with a range of 1-4 using Hollingshead's two factor classification where 1 represents the highest SES category and 5 represents the lowest.

Hypothesis I

The first hypothesis stated that outcome measures would be negatively correlated with asthma competency behaviors in children. Outcome measures were significantly and moderately correlated with each other, supporting the idea that a cluster of behaviors exists wherein poor school attendance, frequent visits to the physician and low activity participation are involved. Table 4 summarizes intercorrelational data for the three outcome measures. Because of the significant intercorrelations, outcome measures were combined into one Composite score to be evaluated as well as with the separate individual scores.

The Pearson Product-Moment correlations were performed among the outcome measures: Office Visits, School Absenteeisms, Activity Rating and Composite, and the Self-Management Competency Inventory subscale scores including the Composite and the Parent Enrollment Questionnaire subscale scores, including the Composite. Table 5 displays these correlations and their significance levels.

Self-Management Competency Inventory (SMCI)

For the child data, correlations ranged from .11 to -.57 (see Table 5). The Prevention subscale was moderately and significantly negatively correlated with Office Visits

TABLE 4
Intercorrelations Among Outcome Measures

Outcome Measure	1	2	3
1. Office visits	----		
2. School Absenteeism	.48*		
3. Activity Rating	.44*	.43*	

* $p < .01$

TABLE 5

Intercorrelations of Outcome Measures with
Prevention, Intervention and Compensatory
Subscales for SMC1 and PEQ

Subscales	Outcome Measures			
	Office	School	Activity	Composite
SMCI (Self-Management Competency Inventory)				
Prevention	-.41**	-.21	-.25	-.29*
Intervention	-.57**	-.35*	-.36*	-.46**
Compensatory	-.16	-.17	.11	-.18
Composite (2 subscales)	-.52**	-.31*	-.33*	-.41**
PEQ (Parent Enrollment Questionnaire)				
Prevention	-.45**	-.37*	-.40**	-.44**
Intervention	-.55**	-.38**	-.43**	-.47**
Compensatory	-.25	-.16	-.21	-.17
Composite (3 subscales)	-.51**	-.36**	-.43**	-.45**

* $p < .05$

** $p < .01$

($r = -.41$, $p < .01$) and moderately correlated with the Composite Outcome Score ($r = -.29$, $p < .05$).

Intervention was highly and significantly negatively correlated with Office Visits ($r = -.57$), moderately correlated with School Absenteeisms ($r = -.35$, $p < .05$), moderately correlated with Activity ($r = -.36$, $p < .05$), and moderately correlated with Composite Outcome Score ($r = -.46$, $p < .01$). The Compensatory subscale was not significantly related to any of the outcome measures. The Composite Subscale which included Prevention and Intervention was moderately and significantly negatively correlated with Office Visits ($r = -.52$, $p < .01$), moderately correlated with School Absenteeisms ($r = -.31$, $p < .05$), moderately correlated with Activity ($r = -.33$, $p < .05$), and moderately correlated with the Composite Outcome Score ($r = -.41$, $p < .01$).

Parent Enrollment Questionnaire (PEQ)

For the parent data, correlations ranged from $-.16$ to $-.55$ (See Table 5). Prevention was moderately and significantly negatively correlated with Office Visits ($r = -.45$, $p < .01$), moderately correlated with School Absenteeisms ($r = -.37$, $p < .05$), moderately correlated with Activity ($r = -.40$, $p < .01$) and moderately correlated with Composite Outcome score ($r = -.44$, p

<.01). Intervention was highly and significantly negatively correlated with Office Visits ($r = -.55$, $p < .01$), moderately correlated with School Absenteeisms ($r = -.38$, $p < .01$), moderately correlated with Activity ($r = -.43$, $p < .01$), and moderately correlated with the Composite Outcome score ($r = -.47$, $p < .01$). As with the child data, Compensatory was not significantly related to any of the outcome measures. The Composite Subscale was moderately and significantly negatively correlated with Office Visits ($r = -.51$, $p < .01$), moderately correlated with School Absenteeisms ($r = -.36$, $p < .01$), moderately correlated with Activity ($r = -.43$, $p < .01$) and moderately correlated with Composite Outcome score ($r = -.45$, $p < .01$). As can be seen in Table 5, there is a general tendency for the parent's subscale correlations to be higher than the child's subscale correlations, the exception being the child Intervention subscales.

To test whether the variables age and sex were impacting on the significant self-management subscale correlations with the outcome measures, both age and sex were statistically controlled in a partial correlational analysis. Table 6 displays this correlational data with significance levels for SMCi and PEQ across outcome measures. The initial correlations are displayed first; the partial correlations are shown in parentheses under the

TABLE 6

Intercorrelations and Partial Correlations
of Outcome Measures with Prevention, Intervention,
Compensatory and Composite Subscales for SMC1
and PEQ with Age and Sex as the Control Variable

Subscales	Outcome Measure			
	Office	School	Activity	Composite
SMC1				
Prevention	-.41** (-.40*)	-.21 (-.16)	-.25 (-.27)	-.29* (-.28*)
Intervention	-.57** (-.61**)	-.35* (-.31*)	-.36* (-.37*)	-.46** (-.47**)
Composite (2 subscales)	-.52** (-.54**)	-.31* (-.29*)	-.33* (-.34*)	-.41** (-.40**)
PEQ				
Prevention	-.45** (-.46**)	-.37* (-.35*)	-.40** (-.42**)	-.44** (-.45**)
Intervention	-.55** (-.58**)	-.38** (-.35**)	-.43** (-.44**)	-.47** (-.48**)
Compensatory	-.25 (-.27)	-.16 (-.19)	-.21 (-.18)	-.17 (-.16)
Composite (2 Subscales)	-.51** (-.54**)	-.36** (-.36**)	-.43** (-.46**)	-.45** (-.49**)

* $p < .05$

** $p < .01$

initial correlations. Significant relationships remained between self-management subscales and outcome measures, independent of sex and age.

Severity of asthma as rated by the physician was significantly correlated with two of the outcome measures as follows: School Absenteeisms ($r = .42$, $p < .009$) and Activity ($r = .45$, $p < .004$). Severity was not significantly correlated with Office Visits. To test whether severity was impacting on the outcome measures in some way that might be accounting for the significant results described above, severity was used as a control variable in a partial correlational analysis. Table 7 displays these correlational data with significance levels for SMC1 and PEQ. Initial correlations are displayed first; partial correlations are shown in parentheses with significance levels. For the SMC1, the effect of controlling for severity did not change the correlations for Office Visits. For School Absenteeisms, the effect of controlling for severity significantly increased the correlation with Prevention from ($r = .21$, $p < .01$) to ($r = .27$, $p < .05$) and increased the correlation with Intervention from ($r = .35$, $p < .05$) to ($r = .43$, $p < .01$). Likewise, for Activity, the effect of controlling for severity significantly increased the correlation with Prevention from ($r = .25$, $p = < .01$) to ($r = .30$, p

TABLE 7

Intercorrelations and Partial Correlations
of Outcome Measures with Prevention, Intervention,
Compensatory and Composite Subscales for SMCI
and PEQ with Severity as the Control Variable

Subscales	Outcome Measure			
	Office	School	Activity	Composite
SMCI				
Prevention	-.41** (-.40*)	-.21 (-.27*)	-.25 (-.30*)	-.29* (-.36*)
Intervention	-.57** (-.57**)	-.35* (-.43**)	-.36* (-.41**)	-.46** (-.53**)
Composite (2 subscales)	-.52** (-.53**)	-.31* (-.38*)	-.33* (-.39**)	-.41** (-.49**)
PEQ				
Prevention	-.45** (-.45**)	-.37* (-.33*)	-.40** (-.37**)	-.44** (-.42**)
Intervention	-.55** (-.56**)	-.38** (-.42**)	-.43** (-.48**)	-.47** (-.54**)
Compensatory	-.25 (-.23)	-.16 (-.20)	-.21 (-.25)	-.17 (-.16)
Composite (2 Subscales)	-.51** (-.47**)	-.36** (-.35**)	-.43** (-.43**)	-.45** (-.45**)
* $p < .05$				
** $p < .01$				

<.05); increased the correlation with Intervention from ($r = .36, p < .05$) to ($r = .41, p < .01$); and increased the correlation with Composite from ($r = .33, p < .05$) to ($r = .39, p < .01$). The results of controlling for severity did not significantly change correlations of the PEQ; significant relationships remained between self-management subscales and outcome measures.

Hypothesis II

The second hypothesis stated that self-management subscale scores would in combination significantly predict outcome measures. Pearson Product-Moment correlations were performed between the four outcome measures: Office Visits, School Absenteeisms, Activity and Composite scores for the SMC and PEQ. Table 8 displays the correlational matrix and the significance levels for each correlation. Correlations ranged from -.21 to -.100.

Examination of the correlational data indicated extreme multicollinearity between child Prevention and child Composite (-.93), and between child Intervention and child Composite (-.95). Since child Prevention and child Intervention were only moderately correlated, they were chosen for inclusion. Therefore, child Composite was not included in the multiple regression analysis. Examination of the correlational data also indicated extreme

TABLE 8
Intercorrelation Matrix for SPICI and PEO subscales
and Outcome Measures

Subscales	Outcome Measures									
	1	2	3	4	5	6	7	8	9	10
1. Office Visits										
2. School Absenteeisms	.48**									
3. Activity Rating	.43**	.44**								
4. Composite	.67**	.96**	.55**							
5. Child Prevention	-.41**	-.21	-.25	-.29*						
6. Child Intervention	-.57**	-.35*	-.36*	-.46**	.78**					
7. Child Composite	-.52**	-.31*	-.33*	-.41**	.93**	.95**				
8. Parent Prevention	-.45**	-.37*	-.40**	-.44**	.52**	.60**	.60**			
9. Parent Intervention	-.55**	-.38**	-.43**	-.47**	.49**	.67**	.62**	.86**		
10 Parent Composite	-.51**	-.36**	-.43**	-.45**	.50**	.62**	.60**	.93**	.93**	

* $p < .01$

** $p < .001$

multicollinearity between parent Prevention and parent Intervention (.86); therefore, both were excluded from the multiple regression analysis and parent Composite was included.

A stepwise model of multiple regression was used for the outcome measures: Office Visits, School Absenteeisms, Activity, and Composite outcome. Accordingly, four separate analyses were conducted using as predictors: child Prevention, child Intervention, and parent Composite. The control variable severity was highly correlated with each of the outcome variables and was therefore entered as a covariate in four separate analyses using the same outcome measures as above and the same predictor variables. Table 9 summarizes the results for the outcome measure Office Visits. The table is divided into two parts, the top half displays the multiple regression analysis for the subscales and the bottom half displays the multiple regression analysis for the subscales and the covariate. Only the significant predictors are presented. The SMCI Intervention subscale entered the regression equation at a significant level ($r^2 = .57$, $p < .01$) and accounted for .33 of the variance. PEQ Intervention subscale entered the regression equation but was not significant. For the covariate analysis, severity entered the regression equation at a non-significant level ($r^2 = .16$, $p < .01$)

TABLE 9

Results of Stepwise Regression Analyses
to Predict Office Visits

Step	Variable Entered	R	R ²	R ² Change
Predictor variables analyzed: subscale scores				
1.	SMCI ^a Intervention	.57	.33	.33*

Predictor variables analyzed: Severity and subscale scores				
1.	Severity	.16	.03	.03
2.	SMCI ^a Intervention	.59	.35	.32*

a. SMCI: Self-Management Competency Inventory

* $p < .01$

and accounted for .03 of the variance. SMC I Intervention subscale entered the regression equation producing a multiple correlation of .59 ($p < .01$) and accounting for .35 of the variance

Table 10 summarizes the results for the outcome measure School Absenteeism. No variables entered the regression equation at significance level. For the covariate analysis, severity entered the regression equation at a significant level ($r = .44$, $p < .01$) and accounted for .19 of the variance. SMC I Intervention entered the regression equation, producing a multiple correlation of .55 ($p < .01$) and accounting for .30 of the variance.

Table 11 summarizes the results for School Absenteeism. PEQ Composite entered the regression equation at a significant level ($r = .42$, $p < .01$) and accounted for .19 of the variance. For the covariate analysis, severity entered the regression equation at a significant level ($r = .44$, $p < .01$) and accounted for .19 of the variance. SMC I Intervention entered the regression equation, producing a multiple correlation of .59 ($p < .01$) and accounting for .35 of the variance.

Table 12 summarizes the results for Composite outcome. SMC I Intervention entered the regression equation at a significant level ($r = .45$, $p < .01$) and accounted for

TABLE 10

Results of Stepwise Regression Analyses
to Predict School Absenteeism

Step	Variable Entered	R	R ²	R ² Change
Predictor variables analyzed: subscale scores				
1.	PEQ ^a Composite	.42	.18	.18

Predictor variables analyzed: Severity and subscale scores				
1.	Severity	.44	.19	.19*
2.	SMCI ^b Intervention	.55	.30	.11*

a. PEQ: Parent Enrollment Questionnaire				
b. SMCI: Self-Management Competency Inventory				
* p < .01				

TABLE 11

Results of Stepwise Regression Analyses
to Predict Activity Rating

Step	Variable Entered	R	R ²	R ² Change
Predictor variables analyzed: subscale scores				
1.	PEQ ^a Composite	.42	.18	.18*

Predictor variables analyzed: Severity and subscale scores				
1.	Severity	.44	.19	.19*
2.	SMCI ^b Intervention	.59	.35	.16*

a. PEQ: Parent Enrollment Questionnaire				
b. SMCI: Self-Management Competency Inventory				
* p < .01				

TABLE 12

Results of Stepwise Regression Analyses
to Predict Composite Outcome

Step	Variable Entered	R	R ²	R ² Change
Predictor variables analyzed: subscale scores				
1.	SMCI ^a Intervention	.45	.21	.21*

Predictor variables analyzed: Severity and subscale scores				
1.	Severity	.44	.19	.19*
2.	SMCI Intervention	.63	.39	.20*

a. SMCI: Self-Management Competency Inventory

* $p < .01$

<.01) and accounted for .19 of the variance. SMCI Intervention entered the regression equation, producing a multiple correlation of .63 ($p < .01$) and accounting for .39 of the variance.

Hypothesis III

The third hypothesis stated that scores on the Self-Management Competency Inventory would correlate with scores on the Parent Enrollment Questionnaire. Table 13 presents the means and standard deviations for child Self-Management Competency Inventory subscale scores and for the Parent Enrollment Questionnaire. For the SMCI, the mean for the Prevention subscale was 2.96; the mean for the Intervention subscale was 3.03; and the mean for the Composite was 3.00. For the PEQ, the mean for the Prevention subscale was 3.14; the mean for the Intervention subscale was 3.34; the mean for the Compensatory subscale was 3.38; and the mean for the Composite was .74.

Table 14 presents Pearson Product-Moment Correlational Coefficients between parent's reports of child's self-management skills and child's self-reports of self-management skills. For Prevention, parents' ratings of frequency of child's self-management skills was significantly and highly correlated with children's

TABLE 13
Means and Standard Deviations for
SMCI^a and PEQ^b Subscale Scores

	Prevention		Intervention		Compensatory		Composite	
	M	S.D.	M	S.D.	M	S.D.	M	S.D.
SMCI	2.96	0.70	3.03	0.88	3.37	0.34	3.23	0.89
PEQ	3.14	0.88	3.34	0.97	3.38	0.75	3.37	0.75

- a. SMCI: Self-Management Competency Inventory
b. PEQ: Parent Enrollment Questionnaire

TABLE 14
Correlation Coefficients Between
SMCI^a and PEQ^b Subscale Scores

Subscales	PEQ		Composite
	Prevention	Intervention	
SMCI			
Prevention	.52**		
Intervention		.67**	
Composite			.60**

a. SMCI: Self-Management Competency Inventory

b. PEQ: Parent Enrollment Questionnaire

* $p < .01$

self-reports of their self-management skills ($r = .54$, $p < .001$). For Intervention, parents' ratings correlated highly and significantly with children's ratings ($r = .69$, $p < .001$). For Compensatory, there were no significant correlations. For the Composite subscale (Prevention and Intervention) there was a positive significant correlation ($r = .64$, $p < .001$). As can be seen, two of the subscales, Prevention and Intervention, evidenced high correlations in a positive direction. The Composite subscales also evidenced high positive correlations.

Log Data

Sixty-eight percent of the parent returned the log data form. Return rate was better for the group that received the forms at the time of the interview. Of the 18 parents who received the log forms by mail, only 8 returned them (44%). Of the 19 parents who were given the forms at the time of the interview, 17 returned them (89%).

Log data was summed across the four-day period for positive incidences of self-management behavior. Subscale correlations with behavioral observations was examined using Pearson Product-Moment Correlational Coefficients. Table 15 summarizes the results. For the Self-Management Competency Inventory, neither the Prevention nor the

TABLE 15

Correlation Coefficients for Log Data of
Prevention, Intervention and Compensatory
with Subscales for SMC^a and PEQ^b

	Prevention	Intervention	Compensatory
Log Data with SMC ^a	.13	.01	
Log Data with PEQ	.61**	.22	.11

a. Self-Management Competency Inventory

b. Parent Enrollment Questionnaire

** $p < .001$

Intervention subscales correlated with parent log data.
For the Parent Enrollment Questionnaire, log data of
Prevention skills correlated highly and significantly with
the Prevention subscale ($r = .61$, $p < .001$).

CHAPTER IV

DISCUSSION

Data strongly supported the first hypothesis that self-management competencies in children were correlated with illness control measures by both child and parent reports. The results indicate that both prevention and intervention competencies are related to successful illness outcome measures, indicating that children who practice these self-management skills have better control of their illness. This finding contributes to the validation of the asthma self-management competencies in that the critical behavioral competencies identified in the instruments were highly correlated with the several reliable measures of illness control, the outcome variables.

In considering how best to use the self-management competency instruments, that is, whether to combine individual subscales or to use them individually, it is important to examine the pattern of correlations. Because the Composite subscales were shown to increase internal reliability, to expand criteria coverage and to correlate highly with illness outcome measures, an argument could be made in favor of using the Composite subscale scores as the best indicator of self-management competencies. However,

the Composite subscales did not yield stronger correlations than the Intervention subscale. Given fairly equal correlations with the outcome measures, it appears that use of the Intervention subscale will provide more information for both clinical, and research purposes than the use of the combined scales. Also, because of the early phase of instrument development, use of the individual subscale scores, despite their weaker psychometric properties, appears to be justified. Accordingly, the individual subscales will be the focus of the discussion of findings.

The findings that the child's intervention skills are somewhat more important to successful outcome than prevention skills is not unexpected. One explanation for the stronger correlation between Intervention subscales and outcome measures than between Prevention subscales and outcome measures is probably that reinforcement is more potent with intervention skills. Intervention behavior leads to escape from aversive stimuli while prevention behavior leads to avoidance. Intervention skills are paired with reduction of symptoms, thereby giving the child immediate reinforcement for the effective performance of an action.

As Bandura (1982) has suggested, successful performance of a behavior increases a person's confidence in the ability to repeat the behavior. Prevention behavior

is not directly related to reduction of symptoms in this way. If a child is successful in avoiding precipitants which lead to an asthma attack, there are fewer immediate reinforcements.

Also, for the child who has good prevention skills but lacks effective intervention skills, there are times when attacks are unavoidable. This child would succumb to the attack without the requisite intervention competencies, regardless of how carefully he/she avoids precipitants. Whereas, for the child who has poor prevention skills, but good intervention skills, there may be more attacks, but he will be able to control the attack by virtue of good intervention competencies. Thus, intervention appears to be the safety net without which the child could not control his attacks.

A final and related explanation for the findings that Intervention subscale scores were more highly correlated with illness outcome scores than Prevention subscale scores is that the acquisition of prevention behavior may be more difficult. As Thorsen and Kirmil-Gray (1983) have discussed, one of the defining characteristics of self-control behavior is making a choice in the face of conflicting alternatives. For example, the child who is allergic to cat dander spies a kitten. The prevention task is to leave the kitten alone and involves: (1) a conflicted

decision (the object is both positive and negative for an asthmatic child); and (2) delay of gratification. When choice also requires a delay of gratification, the self-management task becomes more difficult for the child to master (Mischel, 1973). Prevention skills require the acquisition of delay tactics along with the decision-making skills involved in making a choice. These may be high level skills for the child to learn.

Intervention skills are different in that the child is less ambivalent about the conflict. Once an asthma attack has started, the choice is less difficult because the need to respond to symptoms is more demanding. Also, the options are reduced and this makes the decision to intervene easier. Therefore, it is likely that intervention competencies were more strongly related to illness control measures because of more frequent and successful enactment, potency of reinforcement, and acquisition of skill.

The first hypothesis was further supported by the finding that the significant relationship between self-management skills and outcome measures was not affected by age or sex. This strengthens the claim that self-management competencies can independently account for a substantial amount of successful illness control. Previous research has indicated the possible confounding

factors of age and sex in the relationship between self-management and illness control, with boys demonstrating less self-control ability than girls (Humphry, 1982) and younger children demonstrating less self-control ability than older children (Kendall & Wilcox, 1979). This effect was not found in the present study and may be due to sample characteristics. For example, the younger children in the present sample evidenced a high degree of understanding and interest in their illness.

Similarly, the first hypothesis was supported by controlling for the variable severity. The relationship between self-management competencies and illness control was actually strengthened when the effects of severity were controlled. Results of the present study which demonstrated a high correlation between severity and two of the outcome measures (school absenteeism and activity rating) indicate that severity had an important effect on the illness outcome measures in that severity was positively related to poor illness control. This indicates that severity may have impacted strongly enough on the outcome measures, school absenteeism and activity rating, to mask a rather strong relationship between self-management skills and successful illness outcome. With the effects of severity removed, the Prevention subscale and the Intervention subscale increased to a

significant correlation with school absenteeism and activity rating.

That severity was not correlated with office visits may indicate that in the present sample of asthmatics, office visits did not increase with an increase in severity of illness. Apparently the severe cases in the present sample were under good enough medical management so that asthma flare-ups could be controlled without frequent visits to the physician.

The effect of severity as a confounding variable in previous studies has been noted. As previous research has implied, severity of illness may be related to outcome measures directly (Parcel et al, 1979) or indirectly (Norrish, Tooley, & Godfrey, 1977). In the present study, severity had a direct relationship with two illness outcome measures and no relationship with the third. Implications are that the effects of severity may be different with different illness outcome measures and that the effects may be acting to suppress important relationships which exist but are being mask by the potency of severity.

The importance of using several measures of outcome to represent illness control is substantiated by this study's finding that each outcome measure had a somewhat different pattern of predictors. This was especially clear from the evaluation of the second hypothesis that asthma

self-management competency subscale scores would significantly predict illness outcome measures.

For physician office visits, that the best predictor was child report of Intervention indicates that children are important sources of information and that their intervention skills may be responsible for reducing expensive and time-consuming visits to the physician. Intervention includes a variety of self-management skills: medical compliance, quick action to stop an attack, and flexibility of intervention response patterns. As discussed earlier, this subscale evidenced good internal reliability but did require one item deletion. It would appear that the authors have indeed identified critical intervention competencies which are reliable predictors of physician office visits.

Physician office visits may be influenced by other factors such as (1) the strength of the relationship between the parent and child and the physician; (2) the financial means available for quality medical services; and (3) the tendency of the parent to rely on medical management during periods of exacerbation. Range of office visits was fairly restricted in the present sample indicating that the correlation may have been higher in a sample where there was a broader range of office visits.

School absenteeisms evidenced a broader range of scores than the other outcome variables and appeared to be a robust statistical indicator of illness outcome. Given that the self-management competencies were not good predictors of school absenteeisms until severity was controlled for indicates that there are likely other factors which help determine school attendance for asthmatics in addition to severity of illness. One likely determinant of school attendance is whether the mother is employed full-time and can be with the child during periods of asthma exacerbation. Mothers who work full-time may encourage the child to attend school during mild flare-ups while mothers who are home may allow the child to rest at home during exacerbation of symptoms. Teachers are another factor in whether the asthmatic child feels comfortable going to school on bad days. Asthma attacks require ability to respond on short notice by the child and by the teacher. An understanding teacher may encourage the child to attend school during periods of symptom exacerbation. Social support in the family for academic achievement may be another factor in whether the child attends school on bad days. The child's history of academic success or failure influences future willingness to participate in academic endeavors.

That the child's report was a better predictor of

outcome measures, with the exception of activity rating, than the parent's report was unexpected. One explanation may be that the structured interview was helpful in directing the child to identify and elaborate on important intervention skills. Other studies have generally used self-report inventories where the child answers questions with minimal interaction with the investigator.

Another explanation may be that the sample represented in this study was particularly adept in describing self-management behaviors. The children in this study were highly verbal, above average in intelligence and quite detailed in their responses. A final explanation for the good ability of the present sample to report self-management competencies may be found in the experience and expertise of the interviewer. Examiner effects can have a powerful influence on willingness to report if not accuracy of report. In the present study, the examiner was an advanced graduate student with several years of experience in child assessment and psychotherapy. The children generally responded enthusiastically and attentively to the questions.

The moderate agreement between parents and children concerning the child's self-management competencies supports the use of the instruments as reliable measurement tools for the study of self-management competencies.

Previous research has generally found little agreement between parent and child reports in the area of self-control (Humphry, 1982) and, accordingly, use the adult as the most reliable informer of self-management behaviors. The findings that children appear to be reliable reporters of their own self-management behavior is at variance with previous research.

The findings of the present study are likely to relate first to instrument construction. The critical incidence technique which formed the rationale for item inclusion utilized both parents and children in collecting information about what types of behaviors are associated with symptom prevention, minimization and cessation. Given that both groups contributed to the item pool, it was predicted that there would be at least moderate agreement between the two.

A second factor in the highly significant correlation between parent and child reports may have to do with item construction. The items on the subscales Prevention and Intervention are generally specific and the questions relate to small behavioral units so that the respondent can clearly make distinctions in behavioral criteria before the rating of frequency of behavior is made. Respondents are asked to make frequency ratings of self-management behaviors which are overt and objective. This differs from

ratings on the Compensatory subscale where the parent and the child were asked about the child's internal experiences. It is unfortunate that Compensatory subscales could not be compared due to low and negative reliability coefficients because it is likely that these subscales would have demonstrated less agreement because of the subjective nature of the items.

Instrument Development and Reliability

The present study has utilized newly developed instruments to measure self-management competencies. As discussed earlier, there is a need to standardize and validate instruments for both clinical and research purposes. The instruments used were criterion-referenced. This indicates that for each item there are specific criteria which determined whether the child has mastered the self-management task. Frequency of the child's usage of that competency is the measure of interest. There are problems with the instruments as they are currently being used, and these problems relate to internal consistency. Criterion-referenced tests generally demonstrate lower internal reliability coefficients than non criterion-referenced tests because each item measures a different task which may or may not demonstrate consistency

until all have been mastered. The following discussion is based on particular reliability problems that were encountered during the analysis of data.

Child Self-Management Competency Inventory

For the child Self-Management Competence Inventory, initial subscale inter-item correlations demonstrated that internal reliability was adequate for only one of the subscales (Intervention). Item analysis of the subscales indicated that there were particular items which were lowering the internal consistency.

Prevention: For the subscale Prevention the item lowering the internal consistency was frequency of cooperation with adults in avoiding respiratory infections. The child was asked to estimate how often he/she cooperates with parents' and doctors' orders when experiencing a cold. This is an important question because respiratory infection is a major precipitant of asthma attacks and represents a valid criterion question. However, the item did not relate statistically to the other items in the scale. One explanation may be the use of the word "cooperate". The intention of the question is to measure compliance with treatment of colds. All of the children appeared to know the meaning of the word "cooperate" but included in its interpretation "follows orders willingly". It was

difficult for most of the children to distinguish between mere compliance and cooperation. This problem with the wording on the SMC1 was discovered through probing for different ways of helping the child understand the question. The question was deleted to increase internal reliability. However, it is noted that most children were answering the question of willingness to comply. One subject who scored high in self-management skills except for this question, answered "I never cooperate with them: I always complain".

Intervention: For the subscale Intervention, the problematic item which lowered internal reliability was frequency of being responsible for medical compliance. The question as presented to the child is "How often do you have to be reminded to take your regular asthma medication?". Expectations were that responsibility for medical compliance would be highly correlated with outcome measures but this item did not significantly correlate with any of the outcome measures.

In this particular sample of children, parents were most frequently responsible for overseeing the medication regimen. As parents and children discussed this question afterwards, it was apparent that the parents took an active role in making sure the child was compliant with medications. Parents talked about creative methods which

they had developed to insure medication compliance in their children. It was impressive that the majority of children studied (80%) could identify their medications correctly and reported compliance; however, the responsibility for taking the medication had generally not been turned over to the child. One hypothesis for the reluctance to turn over the responsibility of medications to the child may relate to the physicians' attitudes. One of the referring physicians for this study indicated that education for asthma management was directed toward the parents with the idea that self-management techniques were not encouraged until the child reached the age of 12 or 13.

Compensatory: For the Compensatory subscale, four of the six items were problematic. This subscale represents more subjective areas of treatment as contrasted with the other two subscales which represent more objective criteria. The subscale includes items related to verbalizations of feelings, self-efficacy feelings, compliance with painful treatment, and manipulation through use of asthma. These items obviously measure a broad range of cognitive, affective and behavioral responding and would not be expected to demonstrate high internal reliability. Four of the items in this subscale correlated positively with outcome measures, two significantly.

The items which had significant and positive

correlations with outcome measures were frequency of discussing asthma with peers and frequency of expressing worries about asthma with others. The present findings indicate that children who express more concerns about their asthma and who discuss asthma with their peers, tend to have greater numbers of physician office visits, school absenteeisms, and activity restrictions than children who do not verbalize concerns. This finding was not expected in light of previous research.

Anecdotal information indicates that these children only express emotional concerns when their conditions escalate. Between symptomatic episodes, there appears to be infrequent verbalization of worries or fears. Previous research has highlighted the suppression of affect as unhealthy; yet, this may in fact be a healthy denial which permits the child to function better during intervening periods of non-attacks. Elaborations by the children support this. Many had difficulty identifying concerns about their asthma and most were surprised when asked about talking to their peers about asthma. A common response came from a 10 year-old subject who declared, "We don't have time to talk about asthma, we have too many fun things to do." This type of response implies a focus not on illness behavior but rather on healthy behavior and activities.

Another problematic item which correlated in the opposite direction than was expected was frequency of cooperation with adults when the treatment is difficult and painful. The treatment regimen is often painful for these children, especially when allergy injections are required several times per week. As discussed above, the problem appeared to be in the use of the word "cooperate" and not in noncompliance with treatment.

The final problematic item was frequency of using asthma to manipulate situations or people in getting special favors. Previous research has associated chronic illness with behavior problems and it was expected that manipulation of situations (faking illness to miss school) would be associated with poor outcome. However there was an opposite trend. Those children who admitted to some manipulation tended to have better outcome. This may be related to the issue of internal versus external control. As researchers have noted, internal control is generally related to better illness outcome. By the use of some manipulation, the child may be gaining some measure of internal control in a situation where much behavior is dependent on conditions out of his control.

Parent Enrollment Questionnaire

For the Parent Enrollment Questionnaire initial

subscale reliability analyses demonstrated that reliability levels were adequate for two of the scales (Prevention and Intervention) but less than adequate for Compensatory. Item analyses of the subscales indicated that particular items were lowering the internal reliability for subscales Prevention and Compensatory.

Prevention: For subscale Prevention, the item was "Does your child use any forms of mind control, such as visualizations, to prevent asthma attacks?". Thirty-five out of thirty-seven parents answered that they did not know. This can be contrasted with the child's own reports which show that eight children reported using mind control techniques effectively. The discrepancy, though small, indicates that some children have taken the initiative in developing cognitive self-management techniques on their own. The finding also highlights an untapped area of management training, namely visualization and self-hypnosis techniques. The use of mental imaging offers potential for increasing illness control even more.

Compensatory: For the PEQ Compensatory subscale, as with the child report, the problematic items which lowered internal consistency were frequency of expressing worries related to asthma and discussing asthma with peers. From the parent's perspective, when the child expresses worries, the parent's anxiety may increase and, in attempting to

decrease the anxiety, the parent takes the child to the doctor, keeps the child home from school, or restricts activities. From a cognitive social learning perspective, this behavior on the parent's part may punish the child for expressing worries, thus reducing his verbalizations about illness concerns.

In summary, the individual subscales of the Self-Management Competency Inventory and the Parent Enrollment Questionnaire will require more research and modification before reaching standard levels of internal reliability. Items which correlate in unexpected directions provide valuable information, and on examination may require re-coding in opposite directions as research indicates.

Log Data

Log data was included to aid in interpretation of results. One correlation was highly significant. That the significant correlation was between the Parent Enrollment Questionnaire subscale Prevention and observed prevention skills indicates that children were practicing prevention skills at home and this provides support for the validity of the parent report. Parents indicated that there were few asthma attacks during the four-day observation period which may account for the fact that intervention skills

were not correlated with the log data. That is, if the observed prevention skills were effective, intervention skills would not be needed.

One of the most interesting findings about the log data was the participation rate. Return rate for parents who received the log form at the time of the interview (89%) was much greater than for parents who were given instructions by phone (44%). Many of the self-management programs reviewed emphasize the importance of personal involvement and active effort in subsequent behavior change. The indication is that when the parents met the investigator and had a chance to ask questions and to respond in a more personal manner, return rate increased.

Limitations of the present study encompass the measures, the sample of subjects and the limits on generalizations and prediction. Limitations caused by the measures stem from the use of self-report instruments rather than actual behavioral observation. Some of the findings may reflect the influence of response sets in children who were invested in creating positive images of themselves. Parents' reports may have been influenced by generalizations owing to giving the child credit in one area of self-management which would have a halo effect in other areas. Given the nature of the criterion referenced instruments, this limitation was probably minimized.

Because the instruments are in an early phase of development, another limitation is the lack of test-retest reliability coefficients and internal reliability coefficients. The inability to evaluate emotional and adjustment factors due to the low reliability of the Compensatory subscale was another limitation of the measurement tool.

Limitations due to the subject sample included the fact that the subjects were all chosen from pediatric allergy clinics and were a relatively high functioning group of asthmatics. Examination of the outcome data suggested that the present sample was relatively competent in terms of illness control. Number of hospitalizations and emergency room visits were quite low when compared to other studies of asthma. It is likely that the parents were committed to good medical care for their children by virtue of seeking out a specialist in health care. Also, the physicians evidenced strong commitments to their patients to a degree that is probably not usual in the medical community. Therefore generalizations are limited to similar population groups.

Future research in the area of self-management behavior requires refinement of scales which measure compensatory competencies so that emotional and adjustment factors, which have in the past been over-represented in

the literature, can take their place alongside behavioral factors. In addition, studies replicating the present methodology would increase confidence in the reliability of the instruments.

Future research is also needed to broaden the range of asthmatics to include subjects from pediatric clinics, schools and general hospital admissions. Investigating subjects from different referral sources will contribute to a broader understanding of the observed relationship between self-management competencies and illness outcome. Generalizations based on the restricted range of the present study are of limited value in considerations of clinical utility.

A final recommendation for future research is that severity be given more consideration in terms of both measurement and outcome. There is a need to understand what comprises the physician's judgement of severity. The need to operationalize and elaborate the physician's judgments of severity would enable the researcher to begin to identify significant factors in the overall perception and assessment of severity level across physicians and across patients. Furthermore, asthma research requires a better understanding of the independent impact of severity on illness outcome. The present findings underscore the necessity of accounting for severity and its effect on various outcome measures.

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APPENDICES

APPENDIX A

PHYSICIAN QUESTIONNAIRE

1. Patient _____ Age _____ Sex _____
2. Parent's Name _____
Address _____
Phone (home) _____ (Work) _____
3. Current classification of asthma severity: (circle one)

1	2	3	4	5	(3)
mild		moderate		severe	
4. Do you consider this to be a case of CONFIRMED asthma?
Yes ____ No ____
5. What medications are currently prescribed for this patient?

<u>Drug</u>	<u>Dosage</u>	<u>Frequency</u>
_____	_____	_____
_____	_____	_____
_____	_____	_____
6. What activity restrictions, if any, are recommended?

7. How would you rate this patient's overall success with management of asthma?

1	2	3	4	5	(4)
very poor		average		excellent	

Doctor _____
Date _____

APPENDIX B

Record # 01 (1-2)

Patient _____

MEDICAL OUTCOME DATA FORM

A. Medical outcome data for past 6 mo.

(1) number of office visits _____ (3-4)

(2) number of hospitalizations _____ (5-6)

(3) number of EMR visits _____ (7-8)

(4) number of school-days missed _____ (9-10)

(5) number of activity restrictions _____ (11-12)

B. List precipitants of asthma attacks:

_____	_____
_____	_____
_____	_____
_____	_____

C. List tests to confirm asthma:

D. List other health problems:

APPENDIX C

Parent Demographic Information

Record # 22 (1-2)

1. Child's sex Male__ Female __
2. Child's grade in school _____
Name of School _____
3. Child's ethnic background:
Asian __ (3) Hispanic __ (6)
Black __ (4) Native American __ (7)
Caucasian __ (5) Other _____
4. Parents' highest level of education:
Mother _____
Father _____
5. Occupation of parents:
Mother _____
Father _____
6. How severe is your child's asthma? (circle one number) __ (8)
- 1 2 3 4 5
Mild Moderate Severe
7. At what age was your child first diagnosed as having asthma?
_____ years old (9-10)
8. Over the past 6 months, on how many days was your child absent from school due to asthma?
_____ days _____ (11-12)
9. How many times has your child been to the emergency room during the past 6 mo. due to asthma? _____ (13-14)
10. How many hospitalizations has your child had during the past 6 mo. due to asthma? _____ (15-16)
11. How many physician office visits due to asthma has your child had during the past 6 mo.? _____ (17-18)

APPENDIX D

Name _____

	<u>THURS.</u>	<u>FRI.</u>	<u>SAT.</u>	<u>SUNDAY</u>
1. Stays away from things that cause breathing problems				
2. When having trouble breathing, gets away from what's causing it				
3. Attempts to control breathing and/or uses breathing when having trouble breathing				
4. Tries to relax when having trouble breathing				
5. Drinks water or juice when having breathing problems				
6. Takes medicine correctly when having breathing problems				
7. Knows when adult help is needed with breathing problems				
8. Withstands pressure from other children to do things that would cause breathing problems				
9. Reports side effects of medicine to parents or physician				
10. Stays calm when having breathing problems				
11. Rests following an attack of asthma				
12. Tells people about his/her asthma when necessary				
13. Slows down and takes it easy when breathing problems begin				
14. Keeps asthma medicine handy at home, school and when away				
15. Takes the correct medicine when breathing problems begin				
16. Takes routine medicine correctly and at right time without reminder				

APPENDIX F

Dear Dr.

I am a doctoral candidate in the Department of Clinical Psychology at The University of Tennessee and am involved in research investigating self-management behaviors in asthmatic children. I am including a brief synopsis of my proposal for your consideration. The research has been approved by: the UT Institutional Research Review Board; the Department of Psychology; and the Doctoral Committee.

I am requesting your participation in this project as a referral source to locate subjects. The criteria include: (1) males and females between the ages of 7 and 12 years old; (2) confirmed diagnosis of asthma for at least two years; and (3) maintained on daily medication. Within these criteria, any patients whom you could refer would be greatly appreciated. The procedure involves sending me a list of appropriate patients, their addresses and parents' names; I will send each referral a letter describing the project and requesting their participation. Participation on their part would involve approximately one hour of interviews and self-report measures to be scheduled by me at their convenience. Participation on your part would involve: (1) referring patients; and (2) completing a brief medical questionnaire for each patient.

After completion of all interviews, I will be summarizing our findings on self-management competencies and will make this information available to all participants. I believe that the information will be interesting for both parents and physicians.

I will be calling you within a week to follow-up on your decision about participating. I look forward to discussing the project with you and would be glad to schedule a meeting or a phone conversation if you would like more information. Thank you for your consideration of this project.

Respectfully,

Joanna R. Williams

APPENDIX E

Dear Mrs. :

I am a graduate student in the Department of Clinical Psychology at the University of Tennessee and am working on a study of how children adjust to asthma. Dr. _____ suggested that I contact you as a good source of information. The purpose of my study is to understand more about children's self-management skills in regard to their control of asthma.

This letter is to ask you to participate in my research project. If you agree to take part, both you and your child will be asked to meet with me for approximately one hour to answer questions about asthma management. Your child will be interviewed by me and will be asked particular questions concerning asthma adjustment. I will also be giving your child a short standardized verbal task to insure that he or she is appropriate for the study.

As a parent, you will be asked to do two things: (1) complete a parent questionnaire during the time of your child's interview and (2) keep a brief record of your child's asthma-related behavior for four days. The parent questionnaire will require approximately 30 minutes of your time to complete. We will conduct the interview either at my office at the University of Tennessee or at your home, if that is more convenient for you. All questionnaires will be numbered and recorded with numbers instead of names to insure confidentiality. After completion of all interviews, I will be summarizing our findings and will make them available to all participants. Hopefully, this should be interesting information for all parents of asthmatic children. Should you have questions at any point (before, during or after), I will be glad to discuss them with you. You may call me at 966-9834.

If you choose to participate, you will be making a significant contribution to the study of asthma management. Please indicate your decision on the accompanying form and return it to me as soon as possible in the enclosed stamped envelope. If you decide to be a part of our study, I will either call you or write you soon to arrange the interview.

Thanking you in advance for your consideration of this research,

Joanna R. Williams, M.A.
Department of Psychology

APPENDIX G

INFORMED CONSENT

Principal Investigator: Joanna R. Williams

Title of Project: The Relationship between Self-Management Competencies and Outcome Variables in a Population of Asthmatic Children

Purpose of the Study: To investigate how an inventory of self-management behavioral competencies relates to measures of asthma control in a group of asthmatic children.

Procedure to be Followed: This investigator will meet with both parent and child explaining format of the interview. The child will complete the following: PPVT; SMCII; and HBI; the parent will complete the PEQ and will take home a four-day check list which will be mailed subsequent to the collection of data. The interview will require approximately one hour to complete. Data will be recorded and identified by numbers to assure confidential handling of results. No discomforts or other difficulties are anticipated for the child, given the standard administration of inventories and interview techniques.

This study has been approved by:

The University of Tennessee Institutional Review Board
Department of Psychology Review Committee
Doctoral Dissertation Committee
Referring Physician

I understand the procedure to the extent it has been described to me. I also understand that if the results were to be published, information would be confidential and disguised so that recognition of individuals would be impossible. I understand that I may withdraw my child at any time without prejudice to me or my child. I understand that the study is for purposes of gathering information, and not for the purpose of treatment or experimentation. I also understand that Ms. Williams has agreed to summarize the findings and make them available to me after the study has been completed. I freely and voluntarily agree to participate and to have my child participate in this study.

Signature of Parent, Date

VITA

Joanna Rife Williams was born in Grundy, Virginia on December 23, 1946. She attended elementary school and high school in Grundy and graduated from Grundy Senior High in 1965. In September 1965 she entered Mary Washington College of the University of Virginia and attended for two years. In September 1967 she entered the University of Kentucky and received a Bachelor of Arts degree in Psychology in 1969.

In September 1981 she returned to graduate school at East Tennessee State University and received a Masters of Art degree in 1983. She entered the graduate school of the University of Tennessee in September 1983 to study clinical psychology. She completed a one-year internship in clinical psycyology at the University of North Carolina Medical School in Chapel Hill, North Carolina in August 1987. In August of 1988 she received her Doctor of Philosophy degree with a major in Clinical Psychology from the University of Tennessee.