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In Search of Resilience and Positive Health Outcomes in Low-Income Adolescents with Asthma

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LOYOLA UNIVERSITY CHICAGO

IN SEARCH OF RESILIENCE AND POSITIVE HEALTH OUTCOMES
IN LOW-INCOME ADOLESCENTS WITH ASTHMA

A DISSERTATION SUBMITTED TO
THE FACULTY OF THE GRADUATE SCHOOL
IN CANDIDACY FOR THE DEGREE OF
DOCTOR OF PHILOSOPHY

PROGRAM IN NURSING

BY
DARLA K. DEWOLFF
CHICAGO, ILLINOIS
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To my husband, Steve—with love.
While we breathe, we will hope.

—Barack Obama
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ABSTRACT

Asthma is a chronic lung disease of epidemic proportions affecting 24.6 million Americans, including 7.0 million children. In particular, 22% of high school students indicated a doctor or a nurse had told them that they had asthma, with 10.8% with current asthma. The disease disproportionately afflicts minority children from low-income areas. Adolescents with asthma, who live in such areas, are at particular risk for increased morbidity and mortality. The purpose of this study was to examine the degree to which the phenomenon of resilience, observed in other physical health and psycho-social contexts, may be found in adolescents with asthma exposed to risks that often accompany low-income environments. The Asthma-related Resilience Model was used to guide this study.

The concept of resilience sheds light on the phenomenon where some individuals have thrived while faced with risks to psychosocial and physical health. A variety of protective factors are used by these individuals to moderate the risks. Asthma, which requires negotiation of physical and psychosocial challenges for successful management, fits well with the concept of resilience. It is important to know what resource and protective factors may help to alleviate certain risk factors associated with asthma in low-income adolescents.
One hundred and two adolescents with a physician’s diagnosis of asthma were recruited from four healthcare centers that accepted Medicaid in low-income areas in Chicago, IL (mean age, 16 years; 40% male; 61% Black). Participants completed a confidential paper-and-pencil survey booklet of risk factors, resource factors, and positive health outcomes. Hierarchical multiple regression analyses were performed to assess the benefits of self-esteem, social support, and internal locus of control as both moderators of risk and as main effects.

Three general findings from this study were noted. One was the singular importance of depression as a risk factor for positive health outcomes in adolescents with asthma. Second was the absence of any interaction or significant moderation of risk factors by resource factors. The third general finding was lack of evidence supporting direct beneficial effects due to resource factors characteristic of social support or self-esteem. Internal locus of control was found to have a direct benefit on asthma-related quality of life and asthma control.

The complexity of asthma’s underlying causes and the challenges of managing it as a chronic disease are impacted by many factors. The adolescent’s asthma-related quality of life goes beyond simply managing the severity of the asthma itself. As such, it would seem natural that the concept of resilience would be suited to help explain positive health outcomes. However, this research does not support this assumption.
CHAPTER ONE

PROBLEM STATEMENT

Asthma is a chronic respiratory disease that affects persons of all ages and is characterized by periods of breathing difficulty, wheezing, chest tightness, and coughing, due to inflammation and narrowing of the airways. Asthma symptoms can be controlled with appropriate medications, self-management education, and by avoiding exposure to allergens and irritants that can trigger an asthma exacerbation. Asthma symptoms may be unpredictable and fluctuate from an indolent or controlled state to a more severe condition, or even death, if left untreated (American Lung Association [ALA], 2011; National Heart, Lung, and Blood Institute [NHLBI], 2007).

Asthma is one of the most common chronic diseases of childhood and is a major cause of childhood disability in the United States (NHLBI, 2007). Approximately 7 million children have asthma (U.S. Department of Health and Human Services [USDHHS], 2010a). The prevalence rate for children under age 17 is 9.6%, higher for boys (11.3%) than girls (7.9%), and higher for Black children (17%) than White children (8.5%). Prevalence increased significantly during 2001-2009 for all children (8.7% to 9.6%) (Centers for Disease Control [CDC], 2010, 2011)
Although asthma’s pathophysiology is better understood than it was 20 years ago, no cure or vaccine for asthma exists. Safe and convenient medications are available for its control, and yet asthma prevalence, healthcare use, and morbidity remain high (Akinbami, 2006; Akinbami, Moorman, & Liu, 2011; ALA, 2011; Lurie, Mitchell, & Malveaux, 2009).

The rates of healthcare utilization associated with asthma morbidity remain at unacceptable levels. Four million children less than 18 had at least one asthma attack in the previous year. The asthma attack prevalence rate in those under 18 has been significantly greater than those over 18 (54.8 versus 28.8 per 1000, respectively). Furthermore, there were 6.7 million physician office visits, 0.8 million hospital outpatient department visits, and 0.64 million emergency room visits due to asthma for this same age group. Approximately 33% of the asthma discharges in 2006 were in those under age 15 (ALA, 2011; Akinbami et al. 2011).

Asthma burdens our nation with an annual economic cost of $56 billion; direct healthcare costs were $50 billion with indirect costs (lost productivity) adding another $6 billion. In 2008, asthma accounted for an estimated 14.4 million lost school days in children (Moonie, Sterling, Figgs, & Castro, 2006). Asthma ranks within the top ten prevalent conditions causing limitation of activity (ALA, 2011).

Several authoritative entities have recognized childhood asthma as a national concern including the American Academy of Pediatrics (AAP), U.S. Congress, United States Department of Health and Human Services (USDHHS), and the National, Heart, Lung, and Blood Institute (NHLBI). A “Blueprint for Policy Action” issued by the AAP
in 2002 encouraged a multifaceted approach to effectively decrease pediatric asthma morbidity. According to the AAP, an investment in social and community resources that extends beyond medical care and into behavioral and lifestyle modifications is critical to improving the quality of life for children with asthma (Lara, Rosenbaum, Rachelefsky, Nicholas, Morton, Emont, et al. 2002).

The 112th Congress has recognized childhood asthma as a national health concern. The Asthma Management Plans in School Act introduced in May 2011 (U.S. House Bill 1692) to the House of Representatives is meant to provide grants to schools for the development of asthma management plans and the purchase of asthma medications and devices for emergency use, as necessary (H.R. 1692–112th Congress, 2011). The status of this bill is still under consideration.

*Healthy People 2020*, a national health promotion and disease prevention initiative published by the USDHHS, set the goal of an overall reduction in asthma-related deaths, hospitalizations, and emergency room visits with an increase in asthma-related quality of life. These reductions are an essential part of successful asthma control (USDHHS, 2011).

Lastly, the National Heart, Lung, and Blood Institute recommends four essential components of asthma care: assessment and monitoring, patient education, control of factors contributing to asthma severity, and pharmacologic treatment. Furthermore, the Expert Panel Report 3 recognized the need for a variety of health professionals to deliver asthma healthcare and education effectively. In particular, nurse-educators and advanced practice nurses were noted, in addition to primary care physicians (NHLBI, 2007).
Background and Significance

Asthma affects children of all ages and races, and from families with all incomes. In particular, 22% of high school students indicated a doctor or a nurse had told them that they had asthma, with 10.8% with current asthma (USDHHS, 2010b). Asthma mortality rates are highest in adolescents, approximately twice those of younger children (Akinbami & Schoendorf, 2002).

The disease disproportionately afflicts minority children from low-income areas (Akinbami, 2006; Akinbami & Schoendorf, 2002; Flores et al. 2009; Gupta, Zhang, Sharp, Shannon, & Weiss, 2008; Gupta et al. 2010; Pearlman, Zierler, Meersman, Kim, Viner-Brown, & Caron, 2006; Pongracic, 2010; Smith, Hatcher-Ross, Wertheimer, & Kahn, 2005; Wright et al. 2004). Black children were more likely to have ever been diagnosed with asthma (22%) or to still have asthma (17%) than Hispanic children (13% and 8%) or White children (12% and 8%) (USDHHS, 2010a). Compared with White children, Black children have a 60% higher prevalence rate, a 260% higher emergency department visit rate, a 250% higher hospitalization rate, and a 500% higher death rate from asthma (Akinbami, 2006). Neighborhood factors, including socioeconomic status, stress, and violence appear to contribute to asthma prevalence and morbidity in inner-city areas (Gupta et al. 2010; Pongracic, 2010; Sternthal, Jun, Earls, & Wright, 2010; Wright et al. 2004).

Children in poor families were more likely to have ever been diagnosed with asthma (18%) or to still have asthma (14%) than children in families that were not poor (13% vs. 8%, respectively) (ALA, 2011). Both prevalence and morbidity are worse for
Black children from low-income families than would be expected based on the respective rates for White children from low-income families (Flores et al. 2009; Smith et al. 2005). Children with private health insurance were less likely to have ever been diagnosed with asthma than children with either Medicaid or other public health insurance (8.4% vs. 12.3%, respectively) (USDHHS, 2010a).

Poverty appears to be an important contributing factor to childhood asthma morbidity (Akinbami & Schoendorf, 2002; Lieu et al. 2002). Hospitalization rates for asthma among children residing in areas where poverty was greatest were found to be higher than rates among children residing in other areas. Children living in high-poverty areas had a hospitalization rate that was 1.7 times the rate in medium-poverty areas, and 3.0 times the rate for residents in areas with the lowest poverty (CDC, 2000).

The child with asthma suffers not only in terms of physical health, but also in terms of decreased asthma-related quality of life. Several studies have correlated poor quality of life with asthma morbidity in children and adolescents with asthma (Bender, 1996; Juniper, 1997, 1998; Juniper, Guyatt, Feeny, Ferrie, Griffith, & Townsend, 1996; Juniper, Wisniewski, Cox, Emmett, Nielsen, & O’Byrne, 2004; Okelo, Wu, Krishnan, Rand, Skinner, & Diette, 2004). Poor quality of life includes missed school days. On average, urban minority children with asthma will miss 7 to 9 school days per year due to asthma-related symptoms (Flores et al. 2009; Moonie et al. 2006).

Asthma is a chronic disease with a considerable variation and unpredictability related to asthma symptom burden and asthma exacerbations. As a result, researchers have examined the relationship between the depression of a child with asthma and asthma
morbidity. Weil reported that inner-city children with asthma who scored higher on a measure of psychological distress had more hospitalizations, more days of wheezing, and lower functional status than those scoring lower on distress (Weil, Wade, Bauman, Lynn, Mitchell, & Lavigne, 1999). In 2006, Richardson concluded that adolescents with asthma and depression had significantly more days of asthma symptoms ($p < .001$) than those without depression (5.4 days and 3.5 days, respectively) (Richardson, Lozano, Russo, McCauley, Bush, & Katon, 2006). Furthermore, a similar relationship between youth with asthma and depression was noted by Katon, Lozano, Russo, McCauley, Richardson, and Bush (2007). The authors reported that youth with asthma have an almost twofold higher prevalence of a depressive disorder than the control sample of youth without asthma ($p < .05$). Lastly, children of ethnic minorities and individuals in lower economic positions also may experience greater psychological stress (Williams, Sternthal, & Wright, 2009).

A medical model for understanding the pathology and treatment of asthma has been well established (Byrd & Joad, 2006; Clark, Mitchell, & Rand, 2009; Lanphear, Kahn, Berger, Auinger, Bortnick, & Nahhas, 2001; Lurie et al. 2009). However, a much-needed counterpoint to this long-standing focus on illness and disease should include new resources in advancing knowledge of more positive health (Singer & Ryff, 2001). Clark (2009) and Lurie (2009) recommended going beyond the use of the healthcare system to address asthma morbidity, recognizing the multiple factors—genetics, environment, and social determinants affecting childhood asthma. They suggested that it should encompass
the *how and why* individuals thrive and flourish given the significant adversities associated with their health problem.

In the contexts of psychosocial pathology and other chronic diseases, it has been understood that not all individuals with limited resources and opportunities have poor outcomes; in fact, some show optimal physical and mental health better than what would be expected (Garmezy, 1971, 1985; Haase, 2004; Rutter, 1979a, 1979b; Werner & Smith, 1982). This area of study, known as resilience has begun to be applied to populations with asthma (Chen, Strunk, Trethewey, Schreier, Maharaj, & Miller, 2011; Mitchell, Adams, & Murdock, 2005; Mitchell, Murdock, & McQuaid, 2004; Vinson, 2002).

**Adolescent Health**

The health and well-being of adolescents has a major impact on the overall social and economic health of the country. Today’s adolescents are tomorrow’s workforce, parents, and leaders. Adolescents are an important community asset. The current adolescent population in the United States is estimated to be 17 million (U.S. Census Bureau, 2010). The majority of adolescents are healthy when assessed by traditional medical markers (Brindis, Park, Paul, & Burg, 2002).

Adolescence involves physical, psychosocial, and cognitive changes. Adolescence can also be divided into periods of early, middle, and late adolescence. Early adolescence refers to those individuals between 11 and 14 years; middle adolescence encompasses those who are 15 to 17 years; and late adolescence includes those who are 18 years and older (Rice & Dolgin, 2008).
During adolescence, young people are exploring and experimenting: the most common way of learning and establishing independence. These behaviors are often a normal part of the transition from childhood to young adulthood, but they can also lead to negative and potentially serious health consequences as they learn to manage new capabilities and greater freedom (Brindis et al. 2002; Fonseca, 2010).

The process of sexual maturation or the development of secondary sexual characteristics highlights the physical changes. Variation in the timing of puberty can have a significant impact on the adolescent whose development deviates from the mean. This appears to be related to lower self-esteem and more concerns about body and self-image (Hazen, Scholzman, & Beresin, 2008; Radzik, Sherer, & Neinstein, 2002; Rice & Dolgin, 2008).

Identity formation is the psychosocial task to master in adolescence (Erikson, 1968). This includes greater sense of personal identity, identification with a peer group, and autonomy from parents. Different selves appear in an adolescent’s life marking their sense of relationship as an individual among peers, their sense of who they believe their peers see, and their sense of who they see themselves as outside of any social context. An adolescent’s thoughts, feelings, and actions simultaneously affect their sense of identity within all of these relationships (Rice & Dolgin, 2008).

The cognitive changes that accompany adolescence are marked with qualitative and quantitative changes; that is, the adolescent moves from a concrete operational thinker to one who is more abstract, using formal operations that involve hypothetical reasoning to guide future decision making. The development and refinement of these
abilities continues throughout all of adolescence (Fonseca, 2010; Hazen et al. 2008; Rice & Dolgin, 2008).

Good health enables youth to make the most of their teenage years, while preparing a strong foundation for adult life. Most adolescents traverse this developmental period without major psychological or behavioral problems. This, however, depends on a complex array of factors that includes characteristics of the adolescent, family, and social support (Hazen et al. 2008).

An adolescent’s sense of control and inner self-confidence has been associated with health and well-being (Dumont & Provost, 1999; Lachman & Weaver, 1998; Li, Nussbaum, & Richards, 2007). Family structure has an important influence on adolescent health. Parents who provide supervision and are involved with their adolescent’s activities are promoting a safe environment for their adolescent in which to explore opportunities. Research shows teens who have positive relationships with their parents are less likely to engage in various risk behaviors (Aufseeser, Jekielek, & Brown, 2006; Carbonell, Reinherz, Giaconia, Stashwick, Paradis, & Beardslee, 2002; Zdanowicz, Janne, & Reynaert, 2004).

Positive role models, mentors and other caregivers outside of the family, otherwise known as social support, are known to exert a large influence on adolescent health behaviors as well as on mental health (Aufseeser et al. 2006; Dumont & Provost, 1999; Hurd, Zimmerman & Xue, 2009; Ungar, 2004). The social support and environment of the school and community affect multiple aspects of adolescent development.
While the primary purpose of school is the academic development of students, its effects on adolescents are far broader, also encompassing their physical and mental health, safety, civic engagement, and social development (Marin & Brown, 2008). Creating safe and nurturing community environments for adolescents helps minimize opportunities for behaviors that endanger health and safety. More broadly, one finds in the research that a sense of community and connectedness has been shown to be important in enhancing positive mental health (Birkhead, Riser, Mesler, Tallon, & Klein, 2006).

The quest for independence, self-identity, and adult-like status, and desire for peer acceptance contribute to the adolescent’s drive to be normal, competent, and popular. This struggle may create difficult choices for teenagers with a chronic illness, like asthma. Physical symptoms and treatments are nagging reminders that they are not normal in some way. The adolescent with a chronic illness may have greater difficulties in mastering these developmental tasks and have fewer resource factors than those individuals without a chronic disease (Suris, Michaud, & Viner, 2004).

**Adolescents and Asthma**

Asthma mortality rates are highest in adolescents (Akinbami & Schoendorf, 2002). The management of a chronic condition during adolescence may constitute a major challenge for the individual. For the youth with asthma, the developmental tasks associated with adolescence may be substantially impaired or compounded due to the inherent stressors of the management and treatment of their disease. Development of a poor sense of self and poor mental health, high absenteeism and academic challenges,
and decreased access into peer groups are just a few examples of the effects of having a chronic illness during adolescence (Suris et al. 2004).

Although adolescents with asthma usually have an increased understanding about the disease and treatment, they are less adherent or compliant with treatment than younger children. Issues with emerging autonomy may accentuate good management strategies, or, on the other hand, exacerbate problems with asthma control (Peters & Fritz, 2010). Akinbami (2006) concluded that adolescents with asthma do not readily seek usage of the medical system. They may fail to recognize, or choose to deny, the danger of poorly controlled asthma, may not accept having a chronic illness, or they may view the use of a medical system as infringing upon their emerging independence and adulthood.

The natural progression of an adolescent’s development is towards more independence and less dependence on his or her parents (Rice & Dolgin, 2008). For the child with asthma, the responsibility for managing the disease is primarily done by the parents. By encouraging the adolescent to follow recommended treatments, parents may inadvertently contribute to their adolescent’s feelings of inadequacy by setting limits that are unbecoming to a teenager or regressing to a state of infantilism (Suris et al. 2004; Vitulano, 2003).

The adolescent with asthma striving to attain this goal of independence may be reluctant to have parents oversee his or her care. As a result, the adolescent may experience increased asthma morbidity than when under parental care as a child. Of particular concern for adolescents with asthma is the higher rate of deaths compared with
younger children (3.3 asthma deaths per 1,000,000, and 2.3 asthma deaths per 1,000,000, respectively) (Akinbami, 2006).

The physical well-being of an adolescent with asthma is determined largely by the severity of the disease and the amount of treatment required but also the psychological well-being may be impacted as well. Sadness, depression and anxiety have been found to be linked to asthma severity and were higher than those without asthma (Gillaspy, Hoff, Mullins, VanPelt, & Chaney, 2002; Peters & Fritz, 2010; Richardson et al. 2006; Suris et al. 2004). Katon reported that 16.3% of youth with asthma compared with 8.6% of youth without asthma met DSM-IV criteria for one or more anxiety and depressive disorders (Katon, Lozano, Russo, McCauley, Richardson, & Bush, 2007). In addition, there is some evidence that for adolescents with a chronic illness, depression and risk behavior are associated with noncompliance to medications, poor treatment outcomes, and death (Bender, 2006).

Young people, from an understandable point of view, do not want to stand out or be viewed differently from their peers. Adolescents with asthma may choose to hide their asthma and its treatments. The decision about carrying and using an inhaler may be determined by the development of peer relationships, self-image, and other priorities. As a result, the adolescent may be unprepared for any exacerbation that would occur (Suris et al. 2004).

Adolescents with asthma have the dual challenge of managing not only their disease but also the effects of adolescent development. Although medical interventions are available, the high morbidity of this chronic disease continues to persist. Perhaps it is
time to take a new approach to improving asthma outcomes for adolescents with asthma; that is, a resilience approach.

**The Concept of Resilience**

Resilience is not a new concept; to the contrary, it has substantial history in developmental psychopathology (Garmezy, 1971, 1985, 1987; Werner 1989, 1992, 1993; Werner & Smith, 1982, 1992, 2001). Resilience is defined as the ability of individuals to withstand and rise above adversity, despite reasons to expect otherwise. Implied within this definition are two cardinal tenets (a) exposure to significant adversity or risk, and (b) positive adaptation or outcome (Luthar, Cicchetti, & Becker, 2000). A significant risk or adversity is defined as a major threat to an individual’s competence or development in important domains (Luthar, 2003). Rutter argued that it was no particular risk factor, but the number of risk factors in a child’s background (1979b) that defined a significant risk or adversity. Resilience emerges from processes involving protective factors that positively influence a person’s response or adaptation in the presence of risk. Resilience therefore depends on the exposure to risk, not from the avoidance of risk. Therefore, resilience is an active process (Luthar et al. 2000; Rutter, 1993).

**Risk and Risk Factors**

Risk is defined as the adverse outcome to which a person is vulnerable. Risk factors exacerbate the likelihood of a negative outcome (Luthar et al. 2000). Risk factors have been identified with a diverse array of variables in many types of psychosocial and physical health contexts. Some are chronic poverty, mother with little education, perinatal complications, parental psychopathology, family disruption (Garmezy, 1987; Werner &
Smith, 1982), low socioeconomic status, neighborhood disadvantage (Dubow, Edwards, & Ippolito, 1997; Luthar & Goldstein, 2004; Mitchell et al. 2004), large family size (Rutter, Cox, Tupling, Berger, & Yule, 1975a; Rutter, Yule, Quinton, Rowlands, Yule, & Berger, 1975b), negative life events (Garmezy, 1987; Garmezy, Masten, & Tellegen, 1984; Luthar, 1991), diagnosis of a chronic disease such as cancer, asthma or special need and disability (Buckner et al. 2005; Chen et al. 2011; Corey, Haase, Azzouz, & Monahan, 2008; Mitchell et al. 2004; Patterson & Blum, 1996; Simoes, Gaspar DeMatos, Tome, & Ferreira, 2008; Vinson, 2002), childhood maltreatment (Collishaw, Pickels, Messer, Rutter, Shearer, & Maughan, 2007; Hauser, 1999) depression (Carbonell et al. 2002) and as an adolescent in a variety of situational settings (Grossman, Belnashowitz, Anderson, Sakurai, Finnin, & Flaherty, 1992; Hunter, 2001; Hunter & Chandler, 1999).

Resource and Protective Factors

Resource factors include any aspects of an individual’s characteristics or those of their environment which promote good outcomes. A resource factor will have a direct or main effect on the outcome, independent of the risk (Rutter, 1990). The term protective factor is reserved for a resource factor that operates only in the presence of a risk factor, and involves a change from risk to an adaptive trajectory, or has a moderating affect (Baron & Kenny, 1986; Bennett, 2000; Rose, Holmbeck, Coakley, & Franks, 2004; Rutter, 1987, 1990).

Several researchers have identified a number of potential protective factors. Each can be conceptually placed into one of three categories: personal attributes, family support, and extra-familial support (Cowen & Work, 1988; Werner & Smith, 1982). This

Protective factors moderate the relationship between the risk factor and the outcome or adjustment in a positive direction (Luthar, Sawyer, & Brown, 2006). They include both individual and external characteristics. Examples of individual resource factors found to be protective are self-esteem (Dumont & Provost, 1999; Garmezy, 1987, 1991a; Grossman et al. 1992; Rutter, 1979a, 1987; Vinson, 2002; Werner & Smith, 1982); internal locus of control (Garmezy, 1987, 1991a; Werner & Smith, 1982); academic achievement or school-based competence, and having a connection with adults outside their immediate family (Garmezy, Masten, & Tellegen, 1984; Masten, Garmezy, Tellegen, Pellegrini, Larkin, & Larsen, 1988; Vanderbilt-Adriance & Shaw, 2006; Werner & Smith, 1982).

External characteristics mainly derive from family and social or community environments. An example of family protective factors includes the adaptability of the family to change and solve problems. Family cohesion or the sense of closeness, affection and emotional support, and the absence of parental marital discord have also been reported as protective factors (Garmezy, 1987; Kim & Yoo, 2007; Li et al. 2007; Masten et al. 1988; Rutter, 1979a, 1987, 1993; Simoes et al. 2008; Ungar, 2004; Vanderbilt-Adriance & Shaw, 2006; Werner & Smith, 1982).

In the social or community environment, examples of protective factors include social support systems such as friends, teachers, and neighborhoods that encourage and
reinforce positive adaptation (Garmezy, 1991a; Li et al. 2007; Luthar et al. 2000; Rutter, 1979a, 1987, 1993; Southwick, Morgan III, Vythilingam, & Charney, 2005; Ungar, 2004; Werner & Smith, 1982). While these factors share a common ability to provide support to the individual from their community, the specific set of protective factors will vary by the nature of the risk, the risk context, and other factors such as age (Werner & Smith, 1982).

While it is important to know which protective factors contribute to positive outcomes, it is also important to understand how they operate in the lives of the individuals. Resilience research, therefore, is also concerned with the different mechanisms by which protective factors and risk factors interact to yield positive outcomes (Garmezy et al. 1984).

Positive Outcomes

Research on resilience has focused on positive outcomes that meet or exceed expectations given exposure to risk. Positive outcomes have commonly been defined in terms of good mental health and functional capacity. Examples of these outcomes include psychosocial adaptation (Dumont & Provost, 1999; Garmezy, 1987, 1991; Li et al. 2007; Rutter, 1979a, 1979b; Vanderbilt-Adriance & Shaw, 2006), social competence (Luthar & Zigler, 1991; Werner & Smith, 1982), academic success (Garmezy, 1985; Garmezy et al. 1984; Masten et al. 1988), competence in developmental tasks (Masten & Coatsworth, 1998), and less so as positive health and asthma management (Buckner et al. 2005; Mitchell et al. 2004; Simoes et al. 2008; Vinson, 2002).

The concept of resilience provides a useful framework for understanding the ability to draw on disparate factors to meet challenges of adverse circumstances. Yet
most of the resilience research has addressed social and psychological outcomes related
to resilience (e.g., Carbonell et al. 2002; D’Imperio, Dubow, & Ippolito, 2000; Hauser,
Smith, 1982) and less on physical markers of resilience related to health outcomes. (e.g.

As a result, there is a need to study resilience that includes physical markers of
resilience related to health as well as social and psychological outcomes. Understanding
how and why adolescents with asthma achieve positive health outcomes via resilience
may be an important key to asthma-related quality of life and asthma control as well as a
needed supplement to medicine’s historical emphasis on pathology and its containment.
According to Sapienza and Masten (2011), models of resilience are “workable for
multiple disciplines” (p. 268). One conceptual model for understanding asthma-related
resilience is that of Mitchell, Murdock, and McQuaid (2004).

Significance to Nursing

It is hoped that the study of resilience can explain why some individuals are better
able to adapt to significant adversity than others. Rutter (1979a, 1987) promoted the view
that resilience could be understood as an aspect of the broader question of how good
health emerges. Going from theory to clinical practice, the knowledge gained from
research on resilience may be used to help the adolescent with asthma identify what he or
she sees as available resource factors. By facilitating the adolescent’s awareness of these
resources, nursing can promote the skills for further adolescent development and when
and how to best use them to thwart the harmful health effects associated with asthma.
Conceptual Framework

This study was guided by the Asthma-related Resilience Model by Mitchell, Murdock, and McQuaid (2004) which was derived from the seminal research of Garmezy, (Garmezy, 1985, 1987, 1991a; 1991b; Garmezy et al. 1984) and the longitudinal work of Werner and Smith (1982, 1992, 2001) on child and adolescent resilience. Mitchell, Murdock, and McQuaid ‘s Asthma-related Resilience Model was derived from an empirically based understanding of positive outcomes for children with asthma, and took into consideration a certain set of risk and resource factors within the child and community and their specific interactions that might account for the variation in children’s asthma-related functioning. Within this model, resource factors provide moderation of the risks. See Figure 1.

Figure 1. Asthma-related Resilience Model by Mitchell, Murdock, and McQuaid (2004).

Mitchell, Murdock, and McQuaid conceptualized risk factors as those which were explicitly asthma-specific and those related to the community, implicitly linked to asthma morbidity. The asthma symptom severity for the individual and the neighborhood in which they lived were postulated as risk factors associated with increased asthma morbidity. Operationally, these factors were defined through asthma symptom level and neighborhood disadvantage.
According to the authors, protective factors emerged from individual characteristics (labeled protective processes in Figure 1). These were defined by two factors: perceived self-control and adaptability. Secondly, they hypothesized that the moderation of the risk by protective factors would result in a resilient outcome of health-promoting behaviors, as evidenced by better asthma management behaviors. As is typical of much resilience-based research, the moderation is identified with an interaction between the risk and protective factors (Rose et al. 2004). Operationally, asthma management behaviors were defined through the child’s understanding of the disease and improved treatment compliance.

Summary

Mitchell, Murdock, and McQuaid purposely chose only a few risk factors as well as limited protective factors as their research design was exploratory. The risk factors, asthma symptom level and neighborhood disadvantage, were chosen due to their established link with management behaviors and asthma morbidity. The protective factors were limited to children’s perception of self-control and adaptability. These variables were selected because of their contribution to health management behaviors.

The Asthma-related Resilience Model offers a framework to help better understand those protective factors that allow some individuals with known risk factors to rise above adversity and to succeed when otherwise expected related to asthma management. This Asthma-related Resilience Model can naturally be extended by including other risk and resource factors, and was the framework used for the current research study.
Current Study

In this study, the Asthma-related Resilience Model by Mitchell, Murdock, and McQuaid (2004) provided a helpful framework for examining the role of resource factors (self-esteem, internal locus of control, and social support) in the presence of hypothesized risk factors (asthma severity, depression, and neighborhood disadvantage) in facilitating positive health outcomes (asthma control and asthma-related quality of life) in adolescents with asthma as well as the underlying processes among these variables. It was expected that higher levels of each resource factor would be associated with an asthma-related resilient outcome. In addition, it was expected that the resource factor would moderate the relationship between the risk factor and the asthma-resilient outcome.

In contrast to the study of Mitchell et al. (2004), based on children, this current study included adolescents as well as additional resource and risk factors of: self-esteem, social support and depression. Adaptability was not included in this extended model. Lastly, positive health outcomes included higher levels of asthma control and asthma-related quality of life, both reflecting successful asthma management. Figure 2 shows the modified Asthma-related Resilience Model and the analogous approach taken in the current research study.
Figure 2. Modified Asthma-related Resilience Model.
Research Aims, Questions, and Hypotheses

Aims

(1) To examine the role of resource factors (self-esteem, internal locus of control, and social support) in the presence of hypothesized risk factors (asthma severity, depression, and neighborhood disadvantage) in facilitating positive health outcomes (asthma control and asthma-related quality of life) in adolescents with asthma.

(2) To determine whether identified resource factors function only in the presence of risk (i.e., protective factor-by-risk interaction) or whether they function more directly as resource factors (i.e., main effects).

(3) To establish the usefulness of an Asthma-related Resilience Model.

Questions

(1) Is self-esteem, internal locus of control, or social support important in obtaining positive health outcomes in adolescents with asthma?

(2) Do the resource factors moderate the risk factors in promoting asthma-related resilient outcomes?

Hypotheses

(1) Higher levels of each resource factor, self-esteem, internal locus of control, and social support, will have direct effects on positive health outcomes.

(2) Each resource factor, self-esteem, internal locus of control, and social support, will operate as a protective factor, or moderate the risk factor on the health outcomes.
CHAPTER TWO
LITERATURE REVIEW

The concept of resilience is relatively new to the nursing literature. However, it has its historical roots in psychological and risk research. Psychological researchers noted that some children whose parents were schizophrenic, or children who lived in a state of poverty and deprivation, or exposed to extreme stress, did, in fact, develop well. Despite their risk status or exposure to such adversities, these different individuals showed evidence of adaptive behavior (Garmezy, 1971, 1987, 1993; Werner, 1989, 1992, 1993; Werner & Smith, 1982, 1992).

Over the past five decades, significant studies aimed at exploring factors that contribute to resilience have been published. These studies have provided information regarding the constructs of resilience. On the basis of previous research, three categories of factors that protect against negative outcomes are: (1) dispositional attributes of the child, (2) family cohesion and warmth, and (3) availability and use of social support systems (Luthar & Zigler, 1991). The terms invulnerable, invincible, resilient children, stress-resistant, competent, and adaptive, have been used interchangeably and operationalized in various ways over the past several decades (Luthar & Zigler, 1991; Masten, Best, & Garmezy, 1990; Werner & Smith, 1982).
The use of these terms reflected an attempt to describe a single construct, now known as resilience: positive adaptation despite the odds (Hauser, 1999; Garmezy, 1985; Luthar, 2003, 2006; Masten et al. 1990; Masten & Coatsworth, 1988; Mitchell et al. 2004; Rutter, 1987; Vinson, 2002; Werner, 1992; Werner & Smith, 1982, 1992). The idea of invulnerable or invincible children was replaced with the concept of resilience as the former terms were misleading as they implied that resilience was absolute and unchanging (Rutter, 1987; Luthar, 2003, 2006).

Norman Garmezy (1971, 1985, 1993), and Michael Rutter (1975a, 1975b) and Emmy Werner (1989, 1992, 1993) were the first of these researchers to speak and write about the significance of good adaptation or development when one might expect otherwise. Resilience research, then, began to focus on identifying protective factors and risk factors. Protective factors modify the effects of risk in a positive direction; they encourage and reinforce positive adaptation. Risk factors, on the other hand, exacerbate the negative effects of the risk condition (Luthar & Cicchetti, 2000).

Rutter (1987) provided a seminal article clarifying the definition of resilience and its fluid quality. He suggested that resilience does not reside solely in the person but rather resilience is a dynamic process that includes extra-individual factors, such as a supportive family environment and a social support system, and their interactions with the individual. This dynamic process is responsible for the level of resilience achieved. Thus, the search for resilience processes began.
Key Resilience Studies

The literature review focused on the development and knowledge of resilience. The reviewed papers came predominantly from the mental health literature. While a significant amount of literature exists on resilience, there is a dearth of information related to resilience relevant to adolescents with asthma. The review of literature is arranged in three sections that explore resilience as a topic of scholarly study, with increasing focus on the application to adolescents with asthma. In the first section, a brief overview on the method for retrieval of literature is presented. The next section is devoted to the literature on resilience. The final section highlights major findings in children and adolescents with asthma and resilience.

Literature Search and Retrieval

A computerized literature search was conducted using the following databases: Cumulative Index to Nursing and Allied Health Literature (CINAHL), Medline, PsychINFO, Social Science Citation Index (SSCI) and Educational Resources and Information Center (ERIC). These databases were searched using the keywords: resilience, children or adolescent, and asthma and various combinations of these keywords. Supplementation to the computerized search included seminal works and reviews on resilience, and references cited in the identified literature.

A significant body of literature has been published on the concept of resilience since its introduction during the second half of the twentieth century. However, the purpose of this study was to explore the concept of resilience as it applies to adolescents
with asthma. The articles reviewed were evaluated for their appropriateness for the study of adolescents with asthma and resilience.

Inclusion and Exclusion Criteria

A list of inclusion and exclusion criteria was developed to identify research specific to resilience and asthma among adolescents. In order for the study to be included in the literature review, the inclusion criteria had to be met. Adolescents were the target population; however, studies with younger children were also included.
Table 1. Inclusion and Exclusion Criteria.

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<tr>
<td>Study Population</td>
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<td>All races, cultures, and ethnic groups</td>
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<td>Included a sample of children or adolescents less than 18 years</td>
<td>Foreign Language Studies</td>
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<td>Measured resilience directly or indirectly</td>
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<td>Study aimed at describing, monitoring, or addressing asthma</td>
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Literature on Resilience: Protective Factors

Early research on resilience focused on levels of risk, vulnerability, and protective factors. Risk is defined in terms of a probability for the development of an adverse outcome. Vulnerability or risk factors exacerbate the negative effects of the risk condition (Luthar, 2006). Protective factors are associated with positive outcomes and suppression of negative outcomes.

Risk and resilience-based research primarily emerged from the seminal work of Garmezy, Werner, and Rutter. These psychologists were interested in child development and children who were at risk for undesirable developmental outcomes, and yet developed similarly to those children without the same risk.

The origins of resilience began with such prominent studies as the Kauai longitudinal studies (Werner, 1989, 1992, 1993; Werner & Smith, 1982, 1992, 2001), the Isle of Wight (Berger, Yule, & Rutter, 1975; Rutter et al. 1975a; Rutter et al. 1975b), and Project Competence (Garmezy et al. 1984). In addition, Hauser (1999) investigated the process of resilience in a longitudinal study by means of a narrative analysis. It was in these studies that resilience was first recognized as a distinct phenomenon.

Kauai Longitudinal Study

Werner and Smith conducted a landmark longitudinal study that followed the psychosocial development of 698 infants and children born and living on the Hawaiian island of Kauai for over 30 years. Werner began the study in 1955, looking at the multiracial population of children designated to be at high risk for psychopathology due
to perinatal stress, presence of poverty, family instability, and raised by parents with little education or with mental health problems themselves.

The initial focus of the study was on identification of factors contributing to the development of physical and mental handicaps (Werner & Smith, 1982). Reflecting on their findings, the authors were struck by the prevalence of those who, despite adversity, developed into competent and autonomous young adults.

Werner's findings on resilience resulted from studying a particular subgroup of resilient children \( (n = 72) \). Data were collected at six different points: at birth, and at 1, 2, 10, 18, and 32 years of age. High-risk children were defined as those for whom at least four indicator variables were present. Indicator variables were identified using multiple regressions based on the ability of variables to predict the presence of a serious behavior or coping problem by age 18. For example, low IQ at age 2, a low baby’s activity level, poor standard of living, need for long-term mental healthcare at age 10, learning disability at age 10 and family instability at age 2. Those children who had at least four indicator variables and who did not develop a psychosocial problem by age 18 defined those considered resilient (Werner & Smith, 1982).

Comparisons were made between the resilient children and two groups of their non-resilient, high-risk counterparts: those who developed learning or behavior problems by age 10 \( (n = 90) \) and those who manifested delinquency or exhibited mental health problems at 18 \( (n = 92) \). At age 10, resilient children differed from their non-resilient peers especially in terms of their home lives and personal characteristics. For example,
the resilient children had higher IQ scores ($p < .001$) and resilient girls came from households that had a two parent family ($p < .01$).

At age 18, those in the resilient group were said to be more aware of and willing to be involved with the world around them than their non-resilient counterparts. For example, the resilient group had higher scores for internal locus of control ($p < .01$) and on the California Psychological Inventory sub-scales of responsibility ($p < .001$), socialization ($p < .001$), and communality ($p < .001$).

Werner also observed that resilience was more dependent on the characteristics of the child and care-giving environment at an early age rather than at adolescence. Similarly, the protective factors of interpersonal skills for adolescents were more important at this particular developmental stage than for younger children. The authors inferred from this data the dynamic aspect of resilience; that is, how it can change over time and in scope (Werner & Smith, 1982).

Isle of Wight

In 1964, Rutter began a longitudinal study assessing risk factors associated with the development of psychological and behavioral disorders in a sample of youth ($N = 440$), ages 9 to 11 years, on the rural island of Wight in England. Rutter used the absence of psychiatric disorders as an indicator of resilience. Six risk factors were associated with a heightened prevalence of psychiatric disorders: (a) discord in the marital/parental relationship, (b) a large family crowded into small living quarters, (c) parental disorder, (d) poor parental mental health, (e) low socioeconomic status, and (f) intervention of
government social service agencies (Rutter, 1979b; Rutter et al. 1975a; Rutter et al. 1975b).

In this study, Rutter found that children who had only one of these risks were at no greater disadvantage than children who had none. By contrast, the presence of two risk factors quadrupled the negative effects on adjustment and a 10-fold increase if there were four risk factors. The association between cumulative risk and adjustment had direct implications for how resilient individuals were identified; that is, evidence of positive adaptation in response to several risk factors was likely to identify a rarer, and arguably more valid, exemplar of resilience.

Rutter was able to associate specific factors that seemed to buffer or protect the Isle of Wight children. These included positive personality traits in the child such as easy temperament, self-mastery, self-efficacy, and planning skills. Moreover, family and social interventions such as a supportive family, and support for the child’s development from at least one community agency such as school or church group were associated with resilience (Rutter, 1979b; Rutter et al. 1975a; Rutter et al. 1975b).

Project Competence

Garmezy, in his quest for understanding adults with schizophrenia, was led to an interest in studying children of parents with schizophrenia. The research led by Garmezy became known as Project Competence. In particular, he turned his attention to those children, who despite being at-risk for psychopathology, did develop surprisingly well. Garmezy, and later, Masten, wanted to know what factors made a difference in the lives of such children (Garmezy et al. 1984; Masten et al. 1990).
Many at-risk children in Project Competence did develop normally in terms of various kinds of competence, as judged by teachers, peers, and school records that were similar to the competence of children without the risk factor. Masten summarized that competent children were friendly, easy-going, and had a positive sense of self. In addition, these children had good social skills with peers and adults, and were cooperative and responsive. Parents were important in the development of competent or stress-resistant children. Having parents who were warm, provided structure, and invested in their child’s education was noted as a positive factor. Lastly, any connection between a child and an institution in the community such as church or school--where an adult outside the family was invested in them and whom the child could emulate was found to be important in fostering resilience (Masten et al. 1990).

Hauser Narrative Analysis

Using a qualitative design, Hauser (1999) conducted a longitudinal study following adolescents (between the ages of 13 and 16), who had lived in a psychiatric hospital for 2 to 12 months. His goal was to understand how resilience unfolds. He also sought to gain insight into resilience by identifying common features identified as protective factors from the self-vocalized histories of individuals who displayed success in achieving a competent state of adulthood. These adolescents had experienced significant misfortunes such as: (a) severed ties with family, friends, and community, (b) experienced a serious psychiatric disorder leading to hospitalization, or (c) reported physical abuse at the hands of family members or close relatives.
Participants were interviewed during adolescence and adulthood. Of the 35 adolescents, nine were identified as resilient young adults based on their ability to function in the upper 50th percentile of all former patients and same age, high school, non-patient adolescents (Hauser, 1999).

A narrative analysis of the interviews was conducted and five content themes were noted: self-reflection, agency, self-complexity, persistence and ambition, and self-esteem. Similarly, these themes were recognizable as protective factors found to be associated with resilience in quantitative studies such as those by Garmezy et al. (1984), Masten et al. (1988), Rutter et al. (1975b), and Werner and Smith, (1982). The results of Hauser’s qualitative study thus formed an important validation of the variables found in previous quantitative studies supporting the concepts of resilience (1999).

Summary

Early research established resilience as a distinct phenomenon by identifying populations that clearly persevered in the presence of risk when particular factors were present. These protective factors were broadly categorized as: (a) a child’s unique disposition, (b) family warmth and cohesion, and (c) social support systems.

Within these categories, research established specific examples of protective factors and evidence that their importance changed with time. Werner noted the relative contribution of each category, and that the protective factors within each vary with age. For younger children, the stability and warmth of the family are often seen as more significant than in adolescence (Werner & Smith, 1982). For adolescents, the resilience research consistently shows that a positive regard for oneself, one's ability to initiate
changes, and an awareness of the world around them are associated with resilient outcomes. Examples of variables that expressed these qualities included internal locus of control, self-esteem, presence of family and social support systems (Garmezy et al. 1984; Hauser, 1999; Masten et al. 1990; Rutter et al. 1975a; Rutter et al. 1975b; Werner & Smith, 1982).

**Processes and Mechanisms of Resilience**

Models of resilience are dynamic and focus on processes; that is, how risk, resource factors, and protective factors function in relationship to each other in the context of adversity (Garmezy et al. 1984). Garmezy postulated three research models to help explain the relationship to resilience: (a) compensatory, (b) immunity/vulnerability, and (c) challenge. In the compensatory model, resource factors have direct effects that contribute to positive outcomes—the process referred to as *independent* by Rutter (1987)—or a main effect. The second model is the immunity/vulnerability or interactive model (Luthar, 1991). It is the most widely studied model in resilience research (Erdem & Slesnick, 2010). In this immunity model, the resource factors have a protective effect and buffer the effects of the risk factors. As a result, the resource factors are now referred to as protective factors. On the other hand, in the vulnerability model, there is an interaction between the resource factor and the risk factor. However, the protection normally afforded is suppressed by the risk factor. In the third model, the challenge model, the risk factor is viewed as a non-linear potential enhancer of competence (Garmezy et al. 1984). This model suggests that a moderate amount of risk exposure is more beneficial than no exposure to risk in reducing the negative outcome. Moderate risk
provides a challenge for the individual. Once this challenge has been met, the individual has the potential to prepare for the next challenge or difficulty. However, if the level of risk is too high, the result may be less than adequate. The second and third models are recognized as interactive models or processes. Research conducted by Garmezy et al. (1984), Luthar (1991), and Grossman et al. (1992) have contributed important findings on how resource factors function as protective factors in the presence of risk to produce positive outcomes indicative of resilience. A discussion of these models follows.

Interactive Model

Garmezy followed children considered to be at risk for psychopathology due to a maternal diagnosis of schizophrenia, affective disorder, or personality disorder. Garmezy and his colleagues used the nomenclature of competence and stress resistance to describe the same concept reflected in resilience (Garmezy, 1987; Garmezy et al., 1984). Stress resistance was defined as the “manifestations of competence in children despite exposure to stressful events” (Garmezy et al. 1984, p. 98).

An aim of this study was to explore how intelligence and socioeconomic status affected a child’s social and school competence in the presence of maternal risk behaviors. Participants (N = 200) in Project Competence ranged in school years from third through sixth grade from two schools in a working-class neighborhood and with a substantial proportion from single-parent households. Parents in the study contributed information about exposure of their children to stress by reporting negative life events with a questionnaire developed by the authors. Intellectual ability and Socio-economic status (SES) were considered as resource factors.
Measures of competence included academic achievement, classroom behavior, classroom engagement, and interpersonal competence. Hierarchical regressions were used to determine if SES and intelligence positively contributed to competence. Post hoc analysis of their published results with the program G*Power 3 (Faul, Erdfelder, Lang & Buchner, 2007) showed the statistical power (1-β) to have been greater than .99.

The researchers found that intellectual ability and SES could function as protective factors but not for all measures of competence, and with varying contributions either through a compensatory mechanism or through an immunity/vulnerability mechanism. Intellectual ability was a significant (α = .05) predictor of positive classroom engagement and academic achievement but not for classroom behavior (p = .544). A significant interaction was found between intellectual ability and life stressors for academic achievement, identified with the immunity/vulnerability mechanism (p = .048). No interaction was found between SES and the risk factors. Significant main effects, the compensatory mechanism, for SES were observed for all measures of competence: p = .028 for academic achievement, p = .045 for classroom behavior, and p = .028 for classroom engagement.

In conclusion, the study of Garmezy et al. (1984) was an important demonstration of a design by which the circumstances under which the function of protective factors could be identified and interpreted as showing different mechanisms of resilience. Other studies such as Luthar (1991) have since followed a similar design.
Interactive and Compensatory Models

Luthar (1991) examined resilience among minority adolescents at-risk for maladaptation to negative life events such as parental separation. Using a design similar to that of Garmezy et al. (1984), she studied the relationship between risk and resource variables and positive outcomes using hierarchical multiple regression. Factors associated with positive outcomes through an interaction with risk factors were referred to as protective factors.

The population of interest consisted of inner city, generally minority (45% Black, 30% Hispanic), adolescents (N = 144) drawn from 10 ninth-grade classrooms in a public school. The mean age was 15.3 (SD = .78).

Four measures of competence were measured as outcome variables for resilience. These were academic achievement based on school performance, and three behavioral competence variables: (a) assertive-responsible, (b) disruptive-disengaged, and (c) sociable. Hypothesized moderator variables or protective factors included intellectual ability, social skills, and internal locus of control, ego development, and positive life events. A single risk factor, negative life events, was used for the study.

Hierarchical multiple regressions were performed separately for each of the four outcome variables. Post hoc analysis of the power with the program G*Power 3 (Faul et al. 2007) showed that (1-β) was greater than .99.

As reported by Garmezy et al. (1984), Luthar (1991) similarly found a wide variability in which protective factors were significant (α = .05) to each measure of
competence, and whether a compensatory (main effect), or a protective interaction or both were implicated in the process of resilience.

Social skills functioned as both a compensatory ($p < .0001$) and a protective ($p < .05$) factor with stress due to negative life events. Internal locus of control was found to be significant as a protective process ($p < .05$) and as a compensatory factor ($p < .05$) for positive assertiveness-responsible behavior in the classroom. Ego development was significant as a compensatory factor for assertive-responsible ($p < .01$), disruptive-disengaged ($p < .05$), and academic achievement ($p < .0001$). Positive events played a role only as part of a protective process for academic achievement ($p < .01$).

Intelligence was found to be significant as a compensatory factor for both academic achievement and assertive-responsible behaviors ($p < .05$). However, interaction effects between intelligence and negative life events indicated that rather than being protective in the face of stress, the interaction of intelligence with stress functioned more as a vulnerability factor rather than one as a protective factor. At low stress levels, intelligence was positively related to competence for academic achievement as well as classroom assertiveness. When stress was high, on the other hand, the intelligent adolescents appeared to lose their advantage and demonstrated competence levels more similar to those of less intelligent adolescents. Luthar (1991) discussed whether intelligent children might have higher levels of sensitivity and susceptibility to stressors in their environment. Intelligence may be a protective factor in one context and as a vulnerability factor in another context.
Compensatory Model

Grossman et al. (1992) also studied adolescents and the roles of risk and resource factors in the development of resilience or good adaptation. The goals of this study were to identify specific factors in facilitating good adaptation, and to determine whether these resource factors functioned independent of the amount of risk or if they interacted with the risk as would be the case for a protective factor. The study population ($N=179$) consisted of children in 9th grade from a small northeastern city. The children were described as mostly Caucasian with a significant proportion from Asian descent. The majority of the students came from working and middle-class families.

The data were collected in two phases. The first phase was administered in the classroom, and the second phase occurred three months later with personal interviews with the teenagers. In the first phase of the study, measurements included assessments of resource factors, risk factors, and outcomes using self-reported instruments. Resource factors included family adaptability and cohesion, internal locus of control for children, parent-adolescent communication, and a relationship with a significant non-parent adult. Risk factors included parents' marital status and if anyone in his or her immediate family had a drinking problem with alcohol. Measures of current resilience or adaptation included four separate variables: distressed mood, deviance, self-esteem, and school grades.

To examine how risk and resource factors affected adolescent adaption or resilience, hierarchical multiple regressions were done, similar to previous resilience research by Luthar (1991) and Garmezy et al. (1984). Post hoc analysis of the power with
the program G*Power 3 (Faul et al. 2007) showed that (1-ß) was greater than .99. Significant results were identified as those with $p < .05$.

Family cohesion, good communication with parents, and higher levels of internal locus of control were strongly associated with several adaptive outcomes in these adolescents. For example, family cohesion, internal locus of control, communication with mother, and communication with father showed large correlations with suppression of deviant behavior ($|r| > .27$, $p < .01$ for each). The resource factors of cohesion and communication with mother, independent of risk, predicted all four outcomes for girls and two of four outcomes for boys ($p < .05$). Internal locus of control was a significant resource factor, which predicted three of four outcome variables for girls ($p < .05$) and two of four outcome variables among boys ($p < .01$).

Grossman found that resource factors, as predictors of positive outcomes, were independent of risk. In this study by Grossman et al. (1992), the particular relationship between resource factors and outcomes was seen to be compensatory, unlike Garmezy et al. (1984) and Luthar (1991) who were able to identify significant interactions between risk factors and resource factors.

Perceptions of Resilience

Resilience is the moderation of the adverse effects due to risk factors by protective factors. This interaction is critical for achieving resilient or positive outcomes (Luthar, 1993). However, resilience researchers have suggested that negative outcomes of emotional distress, such as depression and anxiety or defensive coping (Hunter & Chandler, 1999; Luthar, 1991; Luthar, Doernberger, Zigler, 1993), might also accompany
and coexist with resilient outcomes. These studies suggest that resilience is not a one-dimensional construct of just positive adaptation.

**Depression and Anxiety**

In Luthar’s 1991 study, significantly different scores in depression and anxiety among resilient adolescents; non-resilient, at-risk adolescents; and adolescents not at risk were found $F(2, 29) = 9.66, p < .001$, and $F(2, 29) = 9.13, p < .001$, respectively. Furthermore, adolescents identified as resilient (high stress, high social competence) had higher scores of depression and anxiety than did adolescents who were high in competence but from low stress backgrounds ($p < .001$).

In a follow-up study to Luthar’s 1991 cross-sectional study, Luthar conducted a 6-month prospective study of 138 inner-city 9th grade students (Luthar et al. 1993). The purpose of this study was to determine if resilient adolescents would show difficulties in other areas of emotional adjustment.

Measurements of risk were based on uncontrollable negative life events. Outcomes were based on competence measured by school grades, teacher ratings, peer ratings, and emotional distress symptoms. Luthar concluded that those adolescents who showed impressive behavioral competence were highly vulnerable to emotional stress over time and that resilience is not necessarily displayed across all domains of an individual's life ($p < .001$) (Luthar et al. 1993).

**Defensive Coping**

Hunter and Chandler (1999) explored what resilience meant to 51 adolescents, attending an inner-city high school. A triangulated research design was used to explore
what resilient meant to them. From the qualitative data, researchers found that the adolescents viewed themselves as resilient. However, these adolescents considered themselves resilient outside the confines of the more traditional definition of resilience. According to these adolescents, being resilient meant surviving. These adolescents believed that using unconventional tactics such as insulation, isolation, and aggression, and even violence could sustain them.

**Summary of Processes and Mechanisms of Resilience**

Significant research efforts have been undertaken to better understand resilience in terms of processes or mechanisms involving protective factors. These studies have, for example, (Luthar, 1991), demonstrated that a given factor can be both a risk factor and a protective factor, each associated with a distinct type of process. Resilient outcomes are not determined by simply noting the factors present, but require a context that affects the relative strength of different mechanisms. Additionally, the processes or mechanisms, which interact with risk and foster resilience, vary according to the particular resource factor, risk, time, and population. In addition, research supports resilient outcomes in at-risk adolescents, but this outcome may be accompanied by less than desirable outcomes or behaviors in other domains.

Resilience research has benefited from examining varying populations, relying on both qualitative and quantitative, and on longitudinal and cross-sectional studies. A broad range of variables have been explored and an intersection among different contexts has been achieved. Distinguishing between the independent benefits of resource factors and moderating effects provided by protective factors has been tested using hierarchical linear
regression. A challenge has also emerged in managing the large number of variables that may influence resilience. At this time, it is commonly understood that the variables that may play a role in resilience can emerge as features of an individual, their environment, and their external relationships, but few studies simultaneously address factors representative of all three aspects.

**Resilience and Asthma among Children**

The majority of resilience research examined psychosocial adaptations or outcomes, assessed in the context of different risk factors and resource factors. More recently, resilience research has addressed explicit physical health outcomes or behaviors linked to a chronic illness. Two studies specifically addressed resilience and asthma among children (Mitchell et al. 2004; Vinson, 2002), and two studies (Buckner et al. 2005; Chen et al. 2011), focused on older children and adolescents diagnosed with asthma. The significance of these studies is the suggestion that the construct of resilience as found in the psychological literature could be transposed into a model of resilience in children with asthma.

Each of these four studies measured resilience as it related to positive health outcomes. Positive health outcomes were measured by using self-report scales in three of the studies and biophysical measures in one. The number of participants in the three studies ranged from 12 to 235. Participants’ ages ranged from seven to 18 years. Ethnic backgrounds were mixed, with Black participation ranging from 43% to 63%, in two studies (Vinson, 2002; Mitchell et al. 2004) and 26% Asian ethnicity in Chen’s study (2011); no ethnicity was reported by Buckner (2005). Male participants varied from 33%
to 67% of the study populations. Three studies were longitudinal: Buckner, Chen, and Mitchell. No control groups were used.

**Child Resilience Model**

Vinson (2002) studied the relationship among positive health outcomes, risk factors, and resource factors in children with asthma. A resilience-based model, which took elements of family environment and specific child characteristics as resource factors and selected health and quality of life outcomes as markers of resilience, was used.

Vinson’s study of the relationship between positive health outcomes (quality of life and illness indices) and risk among children with asthma was one of the first to focus on identifying protective factors within the child and family that may help to manage their child’s asthma.

A cross-sectional, correlational study was conducted with a sample of 235 children who were diagnosed with asthma and taking daily medication. Children ranged in age from seven through 12; 60% were male, 43% Black, and 51% White.

The emphasis of the study was on establishing whether positive health outcomes emerged from threat appraisal, coping strategies, child characteristics, and family environment. Vinson hypothesized that coping strategies would emerge in direct response to the child’s ability to appraise the health risks of asthma symptoms. The impact of the community was not evaluated as a resource factor. Resource factors that were measured included the family environment: adaptability and cohesion. Child characteristics included sense of coherence and self-esteem. Asthma severity was not included in the
model testing but was used for demographic analysis. Asthma severity was based on the NHLBI guidelines, conventional at that time: mild, moderate, and severe.

Vinson included cognitive and emotional components of threat appraisal and coping as conceptually distinct from characteristics of the child. Different illness indices such as number of days hospitalized, days missed from school, and emergency room visits due to asthma three months prior to the study were included as outcomes as was quality of life. The relationship among these different factors was tested using structural equation modeling (SEM).

Six paths emerged from this model that were statistically significant ($\alpha = .05$): (a) family to child ($p < .005$), (b) child to threat appraisal ($p < .0001$), (c) threat appraisal to quality of life outcomes ($p < .0001$), (d) family to coping patterns ($p < .0001$), (e) coping patterns to illness indices ($p < .005$), and (f) child perceived quality of life to illness indices ($p < .005$).

Of the family environment variables, cohesiveness and adaptability were significantly correlated with coping variables ($p < .0001$). The child’s characteristics, sense of coherence and self-esteem, were negatively correlated with threat appraisal ($p < .0001$). In addition, the greater a child’s self-esteem, higher scores were found with competence and optimism ($p < .005$), and compliance with treatment ($p < .05$). Greater child sense of coherence was also positively correlated with competence and optimism ($p < .005$).

Results of the study by Vinson (2002) supported the concept that, for children with asthma, adaptation is an important concept in obtaining quality of life and positive
health outcomes. Furthermore, Vinson demonstrated that the constructs found from relevant theoretical and research literature regarding resilience could be transposed into a model of resilience in children managing a health condition.

A limitation to this study was the exclusion of a community resource as a potential protective factor. In addition, asthma severity was not tested as a risk factor. The importance of the individual and family factors as components of resilience was demonstrated, although details about the exact underlying mechanisms were not evaluated.

Conceptual Model of Asthma-related Resilience

Mitchell et al. (2004) tested a conceptual model of asthma-related resilience with a sample of 31 urban children with asthma over a two-year period. The emphasis of the study was on establishing whether or not positive health outcomes emerged from the protective factors of managing asthma, as conceptualized in resilience. The authors examined the roles of adaptability and perceived self-control as resource factors (main effect), protective factors (interactive with risk), or both in enhancing asthma management for urban children who face health-related and contextual risk factors (asthma symptoms, neighborhood disadvantage) using hierarchical multiple regressions. This study was unique as it was one of the first resilience studies to investigate aspects of children’s neighborhoods as a potential risk factor to their asthma-related functioning.

Asthma severity was measured using an author created 6-point Likert scale from 0 (not at all) to 5 (every day) related to four primary asthma symptoms (wheezing, tightness in chest, coughing, and shortness of breath) as reported by the primary
caregiver. The total score of asthma symptoms was calculated by summing these frequencies for each of the four symptoms. On this scale 0 indicated no symptoms, 9 indicated child experienced symptoms every day or night, and a score of 10 indicated symptoms every day and night. Neighborhood disadvantage was measured using Dubow’s instrument, Neighborhood Disadvantage Index (Dubow, Edwards, & Ippolito, 1997).

The sample consisted of 8 to 11 year old children with asthma. The majority of participants were Black (63%). Hierarchical regression analyses were done. Post hoc analysis of the power using the program G*Power 3 (Faul et al. 2007) showed that a statistical power of (1-β) .75 was obtained.

There was found to be neither a main effect of asthma severity on the outcome nor any interaction with self-control. Mitchell et al. (2004) found adaptability to be an important individual characteristic, which promoted positive health outcomes but not as a moderating factor of the risk posed by asthma symptoms. Higher levels of asthma management behaviors were related to adaptability as a main effect (p < .05, R^2 = .12). Therefore, adaptability was not considered a protective factor, but rather a resource factor as there was no interaction and its benefit to asthma management behaviors was independent of the risk posed by asthma symptoms.

Adaptability also functioned less well for the child with asthma living in a disadvantaged neighborhood. A significant interaction effect (p < .05) between the two contributed to less positive health outcomes. Although there was an interaction between adaptability and the risk factor, this type of interaction exemplifies the vulnerability
model, where the protection normally afforded is suppressed by the risk factor (Garmezy et al. 1984).

Limitations of this study included the small sample size ($N = 31$), the reliability of the parental and child-self-report responses, lack of a well-validated measure of asthma severity, and exclusion of a family resource factor.

Resilience and Asthma among Adolescents

Buckner et al. (2005) focused on adolescents with asthma. Instead of studying resilience as a concept, their goal was to implement interventions based on the concept of resilience for improving health outcomes. They examined resilience and knowledge as outcomes based on the experiences of a 3-day residential camp for 12 adolescents with asthma between the ages of 12 and 15.

The researchers focused on certain interventions as a means of fostering resilience. Education regarding effective asthma management, promotion of good asthma management behaviors, and strengthening of individual and social elements thought to be important to resilience were provided to the adolescents.

A resilience score for each camp attendee was obtained using the Blackburn Resilience Scale at three different points: (a) on arrival at camp, (b) at the conclusion of camp, and (c) 6 months after camp concluded. Knowledge was determined at camp check-in, by mail survey 3-6 weeks after camp, and again 6 months after camp concluded. Peak flow measurements were conducted twice daily while attending camp. Improved mean levels of resilience, knowledge and peak flow measurements were noted.
Significant limitations to this study were a small sample \((N = 12)\) and minimal statistical analysis. Although Buckner did provide some descriptive statistics, the analysis was limited to presentation of means and standard deviations related to the sample and the variables of interest: resilience scores, peak flow measurements, and knowledge (Buckner et al. 2005). Post hoc analysis of the power showed that \((1-\beta)\) varied from .3 to .6. Despite these limitations, the study offered a practical example of using a teen asthma camp to promote resilience and positive health outcomes.

Chen’s resilience study of 121 young adolescents with asthma sought to test if a psychological characteristic, shift-and-persist (reframing stressors more positively and persisting optimistically about the future), would buffer low socioeconomic adolescents from poor asthma outcomes. The majority of the participants were male and White (67% and 61%, respectively), and Asian (26%); mean age, 12.6 years (2011).

Baseline biophysical markers were taken that included a complete blood count and pulmonary function. At that time, daily diaries were to be completed at home for two weeks. Six months later, the participants did a repeat pulmonary function and again kept a daily diary of rescue inhaler use, and school absences for two weeks. Self-reported instruments were used to collect parent socioeconomic resources and adolescent shift-and-persist strategies. Hierarchical multiple regression analyses were done.

For those adolescents who came from low socioeconomic backgrounds, a significant interaction was found between low socioeconomic status and shift-and-persist so that these adolescents had less asthma inflammation at baseline \((p < .05)\) and less asthma impairment at the 6-month follow-up \((p < .001)\). For this age and population, risk
factor (low socioeconomic status) and outcome, the shift-and-persist strategies would be considered a protective factor. In contrast, the shift-and-persist strategies were not beneficial among high socioeconomic youth with asthma.

This particular study’s design was similar to other resilience research; that is, it looked at previously tested risk and resource factors, working with an at-risk population, and running multiple hierarchical regressions. Limitations included lack of family and social support resources.

Summary of Resilience and Asthma among Children and Adolescents

In summary, several of the same resource and risk factors examined in the psychosocial areas of resilience research have also been evaluated in resilience studies involving asthma among children and adolescents. At present there are a limited number of such studies. However, they have provided an important extension of the concept of resilience from the psychosocial aspects of adjustment to physical health determinants.

Gaps in Knowledge

While researchers have consistently studied the same set of resource factors which contribute to resilience such as self-esteem, internal locus of control, family and community support, researchers have not simultaneously studied all three categories of resource factors and their processes or mechanisms in the context of asthma management or positive health outcomes. Furthermore, there has been a primary focus on young children, not in racially/ethnically diverse adolescents with asthma living in an urban area. Thus, important questions remain about the relationship of the triad of resource factors to positive health outcomes of asthma control and asthma-related quality of life in
racially diverse adolescents living in low-income urban areas. A better understanding of the resource or protective factors that are specific to this population offers the possibility of learning new and better ways to introduce or reinforce what is needed to successfully meet the challenges of this disease.
CHAPTER THREE

METHODOLOGY

The purpose of this study was to examine the degree to which the phenomenon of resilience, observed in other physical health and psycho-social contexts, may be found in adolescents with asthma exposed to risks that often accompany low-income environments. Specifically, are there protective factors associated with positive health outcomes despite the risks presented by their condition or environment?

Study Design

The design for this study was descriptive correlational, and cross-sectional to examine the relationships between self-esteem, internal locus of control, social support and risks associated with asthma control and asthma-related quality of life. According to Brink and Wood (1998), descriptive correlational cross-sectional designs are appropriate when investigating specific variables of a proposed conceptual framework and when seeking to discover possible relationships between groups of independent and dependent variables. Furthermore, this type of research design is suited for quantitative data collection methods and multivariate statistical techniques. In this study, both quantitative data collection and multivariate analysis were used to explore the relationships between variables.
Sample

A convenience sample of 102 adolescents with a physician diagnosis of asthma participated in the study. Inclusion criteria for the study required that the participants were: adolescents with a physician diagnosis of asthma, currently enrolled in high school, able to read, write and communicate in English. Both males and females and all racial and ethnic groups who met the above criteria were included in the study.

Sample Size Determination

Prior research provided modest guidance as to possible effect sizes corresponding to interactions between risk and resource factors. Significant interactions were reported by Mitchell, Murdock, and McQuaid (2004) between adaptability and neighborhood disadvantage for asthma management behaviors $N = 31; (p < .05; \Delta R^2 = .13)$. The work of Chen et al. (2007) found significant $(p < .05; \Delta R^2 = .06)$ interactions between family support and neighborhood disadvantage for risk to pulmonary function for youths with asthma $(N = 78)$. Luthar (1991) found significant interactions between stress and internality $(p < .05; \Delta R^2 = .03)$ and between stress and intelligence $(p < .05; \Delta R^2 = .03)$ for assertive-responsible, and between stress and social skills $(p < .05; \Delta R^2 = .03)$ for sociability among 144 inner-city 9th grade students. Garmezy, Masten, and Tellegen detected a significant interaction $(p < .05; \Delta R^2 = .02)$ between IQ and stress for predicted academic achievement (1984). Dubow, Edwards, and Ippolito (1997) detected cases of significant interactions $(p < .05; \Delta R^2 = .03)$ between stressors and resource factors affecting antisocial behavior, drug use, and school grades among a sample of young people $(N = 315)$. Recent work by Chen et al. (2011) detected a large interaction between
socio-economic status and psychological adaptation strategies with $N = 121$ of children 9 to 18 years with a physician diagnosis of asthma. No value for $\Delta R^2$ was provided, but the $\beta$ coefficient ($\beta = .315$) would imply $\Delta R^2 = .09$.

Guided by effect sizes reported in the prior research cited above, a power analysis was carried out assuming a total $R^2$ ranging from .2 to .5 based on the independent variables and demographic variables. For $\alpha = .05$, power $(1-\beta) = .80$, the sample size required to detect a contribution of $\Delta R^2 = .04$ due to an interaction or another variable varied from 100 to 200 (Cohen, Cohen, West, & Aiken, 2003; F. Bryant, personal communication, March 25, 2010). A targeted sample of 68 to 107 was also determined by performing a separate power analysis using G*Power 3 (Faul et al. 2007) with a significance level of $\alpha = .05$, power $(1 – \beta)$ of .80 to .95, and a medium effect size of 0.15.

Setting

The setting for the study was the city of Chicago, Illinois. Chicago is the third largest city in the U.S. with a population of almost 3 million persons. Youth living in Chicago comprise 12% (U.S. Census Bureau, 2011). In addition, the city has been ranked consistently in the top 100 Asthma Capitals as a challenging place to live with asthma. Currently, Chicago is listed as 46th on that list (Asthma and Allergy Foundation of America [AAFA], 2011). According to Gupta (2010), the asthma prevalence for children living in Chicago is 12.9%, which is higher than the national average of 10% (CDC, 2011).
The majority of the participants (75%) lived in an area along the western portion of the city according to their provided zip codes. The ethnic distribution of this area was 85% Black, 6% Hispanic, and 4% White. Adult educational attainment of less than a high school degree was 37% as compared to the Illinois average of 13.5%; 7.5% had earned a college degree versus the 19% state average. Families living below the poverty level in this area were greater than the state average (38% vs. 13%, respectively); the median household income was $33,060 whereas the state average reported $55,010. Eighty-three percent of single-parent households were with a female head of household. The unemployment rate of 10% for this area was greater than both the state and national average (9% vs. 8%, respectively). In 2009, the crime index (higher means more crime) of Chicago (murders, rapes, burglaries, thefts) was 582.8 as compared to the U.S. average of 319 (City-Data, 2012).

Variables and Instruments

Various validated instruments were used in this study. In addition, a Sociodemographic questionnaire created by the researcher was used for this study in order to obtain the following information: individual identification and sociodemographics of the adolescent including asthma severity, gender, age, grade level, ethnicity, source of healthcare coverage, parents’ occupational and educational background. The research instruments were based on the conceptual framework and purpose of the study. Moreover, length and acceptable grade reading level, ease of administration, acceptable psychometric properties, and use with culturally diverse adolescents contributed to their selection.
Eight instruments were used to collect the data. The independent variables were self-esteem, internal locus of control, social support, asthma severity, depression, and neighborhood disadvantage. The dependent variables were asthma control and asthma-related quality of life (Table 2).

**Table 2. Measurement of Key Variables.**

<table>
<thead>
<tr>
<th>Variables</th>
<th>Instruments</th>
</tr>
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<tbody>
<tr>
<td><strong>Independent</strong></td>
<td></td>
</tr>
<tr>
<td>Psychological well-being Community</td>
<td>Depressive Mood Inventory (DMI)</td>
</tr>
<tr>
<td>Asthma Severity</td>
<td>Neighborhood Disadvantage Items (NDI)</td>
</tr>
<tr>
<td><strong>Resource Factors</strong></td>
<td></td>
</tr>
<tr>
<td>Self-esteem</td>
<td>Rosenberg Self-Esteem Scale (RSES)</td>
</tr>
<tr>
<td>Internal Locus of Control</td>
<td>Nowicki-Strickland Locus of Control Scale (LOC)</td>
</tr>
<tr>
<td>External Support</td>
<td>Child and Adolescent Social Support Scale (CASSS)</td>
</tr>
<tr>
<td><strong>Dependent</strong></td>
<td></td>
</tr>
<tr>
<td>Asthma Control</td>
<td>Asthma Control Test (ACT)</td>
</tr>
<tr>
<td>Asthma-related Quality of Life</td>
<td>MiniPAQLQ</td>
</tr>
</tbody>
</table>

Permission to use the Depressive Mood Inventory (DMI), Neighborhood Disadvantage Items (NDI), Child and Adolescent Social Support Scale, (CASSS), and MiniPAQLQ was obtained from the authors of these instruments. The Rosenberg Self-esteem Scale (RSES), Nowicki-Strickland Locus of Control (LOC), and the Asthma Control Test (ACT) were available in the public domain and therefore permission was
not required. The investigator developed the Sociodemographic questionnaire. The instruments were assembled into a survey booklet for administration. According to the Flesch-Kincaid grade level test, the readability scores of the surveys were at a 5th grade reading level.

**Sociodemographic Data and Health Information**

Age (in years), gender, and with which ethnic group they primarily identified were obtained by self-report (Appendix A). It was assumed that the adolescent in question completed the survey booklet in its entirety. However, no exact determination was made of whether the respondent was the adolescent, their guardian, or both. Each parents’ highest level of education was also obtained by self-report. The parents’ highest level of education was used to identify socioeconomic status. This indicator has been shown to correlate well with socioeconomic status (Ackard, Neumark-Sztainer, Story, & Perry, 2003; Martyn-Nemeth, Penkofer, Gulanick, Velsor-Friedrich, & Bryant, 2009). Five categories varying from completion of grade school through achieving a Master’s Degree or higher were included. Occupational status was determined separately for the Mother and Father. The allowed responses were *Stay at Home*, *Work part-time for pay*, *Work full-time for pay*, and *I don’t know*. The adolescent’s academic (GPA on a 4.0 scale) was based on self-report. Participants were also asked about the source of their healthcare coverage with responses including *None, Private Insurance, Public Aid including Medicaid*, and *Not knowing*. 
Risk Factors

*Psychological well-being*

Depression was measured as an affective disorder of psychological well-being using the Kandel Depressive Mood Inventory (DMI) (Kandel & Davies, 1982), a self-administered six-item 3-point Likert instrument: 1 = Not at all to 3 = Much (Appendix B). Scoring is calculated by taking the average weighted score and multiplying by a factor of 10 (range from 10 to 30). Scores of 23 or greater have been correlated with depression. This instrument has been used with racially and economically diverse adolescent populations (Ackard et al. 2003; Martyn-Nemeth et al. 2009). The Cronbach alpha was reported as .79. The Cronbach alpha for the current study was .78.

*Community*

Risk posed by a low-income community was measured using the nine-item Neighborhood Disadvantage Items (NDI) (Dubow et al. 1997) to assess neighborhood stressors, such as safety, litter, crime and violence. Items were answered with a Yes or No response. Item responses were summed, and higher total scores reflected higher levels of perceived neighborhood disadvantage (Appendix C).

Coefficient alpha of .64 - .76, and test-retest reliability of .68 after a 1-year interval have been reported (Dubow et al. 1997; Mitchell et al. 2004). The Cronbach alpha for the current study was .87.
Asthma Severity

To assess perceived asthma severity, adolescents chose their level of severity based on the NHLBI 2007 guidelines which were conventional at the time of data collection, where 1 = Mild, 2 = Moderate, and 3 = Severe or 4 = None of the above. This means of assessing asthma severity has been used in resilience research by Vinson (2002) and Mitchell et al. (2004) and cited in Murdock, Robinson, Adams, Berz, and Rollock (2009) study of children with asthma living in urban, low-income neighborhoods.

Resource Factors

Self-Esteem

Self-esteem, defined as high levels of perceived worth and competence, was measured with the Rosenberg (1965) Self-Esteem Scale (RSES). The RSES is among the most popular and well-utilized measure of self-esteem. This instrument has been used with racially and economically diverse adolescent populations (Grossman et al. 1992; Martyn-Nemeth et al. 2009).

The RSES (Appendix D) is a 10-item Likert scale with items answered on a four point scale – from Strongly Agree to Strongly Disagree. Half of the questions are stated positively and half are stated negatively; the higher the score, the higher the self-esteem. The instrument has a 3rd grade reading level and can be easily completed in 5 minutes. A reliability coefficient of .92 among adolescents was reported by Rosenberg (1965) and a two-week test-retest reliability of $r = .85$ among 44 adolescents was reported by Silber and Tippet (1965). The Cronbach alpha coefficient was .85 in this study.
Internal Locus of Control

The Nowicki-Strickland Locus of Control Scale (LOC) for children in grades 7-12 measured the degree to which the adolescent believed that events or occurrences are a result of their own control or a result of fate or chance (Appendix E). The instrument consists of 21 questions that are answered with a Yes-No format. A low score on the LOC represents a lower internal locus of control (Nowicki & Strickland, 1973). This instrument has been used with racially and economically diverse adolescent populations (Grossman et al. 1992; Luthar, 1991). Reliability ranges from .63 to .81, depending on grade level and test-retest reliability ranges from .63 to .71. The Cronbach alpha for the current study was .76.

External support

External support, as a resource factor, was measured using The Child and Adolescent Social Support Scale (CASSS) (Malecki & Demaray, 2002). CASSS is intended for use with students in grades 3-12. It is a 60-item questionnaire containing five subscales (Parent, Teacher, Classmate, Close Friend, and School) and an importance ranking section. For the purposes of this study, the subscale School and the importance ranking section were not included. C. Malecki suggested that this is adequate as the subscales can stand alone (personal communication, October 26, 2009). Items are answered on a frequency rating of how often using a six point Likert scale from 1 Never to 6 Always. Higher scores indicate high social support. Internal consistency has been reported at .96, with test-retest reliability at .78. The Cronbach alpha for the current study was .96 (Appendix F).
Asthma Control

Asthma control, as an outcome, was measured using the Asthma Control Test™ (ACT). The ACT is a simple, 5-item questionnaire with a 5-point scale ranging from Not controlled at all to Completely controlled. Total scores range from 5-25, with lower scores indicating poorer control (Appendix G).

The instrument was originally tested with participants 12 years or older who had been diagnosed with asthma. Internal consistency was .84 to .85. Test-retest reliability was .70. Criterion validity was demonstrated by significant correlations between baseline ACT scores and baseline specialists’ ratings of asthma control ($r = .52, p < .001$) (Nathan et al. 2004; Schatz et al. 2006). The NHLBI has recognized the ACT as a validated instrument for the detection of asthma control problems (2007). The Cronbach alpha for the current study was .87.

Asthma-related Quality of Life

The MiniPaediatric Asthma Quality of Life (MiniPAQLQ) questionnaire measured the adolescent’s experiences, during the week prior to completing it, related to symptoms, limitations, emotional function, and environmental stimuli. The MiniPAQLQ has 13 items using a Likert-type scale from 1 = severe impairment to 7 = no impairment. The overall score is calculated as the mean response to all questions. Lower scores indicate impaired asthma-related quality of life. Internal consistency for adolescents ranged from .87 - .96 (Juniper, 1998; Juniper et al. 1996) (Appendix H). The Cronbach alpha for the current study was .94.
Recruitment of Participants

Initially, eight healthcare clinics in metro Chicago were approached for participation in this study because each of these healthcare clinics serves a large diverse, low-income population and accepts Medicaid. Four of the healthcare clinics were not able to participate due to lack of personnel or resources. The remaining four healthcare clinics, located in western Chicago, agreed to assist but in a limited capacity, again due to shortage of personnel, resources and potential infringement upon the healthcare provider’s time.

Two of the healthcare clinics were not-for-profit hospital-based, and two were not-for-profit independent healthcare clinics. The hospital-based clinics are each part of a large medical center—in a community hospital setting. The characteristics of the patients at these sites reflect the diverse nature of the target population with regard to demographic range in education, income, and culture.

Both not-for-profit healthcare clinics service the medically indigent. One of the healthcare clinics provides medical services to a predominantly Black and impoverished community of Chicago’s west side. The other not-for-profit healthcare clinic also provides care to a diverse population: 52% Hispanic, 30% Black, 9% White, 2% Bi-racial, 4% Asian and serves thousands of underserved children from 50 Cook County west suburban communities and Chicago.

The researcher worked with the healthcare center staff at each of these four sites for recruitment of potential participants. Potential participants were identified by the staff through a computer inquiry using the ICD-9 code of “asthma” in addition to meeting the
inclusion criteria of the study. Approximately 800 potential participants were identified through this inquiry.

**Research Procedures**

Healthcare center staff generated mailing lists of 828 adolescents whose record indicated an asthma diagnosis. From site one, 345 potential participants met the inclusion criteria; site two – 26; site three 436; and site four – 21. More than eight hundred study packets consisting of a stamped outer envelope, a healthcare clinic/provider letter (Appendix I), letter of introduction from the researcher (Appendix J), informed consent (Appendix K) and assent (Appendix L) documents, a survey booklet with front and back covers (Appendices M and N), and a self-addressed stamped envelope were assembled and stamped with a unique participant code number. All materials and assessment measures were written in English. Recruitment materials were mailed to their parents at home for the adolescent to complete. Subsequently, upon completion, the survey booklet was mailed to the researcher.

Four different mailings of approximately 200 each occurred over a 6 to 8 month period. The first mailing return rate of completed packets was 11%. Approximately 50 packets were returned to the researcher’s office address because they were undeliverable, presumably because the address was not current. The number of undeliverable packets that were not returned to the researcher was unknown. One follow-up mailing occurred for non-respondents with the first batch, but the return rate was 0%. Further follow-up mailings were discontinued due to prohibitive cost factors. As a result, usable survey
booklets for the study were 102; 726 – not returned or an overall response rate of 12%, not including those to whom a second packet was sent.

Ethical Considerations

Approval was obtained from each participating healthcare center and the Loyola University Institutional Review Board for the protection of human subjects prior to initiation of the study. Data was collected after obtaining an informed assent from the participant and consent from his or her parents/guardian. Included in each survey booklet was a written explanation of the purpose of the study, potential risks and benefits, privacy act, and of their right to withdraw at any time from the study. In addition, the parents and adolescents of the study received the name and contact information of the investigator concerning questions of the study.

No identifying information of any individual participant was associated with the data. All data was collected by the investigator and was maintained in a secure location. There was no cost to the adolescent for participating in the study. Following receipt of the completed survey, each participant was compensated with a certified $20 check via mail.
CHAPTER FOUR

RESULTS AND DATA ANALYSIS

The overall purpose of this study was to examine the relationships of particular risk factors (asthma severity, depression, and neighborhood disadvantage) and resource factors (internal locus of control, self-esteem, and social support) to specific indices of positive health outcomes (asthma-related quality of life and asthma control) using an asthma-related resilience model. Demographic characteristics of participants, description of key variables, and correlations among study variables are reported. Lastly, the results are reported addressing the specific aims of the study.

Demographic Characteristics of Participants

A total of 102 adolescents participated in this study with a physician’s diagnosis of asthma. The ages of the participants ranged from 14 to 19 years; the mean age was 16 years. Forty-one of the participants were male (40.2%) with 61 females (59.8%). Self-reported ethnic groups consisted of Black or African American (60.8%), Hispanic or Latino (21.6%) and White (10.8%). Participants’ asthma severity ratings were as follows: Mild (N = 33), Moderate (N = 15), Severe (N = 4), or None of the above (N = 46).

Approximately 70% of the participants reported their source of healthcare coverage as Medicaid. Thirty-seven percent reported their mother as having attended some college or training after high school, 39% as working full-time. On the other hand, 21% reported
their fathers as having attended some college or training with only 2% working full-time.

Demographic information about the sample is presented in Table 3.
Table 3. Demographic Characteristics of Participants (N = 102).

<table>
<thead>
<tr>
<th>Demographic Variable</th>
<th>N</th>
<th>%</th>
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<tbody>
<tr>
<td>Gender</td>
<td></td>
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</tr>
<tr>
<td>Male</td>
<td>41</td>
<td>40.2</td>
</tr>
<tr>
<td>Female</td>
<td>61</td>
<td>59.8</td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>13</td>
<td>12.9</td>
</tr>
<tr>
<td>15</td>
<td>24</td>
<td>23.8</td>
</tr>
<tr>
<td>16</td>
<td>22</td>
<td>21.8</td>
</tr>
<tr>
<td>17</td>
<td>18</td>
<td>17.8</td>
</tr>
<tr>
<td>18</td>
<td>23</td>
<td>22.8</td>
</tr>
<tr>
<td>19</td>
<td>1</td>
<td>1.0</td>
</tr>
<tr>
<td>Grade Level</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>22</td>
<td>21.8</td>
</tr>
<tr>
<td>10</td>
<td>25</td>
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<tr>
<td>11</td>
<td>17</td>
<td>16.8</td>
</tr>
<tr>
<td>12</td>
<td>35</td>
<td>34.7</td>
</tr>
<tr>
<td>GPA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.0/4.0</td>
<td>7</td>
<td>2.0</td>
</tr>
<tr>
<td>3.0/4.0</td>
<td>44</td>
<td>43.1</td>
</tr>
<tr>
<td>2.0/4.0</td>
<td>28</td>
<td>27.5</td>
</tr>
<tr>
<td>1.0/4.0</td>
<td>4</td>
<td>3.9</td>
</tr>
<tr>
<td>Less than 1.0</td>
<td>2</td>
<td>2.0</td>
</tr>
<tr>
<td>I don’t know</td>
<td>15</td>
<td>14.7</td>
</tr>
<tr>
<td>Ethnicity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>White or Caucasian</td>
<td>11</td>
<td>10.8</td>
</tr>
<tr>
<td>Black or African American</td>
<td>62</td>
<td>60.8</td>
</tr>
<tr>
<td>Hispanic or Latino</td>
<td>22</td>
<td>21.6</td>
</tr>
<tr>
<td>Asian American</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td>Native American</td>
<td>1</td>
<td>1.0</td>
</tr>
<tr>
<td>Other</td>
<td>6</td>
<td>5.9</td>
</tr>
<tr>
<td>Source of Healthcare Coverage</td>
<td></td>
<td></td>
</tr>
<tr>
<td>None</td>
<td>2</td>
<td>2.0</td>
</tr>
<tr>
<td>All Kids/Public Aid/Medicaid</td>
<td>72</td>
<td>70.6</td>
</tr>
<tr>
<td>Private Insurance</td>
<td>16</td>
<td>15.7</td>
</tr>
<tr>
<td>I don’t know</td>
<td>11</td>
<td>10.8</td>
</tr>
<tr>
<td>Mother’s Education</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Completed grade school</td>
<td>13</td>
<td>12.7</td>
</tr>
<tr>
<td>Completed high school or</td>
<td>20</td>
<td>19.6</td>
</tr>
<tr>
<td>GED</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Did some college or training after high school</td>
<td>38</td>
<td>37.1</td>
</tr>
<tr>
<td>Finished college</td>
<td>14</td>
<td>13.7</td>
</tr>
<tr>
<td>Master’s degree or PhD</td>
<td>7</td>
<td>6.9</td>
</tr>
<tr>
<td>I don’t know</td>
<td>10</td>
<td>9.8</td>
</tr>
<tr>
<td>Father’s Education</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Completed grade school</td>
<td>11</td>
<td>10.8</td>
</tr>
<tr>
<td>Completed high school or GED</td>
<td>25</td>
<td>24.5</td>
</tr>
<tr>
<td>Did some college or training after high school</td>
<td>21</td>
<td>20.6</td>
</tr>
<tr>
<td>Finished college</td>
<td>8</td>
<td>7.8</td>
</tr>
<tr>
<td>Master’s degree or PhD</td>
<td>5</td>
<td>4.9</td>
</tr>
<tr>
<td>I don’t know</td>
<td>31</td>
<td>30.4</td>
</tr>
<tr>
<td>Mother’s Work Status</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Work full-time for pay</td>
<td>39</td>
<td>38.2</td>
</tr>
<tr>
<td>Work part-time for pay</td>
<td>18</td>
<td>17.6</td>
</tr>
<tr>
<td>Stay at Home</td>
<td>34</td>
<td>33.3</td>
</tr>
<tr>
<td>I don’t know</td>
<td>6</td>
<td>5.9</td>
</tr>
<tr>
<td>Father’s Work Status</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Work full-time for pay</td>
<td>2</td>
<td>2.0</td>
</tr>
<tr>
<td>Work part-time for pay</td>
<td>38</td>
<td>37.3</td>
</tr>
<tr>
<td>Stay at Home</td>
<td>7</td>
<td>6.9</td>
</tr>
<tr>
<td>I don’t know</td>
<td>39</td>
<td>38.2</td>
</tr>
<tr>
<td>Asthma Severity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Level 1: Wheeze or cough more than 2 days a week</td>
<td>33</td>
<td>32.4</td>
</tr>
<tr>
<td>Level 2: Wheeze or cough daily</td>
<td>15</td>
<td>14.7</td>
</tr>
<tr>
<td>Level 3: Wheeze or cough throughout the day</td>
<td>4</td>
<td>3.9</td>
</tr>
<tr>
<td>Level 4: None of the above</td>
<td>46</td>
<td>45.1</td>
</tr>
</tbody>
</table>
Description of Variables

Neighborhood Disadvantage

The neighborhood disadvantage scores spanned the full range of the scale from a level of 0 (indicating low levels of perceived neighborhood disadvantage) to a level of 9 (indicating high levels of perceived neighborhood disadvantage). The mean neighborhood disadvantage score in this sample ($N = 102$) was $3.4$ ($SD = 3.0$) which is comparable to other studies of children living in urban, primarily low-income environments (DuBow et al. 1997; Mitchell et al. 2004).

Asthma Severity

Adolescents were asked to identify their asthma condition with possible values ranging from 1 - mild to 3 – severe. One additional option – 4 was added that corresponded to None of the above. More than 50% of the participants choose this option to describe their asthma condition. This option was not useful for analysis as it provided limited detail and depth of the adolescent’s asthma severity. The mean score in the reduced sample ($N = 52$) formed by omitting cases with this value was 1.4 (based on the values of 1 to 3), indicating that most of the adolescents in this sample reported mild asthma severity. This variable was excluded as a risk factor from further analysis due to the substantial proportion of cases lacking meaningful and usable data and loss of power. Thus, it would not be representative of the population from which it was drawn (Cohen et al. 2003) and increase chance of a Type I error. However, this information was used for demographic analysis as was found in Vinson (2002).
Depression

The range of scores for the Depressive Mood Inventory was from a level of 10 to 30. Kandel and Davies reported means between 17 to 18. Scores of 23 or greater have been associated with depression (1982). The mean for this sample population \((N = 101)\) was 17.5. These results suggest that the current sample had an average level of depression. The mean scores for each of the six items comprising the survey were similar, ranging from 1.4 for Feeling hopeless about the future to 1.9 for Feeling too tired to do things. The number of respondents who selected the highest value for each item varied from 24 Worrying too much to 9 Feeling hopeless about the future.

Internal Locus of Control

The average score for internal locus of control was 8.2, with a possible range of 0 to 22 for \(N = 102\). This score suggests that these adolescents with asthma perceived they had control over certain areas of their life, while believing they had little control in other areas (Nowicki & Strickland, 1973).

Social Support

The possible range of scores for this scale was 6 to 288, with higher scores indicating good social support. A mean score of 201.19 was reported by the authors of the instrument (Malecki & Demaray, 2002). The mean social support score of this study was 218.6, suggesting that this population perceived a relatively good support system.
Self-esteem

The mean self-esteem score was 31.9 (possible range of 10 to 40.) for $N = 99$, with a higher score reflecting greater self-esteem. Earlier resilience research using this instrument has reported similar scores with at-risk adolescents (Grossman et al. 1992).

Asthma Control

The average asthma control score was 17.9 for $N = 99$. According to Nathan et al. 2004 and Schatz et al. 2006, the cut point for controlled asthma is $> 19$. The current study indicates that these particular adolescents had less than satisfactory asthma control.

Asthma-related Quality of Life

The best possible score for asthma-related quality of life is 7, meaning that the adolescent has no impairment due to their asthma. All scores less than 7 reflect worsening degrees thereof. A score of 4 is reflective of one who has a moderate degree of impairment; a score of 6 is reflective of one who is hardly bothered at all. The current study’s mean score was 5. According to Juniper, the author of the instrument, a score of 5 indicates one who is bothered a bit (Juniper et al. 1999). Taken at face value, the respondents in this study are affected by the disease, albeit not severely.
Table 4. Description of Variables: Means, Standard Deviations, and Ranges for Neighborhood Disadvantage, Asthma Severity, Depression, Internal Locus of Control, Social Support, Self-esteem, Asthma Control, and Asthma-related Quality of Life.

<table>
<thead>
<tr>
<th></th>
<th>Neighborhood Disadvantage</th>
<th>Asthma Severity</th>
<th>Depression</th>
<th>Internal Locus of Control</th>
<th>Social Support</th>
<th>Self-esteem</th>
<th>Asthma Control</th>
<th>Asthma-related Quality of Life</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>102</td>
<td>52*</td>
<td>101</td>
<td>102</td>
<td>92</td>
<td>99</td>
<td>99</td>
<td>100</td>
</tr>
<tr>
<td>Mean (SD)</td>
<td>3.4 (3.0)</td>
<td>1.4 (0.6)</td>
<td>17.5 (5.1)</td>
<td>8.2 (4.2)</td>
<td>218.6 (37.4)</td>
<td>31.9 (5.4)</td>
<td>17.9 (4.8)</td>
<td>5.0 (1.4)</td>
</tr>
<tr>
<td>Possible range</td>
<td>0-9</td>
<td>1-3</td>
<td>10-30</td>
<td>0-22</td>
<td>6-288</td>
<td>10-40</td>
<td>5-25</td>
<td>1-7</td>
</tr>
<tr>
<td>Actual range</td>
<td>0-9</td>
<td>1-3</td>
<td>10-30</td>
<td>0-18</td>
<td>122-288</td>
<td>13-40</td>
<td>7-25</td>
<td>1.3-7</td>
</tr>
</tbody>
</table>

Note. 46 respondents selected the response of None of the above for asthma severity. These responses were treated as missing values and omitted in the descriptive statics.
Data Analysis

The data were entered into a database and analyzed using the Statistical Package for the Social Sciences (SPSS) 17.0 for Windows. All of the data were manually screened for data entry errors and corrected. Missing data were omitted. Descriptive information (percentages and means) was used to describe general characteristics of the sample population (Table 3); description of variables is presented in Table 4.

One Way Analyses of Variance (ANOVA) were conducted to determine whether there were any relationship between the categorical demographic variables (gender, age, grade level, GPA, race, source of healthcare coverage, mother’s education, father’s education, mother’s work status, and father’s work status) from the sociodemographic survey and the outcome variables, asthma control and asthma-related quality of life, as potential confounders. ANOVA is a statistical test to identify differences on variables between values of one or more categorical values. When such differences are found, these covariates can be held constant so that the effect of the dependent variable on the outcome criterion can be estimated (Brink & Wood, 1998).

Pearson correlation coefficients were computed to determine the relationship between all study variables. A correlation matrix of study variables was used to test whether resource and risk factors were appropriately correlated with the outcomes (Table 5). Most of the intercorrelations between key study variables were low to medium in magnitude.
Research Aims 1 and 2 were addressed separately using linear regression. The respective roles of hypothesized risk and resource factors were addressed by a set of linear regressions designed to establish separately which resource factors were important predictors of the outcome variables, which risk factors were important predictors of the outcome variables, and the relative importance of all significant factors (Tables 7-12).

The research question of the existence of possible moderating effects of resource factors on risk factors was addressed with the use of hierarchical regressions for each outcome variable (Tables 13-18). This was in accordance with Mitchell, Murdock, and McQuaid’s Asthma-related Resilience Model (2004), which guided this current study as well as previously cited resilience research (Dubow et al. 1997; Grossman et al. 1992; Luthar, 1991; Rose, Holmbeck, Millstein, Coakley, & Franks, 2004). Hierarchical multiple regression, as a general method of analysis, provides results that indicate both the relationship of a set of independent variables, as a whole, to the dependent variable and the partial contribution of those variables included at separate steps in the analysis (Cohen et al. 2003).

Before the analyses were run all variables were first centered. In the first step of each regression, demographic variables (gender, mother’s work status, and father’s educational level) for which a significant relationship was demonstrated with the outcome variables were analyzed. In the second step, the main effects of one risk factor and one resource factor were included to test the moderating effect of the resource factor (Aiken & West, 1991). By including the interaction term, it allowed the researcher to test
the hypothesis that each resource factor would function as a protective factor, or moderate the risk factor on the health outcomes (Rose et al. 2004).

Three resource factors were hypothesized for each outcome variable with depression as the only significant risk factor identified. Thus, six hierarchical regressions were performed.
Table 5. Correlations among Risk Factors, Resource Factors and Positive Health Outcomes.

<table>
<thead>
<tr>
<th>Variables</th>
<th>Asthma Control</th>
<th>Asthma-related QOL</th>
<th>Depression</th>
<th>Neighborhood Disadvantage</th>
<th>Internal Locus of Control</th>
<th>Self-esteem</th>
<th>Social Support</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asthma Control</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asthma-related QOL</td>
<td>.890**</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Depression</td>
<td>-.467**</td>
<td>-.546**</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Neighborhood Disadvantage</td>
<td>-.269**</td>
<td>-.284**</td>
<td>.407**</td>
<td>.407**</td>
<td>1.000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Internal Locus of Control</td>
<td>-.355**</td>
<td>-.378**</td>
<td>.488**</td>
<td>.336**</td>
<td>1.000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Self-esteem</td>
<td>.199</td>
<td>.199</td>
<td>-.532**</td>
<td>-.139</td>
<td>-.444**</td>
<td>1.000</td>
<td></td>
</tr>
<tr>
<td>Social Support</td>
<td>.073</td>
<td>.012</td>
<td>-.224*</td>
<td>-.361**</td>
<td>-.371**</td>
<td>.101</td>
<td>1.000</td>
</tr>
</tbody>
</table>

*Note.* Internal Locus of Control was scored so that a higher numeric value reflects less internal locus of control. Less internal locus of control is thus associated with poorer asthma control, asthma-related quality of life, less self-esteem, and less social support.

*p < .05

**p < .01
Correlation of Study Variables

The risk factors (depression and neighborhood disadvantage) were negatively correlated with asthma control and asthma-related quality of life outcomes \( r = -.467; r = -.269, \) and \( r = -.546; r = -.284, \) respectively at \( p < .01 \). Two resource factors (social support and self-esteem) were not correlated with any outcomes. Internal locus of control was negatively correlated \( (r = -.355; r = -.378) \) with both outcome variables \( (p < .01) \) and positively correlated with risk factors depression and neighborhood disadvantage \( (p < .01) \).

Results of the one way analyses of variance found the effects of gender, mother’s work status, and father’s education were significant for both outcome variables. Asthma-related quality of life was sensitive \( (\alpha = .05) \) to gender, \( F(1, 98) = 5.42, p = .022, \) mother’s work status, \( F(3, 91) = 3.87, p = .012, \) and father’s education, \( F(5, 93) = 3.45, p = .007. \) Asthma control was significant for gender, \( F(1, 97) = 4.69, p = .033, \) mother’s work status \( F(3, 90) = 2.96, p = .036, \) and father’s education \( F(5, 92) = 2.91, p = .017. \) No other demographic variables were significant. In the regression analyses reported, gender, mother’s work status, and father’s education were controlled for as they were significantly related to the outcome variables.

Missing Data and Unusable Data

Infrequent and randomly occurring missing values were identified within the data. Such cases were removed from the relevant analysis. By variable, the number of such missing responses varied between 0 (for internal locus of control and neighborhood disadvantage) and 10% for social support (Table 6). Overall, 23 of 816 case values were
omitted or 2.9%. Opting to drop the variables due to randomly occurring missing responses, when confined to less than 3% of the dataset, is considered an acceptable treatment of missing data (Cohen et al. 2003) and has been reported in the literature (Ghazarian & Buehler, 2010).

Table 6. Missing Data.

<table>
<thead>
<tr>
<th>Resource Factors</th>
<th>Risk Factors</th>
<th>Outcomes</th>
<th>Sociodemographics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Social Support - 1</td>
<td>Depression - 1</td>
<td>Asthma Control - 3</td>
<td>Father’s Education - 1</td>
</tr>
<tr>
<td>Internal Locus of Control - 0</td>
<td>Neighborhood Disadvantage Items - 0</td>
<td>Asthma-related Quality of Life - 2</td>
<td>Gender - 0</td>
</tr>
<tr>
<td>Self-esteem - 3</td>
<td></td>
<td></td>
<td>Mother’s work status - 5</td>
</tr>
</tbody>
</table>

*Note: There are 5 cases where missing data overlaps within the same survey.*

As previously noted, more than 50% of the respondents selected an option which made the use of asthma severity problematic. As a result, this variable was not under further consideration as a risk factor for analysis but rather a descriptor of the population.
Table 7. Regression Analyses for Depression and Neighborhood Disadvantage as Risk Factors for Asthma Control (N = 93).

<table>
<thead>
<tr>
<th>Risk Factor</th>
<th>b</th>
<th>SE b</th>
<th>β</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>16.090</td>
<td>1.545</td>
<td></td>
</tr>
<tr>
<td>Neighborhood Disadvantage</td>
<td>-.137</td>
<td>.165</td>
<td>-.085</td>
</tr>
<tr>
<td>Depression</td>
<td>-.308</td>
<td>.099</td>
<td><strong>-.337</strong></td>
</tr>
</tbody>
</table>

Note: $R^2 = .349$. *p < .05, **p < .01

Table 7 shows the results for the regression using asthma control as the dependent variable and risk factors depression and neighborhood disadvantage. The findings show that having more depression is a significant predictor of asthma control.

Table 8. Regression Analyses for Depression and Neighborhood Disadvantage as Risk Factors for Asthma-related Quality of Life (N = 94).

<table>
<thead>
<tr>
<th>Risk Factor</th>
<th>b</th>
<th>SE b</th>
<th>β</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>4.086</td>
<td>.389</td>
<td></td>
</tr>
<tr>
<td>Neighborhood Disadvantage</td>
<td>-.043</td>
<td>.043</td>
<td>-.091</td>
</tr>
<tr>
<td>Depression</td>
<td>-.116</td>
<td>.026</td>
<td><strong>-.432</strong></td>
</tr>
</tbody>
</table>

Note: $R^2 = .456$. *p < .05, **p < .01

Table 8 shows the results for the regression using asthma-related quality of life as the dependent variable and risk factors depression and neighborhood disadvantage. The
findings show that having greater depression is a significant predictor of asthma-related quality of life.

Table 9. Regression Analyses for Internal Locus of Control, Self-esteem, and Social Support as Resource Factors for Asthma Control (N = 83).

<table>
<thead>
<tr>
<th></th>
<th>b</th>
<th>SE b</th>
<th>β</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>15.268</td>
<td>1.585</td>
<td></td>
</tr>
<tr>
<td>Resource Factor:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Internal Locus of Control</td>
<td>-.388</td>
<td>.128</td>
<td>-.362**</td>
</tr>
<tr>
<td>Self-esteem</td>
<td>.061</td>
<td>.093</td>
<td>-.074</td>
</tr>
<tr>
<td>Social Support</td>
<td>-.004</td>
<td>.013</td>
<td>-.031</td>
</tr>
</tbody>
</table>

Note: $R^2 = .376$. *$p < .05$, **$p < .01$

Table 9 shows the results for the regression using asthma control as the dependent variable and resource factors internal locus of control, self-esteem, and social support. The findings show that having more internal locus of control is a significant predictor of asthma control.
Table 10. Regression Analyses for Internal Locus of Control, Self-esteem, and Social Support as Resource Factors for Asthma-related Quality of Life (N = 84).

<table>
<thead>
<tr>
<th></th>
<th>b</th>
<th>SE b</th>
<th>β</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>4.153</td>
<td>.467</td>
<td></td>
</tr>
<tr>
<td>Resource Factor:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Internal Locus of</td>
<td>-.132</td>
<td>.037</td>
<td>-.404**</td>
</tr>
<tr>
<td>Control</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Self-esteem</td>
<td>.011</td>
<td>.027</td>
<td>.044</td>
</tr>
<tr>
<td>Social Support</td>
<td>-.003</td>
<td>.004</td>
<td>-.087</td>
</tr>
</tbody>
</table>

Note: $R^2 = .399$. *p < .05, **p < .01

Table 10 shows the results for the regression using asthma-related quality of life as the dependent variable and resource factors internal locus of control, self-esteem, and social support. The findings show that having more internal locus of control is a significant predictor of asthma-related quality of life.

Table 11. Regression Analyses for Internal Locus of Control and Depression as Independent Variables and Asthma Control as Dependent Variable (N = 93).

<table>
<thead>
<tr>
<th></th>
<th>b</th>
<th>SE b</th>
<th>β</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>16.090</td>
<td>1.545</td>
<td></td>
</tr>
<tr>
<td>Internal Locus of</td>
<td>-.209</td>
<td>.121</td>
<td>-.185</td>
</tr>
<tr>
<td>Control</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Depression</td>
<td>-.255</td>
<td>.102</td>
<td>-.279*</td>
</tr>
</tbody>
</table>

Note: $R^2 = .367$. *p < .05, **p < .01
Table 11 shows the results for the regression using asthma control as the dependent variable and independent variables internal locus of control and depression. These findings indicate that depression is the only significant predictor of asthma-control.

Table 12. Regression Analyses for Internal Locus of Control and Depression as Independent Variables and Asthma-related Quality of Life as Dependent Variable (N = 94).

<table>
<thead>
<tr>
<th></th>
<th>b</th>
<th>SE b</th>
<th>β</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>4.553</td>
<td>.382</td>
<td></td>
</tr>
<tr>
<td>Internal Locus of Control</td>
<td>-.055</td>
<td>.032</td>
<td>-.165</td>
</tr>
<tr>
<td>Depression</td>
<td>-.104</td>
<td>.027</td>
<td><strong>-.388</strong></td>
</tr>
</tbody>
</table>

Note: $R^2 = .469$. *$p < .05$, **$p < .01$

Table 12 shows the results for the regression using asthma-related quality of life as the dependent variable and independent variables internal locus of control and depression. These findings indicate that depression is the only significant predictor of asthma-related quality of life.
Table 13. Hierarchical Multiple Regression Analyses for Depression, and Internal Locus of Control with Dependent Variable Asthma Control ($N = 93$).

<table>
<thead>
<tr>
<th></th>
<th>$b$</th>
<th>SE $b$</th>
<th>$\beta$</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Step 1</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Constant</td>
<td>16.971</td>
<td>1.432</td>
<td></td>
</tr>
<tr>
<td>Internal Locus of Control</td>
<td>-.209</td>
<td>.121</td>
<td>-.185</td>
</tr>
<tr>
<td>Depression</td>
<td>-.255</td>
<td>.102</td>
<td>-.279*</td>
</tr>
<tr>
<td><strong>Step 2</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Constant</td>
<td>16.90</td>
<td>1.45</td>
<td></td>
</tr>
<tr>
<td>Internal Locus of Control</td>
<td>-.208</td>
<td>.122</td>
<td>-.184</td>
</tr>
<tr>
<td>Depression</td>
<td>-.267</td>
<td>.108</td>
<td>-.292*</td>
</tr>
<tr>
<td>Internal Locus of Control $\times$ Depression</td>
<td>.008</td>
<td>.024</td>
<td>.037</td>
</tr>
</tbody>
</table>

Note: $R^2 = .367$ for Step 1: $\Delta R^2 = .001$ for Step 2. *$p < .05$, **$p < .01$

Table 13 shows the results for the hierarchical regression using depression and internal locus of control as independent variables in Step 1 and with an interaction term added in Step 2. The findings show no significant interaction between depression and internal locus of control for asthma control.
Table 14. Hierarchical Multiple Regression Analyses for Depression, and Internal Locus of Control with Dependent Variable Asthma-related Quality of Life (N = 94).

<table>
<thead>
<tr>
<th></th>
<th>b</th>
<th>SE b</th>
<th>β</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Step 1</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Constant</td>
<td>4.553</td>
<td>0.382</td>
<td></td>
</tr>
<tr>
<td>Internal Locus of Control</td>
<td>-0.055</td>
<td>0.032</td>
<td>-0.165</td>
</tr>
<tr>
<td>Depression</td>
<td>-0.104</td>
<td>0.027</td>
<td>-0.388*</td>
</tr>
<tr>
<td><strong>Step 2</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Constant</td>
<td>4.600</td>
<td>0.385</td>
<td></td>
</tr>
<tr>
<td>Internal Locus of Control</td>
<td>-0.055</td>
<td>0.032</td>
<td>-0.166</td>
</tr>
<tr>
<td>Depression</td>
<td>-0.096</td>
<td>0.028</td>
<td>-0.358*</td>
</tr>
<tr>
<td>Internal Locus of Control × Depression</td>
<td>-0.006</td>
<td>0.006</td>
<td>-0.093</td>
</tr>
</tbody>
</table>

Note: \( R^2 = .469 \) for Step 1; \( \Delta R^2 = .006 \) for Step 2. *p < .05, **p < .01

Table 14 shows the results for the hierarchical regression using depression and internal locus of control as independent variables in Step 1 and with an interaction term added in Step 2. The findings show that no significant interaction between depression and internal locus of control for asthma-related quality of life.
Table 15. Hierarchical Multiple Regression Analyses for Depression and Self-esteem with Dependent Variable Asthma Control (N = 91).

<table>
<thead>
<tr>
<th></th>
<th>b</th>
<th>SE b</th>
<th>β</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Step 1</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Constant</td>
<td>17.203</td>
<td>1.507</td>
<td></td>
</tr>
<tr>
<td>Self-esteem</td>
<td>-.028</td>
<td>.097</td>
<td>-.033</td>
</tr>
<tr>
<td>Depression</td>
<td>-.367</td>
<td>.104</td>
<td>-.412**</td>
</tr>
<tr>
<td><strong>Step 2</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Constant</td>
<td>17.330</td>
<td>1.572</td>
<td></td>
</tr>
<tr>
<td>Self-esteem</td>
<td>-.038</td>
<td>.103</td>
<td>-.045</td>
</tr>
<tr>
<td>Depression</td>
<td>-.362</td>
<td>.106</td>
<td>-.407**</td>
</tr>
<tr>
<td>Self-esteem × Depression</td>
<td>.004</td>
<td>.013</td>
<td>.036</td>
</tr>
</tbody>
</table>

Note: $R^2 = .332$ for Step 1; $\Delta R^2 = .001$ for Step 2. *p < .05, **p < .01

Table 15 shows the results for the hierarchical regression using depression and self-esteem as independent variables in Step 1 and with an interaction term added in Step 2. The findings show no significant interaction between depression and self-esteem for asthma control.
Table 16. Hierarchical Multiple Regression Analyses for Depression and Self-esteem with Dependent Variable Asthma-related Quality of Life (N = 90).

<table>
<thead>
<tr>
<th></th>
<th>b</th>
<th>SE b</th>
<th>β</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Step 1</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Constant</td>
<td>4.569</td>
<td>.408</td>
<td></td>
</tr>
<tr>
<td>Self-esteem</td>
<td>-.024</td>
<td>.026</td>
<td>-.098</td>
</tr>
<tr>
<td>Depression</td>
<td>-.141</td>
<td>.028</td>
<td>.533**</td>
</tr>
<tr>
<td><strong>Step 2</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Constant</td>
<td>4.633</td>
<td>.425</td>
<td></td>
</tr>
<tr>
<td>Self-esteem</td>
<td>-.029</td>
<td>.028</td>
<td>-.119</td>
</tr>
<tr>
<td>Depression</td>
<td>-.138</td>
<td>.029</td>
<td>-.525**</td>
</tr>
<tr>
<td>Self-esteem × Depression</td>
<td>.002</td>
<td>.004</td>
<td>.061</td>
</tr>
</tbody>
</table>

Note: $R^2 = .433$ for Step 1; $\Delta R^2 = .002$ for Step 2. *p < .05, ** p < .01

Table 16 shows the results for the hierarchical regression using depression and self-esteem as independent variables in Step 1 and with an interaction term added in Step 2. The findings show no significant interaction between depression and self-esteem for asthma-related quality of life.
Table 17. Hierarchical Multiple Regression Analyses for Depression and Social Support with Dependent Variable Asthma Control (N = 86).

<table>
<thead>
<tr>
<th></th>
<th>b</th>
<th>SE b</th>
<th>β</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Constant</td>
<td>15.086</td>
<td>1.526</td>
<td></td>
</tr>
<tr>
<td>Social Support</td>
<td>-.001</td>
<td>.013</td>
<td>-.007</td>
</tr>
<tr>
<td>Depression</td>
<td>-.366</td>
<td>.097</td>
<td>-.408</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Step 2</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>15.012</td>
<td>1.522</td>
<td>1.522</td>
</tr>
<tr>
<td>Social Support</td>
<td>.002</td>
<td>.013</td>
<td>.017</td>
</tr>
<tr>
<td>Depression</td>
<td>-.385</td>
<td>.098</td>
<td>-.430**</td>
</tr>
<tr>
<td>Social Support × Depression</td>
<td>-.003</td>
<td>.002</td>
<td>-.124</td>
</tr>
</tbody>
</table>

Note: $R^2 = .469$ for Step 1; $\Delta R^2 = .006$ for Step 2. *p < .05, **p < .01

Table 17 shows the results for the hierarchical regression using depression and social support as independent variables in Step 1 and with an interaction term added in Step 2. The findings show no significant interaction between depression and social support for asthma control.
Table 1. Hierarchical Multiple Regression Analyses for Depression and Social Support with Dependent Variable Asthma-related Quality of Life ($N = 85$).

<table>
<thead>
<tr>
<th></th>
<th>$b$</th>
<th>SE $b$</th>
<th>$\beta$</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Step 1</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Constant</td>
<td>4.241</td>
<td>.432</td>
<td></td>
</tr>
<tr>
<td>Social Support</td>
<td>-.002</td>
<td>.004</td>
<td>-.058</td>
</tr>
<tr>
<td>Depression</td>
<td>-.132</td>
<td>.027</td>
<td>-.485**</td>
</tr>
<tr>
<td><strong>Step 2</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Constant</td>
<td>4.228</td>
<td>.433</td>
<td></td>
</tr>
<tr>
<td>Social Support</td>
<td>-.002</td>
<td>.004</td>
<td>-.041</td>
</tr>
<tr>
<td>Depression</td>
<td>-.135</td>
<td>.028</td>
<td>-.498**</td>
</tr>
<tr>
<td>Social Support $\times$ Depression</td>
<td>-.001</td>
<td>.001</td>
<td>-.078</td>
</tr>
</tbody>
</table>

Note: $R^2 = .459$ for Step 1; $\Delta R^2 = .005$ for Step 2. *$p < .05$, **$p < .01$*

Table 18 shows the results for the hierarchical regression using depression and social support as independent variables in Step 1 and with an interaction term added in Step 2. The findings show no significant interaction between depression and social support for asthma-related quality of life.
Summary of Regression Analyses

The research questions sought to understand which of the variables act as resource factors and risk factors within this population for the two outcome variables, and which variables serve as moderators of risk factors as expected within the model of resilience used. Regressions presented in Tables 7-12 showed that depression was the only significant risk factor for both asthma control and asthma-related quality of life and that internal locus of control was the only significant resource factor. When controlling for both internal locus of control and depression, depression was the only significant predictor of either asthma control or asthma-related quality of life.

Evidence of asthma-related resilience would be indicated by the presence of a significant interaction between the variables representative of protective and risk factors. An interaction would indicate a decreased sensitivity of the outcome variable to the risk factor in the presence of the protective factor. No interaction between any combination of risk factor and resource factor was significant (Tables 13-18). Furthermore, no significant increase in $R^2$ was observed for any interaction term introduced. Thus, the null hypotheses cannot be rejected.

Moreover, an interaction whose effect size was too small to have been detected cannot be disproved. Post hoc power analysis applied to the point estimates for $\Delta R^2$ due to the interaction terms (Step 2 in each of Tables 7-12) are shown and indicate values of $1-\beta$ varying from .06 to .40 (F. Bryant, personal communication, May 15, 2011).

The point estimates are the best estimate of $\Delta R^2$ derived by each regression, regardless of whether it is significant. This power differs from what was calculated in the
study design which was based on the larger effect sizes typically found in the literature where significant effects were detected. The sample used in this study met the design goals ($N$ between 100 and 200) to achieve the power to detect these effect sizes.

If an undetected interaction had been present with an effect size corresponding to the point estimates, a Type II error would have been made. The probability of a Type II error for each regression, evaluated for the point estimates of the interactions and corresponding to the power quoted above, would be between .60 and .94.

While very small-sized effects due to interactions cannot be disproved, the analysis retained statistical power to address the effect sizes targeted for the study. Table 19 and Table 20 show the value of $\Delta R^2$ for which $1-\beta$ would be .80 given the measured value of $R^2$ for the non-interaction terms and the sample sizes used. These correspond favorably to the range of $\Delta R^2$ for which the analysis was designed to be sensitive.

For asthma-related quality of life and asthma control outcomes, these values confirmed that the study had appropriate sensitivity to the effect sizes expected based on prior research and conventional definitions of medium sized effects.
Table 19. Post Hoc Power Analysis for Asthma-related Quality of Life.

<table>
<thead>
<tr>
<th>Interaction</th>
<th>Residual $R^2$</th>
<th>$\Delta R^2$</th>
<th>$N$</th>
<th>1-β</th>
<th>$\Delta R^2(\beta = .2)$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self-esteem × Depression</td>
<td>.433</td>
<td>.002</td>
<td>91</td>
<td>.10</td>
<td>.039</td>
</tr>
<tr>
<td>Social Support × Depression</td>
<td>.459</td>
<td>.005</td>
<td>86</td>
<td>.16</td>
<td>.044</td>
</tr>
<tr>
<td>Internal Locus of Control × Depression</td>
<td>.469</td>
<td>.006</td>
<td>94</td>
<td>.19</td>
<td>.041</td>
</tr>
</tbody>
</table>
Table 20. Post Hoc Power Analysis for Asthma Control.

<table>
<thead>
<tr>
<th>Interaction</th>
<th>Residual $\Delta R^2$</th>
<th>$\Delta R^2$</th>
<th>$N$</th>
<th>$1-\beta$</th>
<th>$\Delta R^2(\beta =.2)$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self-esteem $\times$ Depression</td>
<td>.332</td>
<td>.001</td>
<td>90</td>
<td>.08</td>
<td>.030</td>
</tr>
<tr>
<td>Social Support $\times$ Depression</td>
<td>.390</td>
<td>.013</td>
<td>85</td>
<td>.37</td>
<td>.038</td>
</tr>
<tr>
<td>Internal Locus of Control $\times$ Depression</td>
<td>.367</td>
<td>.001</td>
<td>93</td>
<td>.08</td>
<td>.032</td>
</tr>
</tbody>
</table>

Table 21. Confidence Intervals after Study Completion for Hypothesized Interactions.

<table>
<thead>
<tr>
<th>Health Outcome Variables</th>
<th>Asthma-related Quality of Life</th>
<th>Asthma Control</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>95% CI</td>
<td>95% CI</td>
</tr>
<tr>
<td>Independent Variable</td>
<td>$\beta$</td>
<td>LL</td>
</tr>
<tr>
<td>Depression, Self-esteem</td>
<td>.06</td>
<td>-.15</td>
</tr>
<tr>
<td>Depression, Social</td>
<td>-.08</td>
<td>-.16</td>
</tr>
<tr>
<td>Support</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Depression, Internal</td>
<td>-.09</td>
<td>-.29</td>
</tr>
<tr>
<td>Locus of Control</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
According to Smith and Bates (1991), well-conducted studies of low power can be informative with the use of predicted confidence intervals. The usefulness of the upper bound of the \( (1 - \alpha)\% \) confidence interval provides a limit on the likely magnitude of any actual effect. A point estimate with confidence limits is much more informative than post hoc power calculations incorporating the actual study size.

These values provide regions of interaction coefficient size within which there remains at least a 95% chance that the observed value of interaction size would have been obtained. The confidence intervals for all non-significant interactions are summarized in Table 21. It is clear that the present study limits the range within which resilience would manifest itself as an interaction among variables.

**Aim 1: Description of the Role of Resource Factors in the Presence of Risk Factors in Facilitating Positive Health Outcomes in Adolescents with Asthma**

The variables used in this current study were chosen based on previous research studies on asthma and resilience. Results indicated that internal locus of control was a significant resource factor for asthma control and asthma-related quality of life \( (\beta = -0.36 \) and \(-0.40\), respectively; \( p < .01 \) for both). However, the resource factors, self-esteem and social support showed no significant role as resource factors for either asthma control or asthma-related quality of life.

Among risk factors, only depression was significantly predictive of asthma-related quality of life \( (\beta = -0.43, p < .01) \) and asthma control \( (\beta = -0.34, p < .01) \).

Neighborhood disadvantage was not predictive of either outcome variable. Regressions performed for asthma control and asthma-related quality of life simultaneously including
depression and internal locus of control showed depression to be the most significant factor ($\beta = -0.279, p < 0.05$ and $\beta = -0.388, p < 0.01$, respectively) in predicting either outcome. Furthermore, internal locus of control was not significantly predictive when combined with a regression using depression. The Pearson’s correlation matrix shows that depression and internal locus of control are strongly correlated and this result may suggest the possibility of a mediational effect among these two variables.

**Aim 2: Determination of Resource Factors as Protective Factors**

The resource factors were hypothesized to operate as protective factors; that is, to buffer adolescents from poor asthma outcomes in the presence of a risk factor. Depression was the sole significant risk factor identified. Each of the three hypothesized resource factors, internal locus of control, self-esteem, and social support, were considered regardless of whether they showed significant direct effects. In this study, there were no statistically significant interactions between any of the resource factors and depression. As a result, the resource factors did not function as protective factors.

**Aim 3: Usefulness of an Asthma-related Resilience Model**

In this study, the usefulness of a modified asthma-related resilience model for adolescents, based on Mitchell, Murdock, and McQuaid’s asthma-related resilience model (2004), was explored. Their model used hierarchical multiple regression to test a limited number of resource and risk factors related to resilient outcomes.

In this current research study, additional resource factors (representing each of the three major categories) and risk factors were added with the intent to capture resilient health outcomes as evidenced by moderation. However, there was lack of any statistical
evidence to support that any of the three resource factors tested had contributed significantly towards such an outcome. Therefore, the findings from this research study do not support a modified asthma-related resilience model to help explain positive health outcomes for adolescents with asthma.

**Hypothesis One**

Hypothesis one posited higher levels of each of the resource factors, self-esteem, internal locus of control, and social support, would have direct effects on positive health outcomes. Neither self-esteem nor social support showed any significant predictive ability for either positive health outcome. Therefore, hypothesis one is rejected for self-esteem and social support.

Hypothesis one also posited higher levels of depression and neighborhood disadvantage would have direct negative effects on health outcomes. Only depression was found to have any such effect. Therefore hypothesis one is rejected for neighborhood disadvantage.

Internal locus of control and depression were found to be significantly predictive of both asthma control and asthma-related quality of life; therefore, hypothesis one is supported for these two variables. The regression analyses using both variables show that depression is the most significant factor in predicting either outcome variable.

**Hypothesis Two**

Hypothesis two posited each of the resource factors would operate as a protective factor or buffer adolescents from poor asthma outcomes in the presence of a risk factor. Depression was the only significant risk factor identified in this study and was not found
to be moderated by social support, self-esteem, or internal locus of control. Thus, hypothesis two cannot be supported for any of these variables for either asthma control or asthma-related quality of life where depression is the risk factor.
CHAPTER FIVE
DISCUSSION

The high prevalence rate of current asthma in adolescents served as the impetus for this study. The YRBS of 2009 reported that 22% of high school students had been told by a healthcare provider that they had asthma, with 10.8% with current asthma (USDHHS, 2010b). In addition, studies of minority children living with asthma in low-income areas tend to fare poorer regarding positive health outcomes (Gupta et al. 2008; Gupta et al. 2010). Yet, only a few resilience studies have reported that children and adolescents with asthma had exhibited good asthma control and health-related quality of life despite living in adverse environments (Chen et al. 2011; Mitchell et al. 2004). Research on asthma-related resilience has predominately focused on only one or two resource factors versus all three (individual attributes, relationships and community resources) and risk factors to test for moderation in non-diverse groups. The overall purpose of this study was to address the degree to which the phenomenon of resilience, observed in other physical health and psycho-social contexts, may be found in diverse adolescents with asthma exposed to risks that often accompany low-income environments to guide the development of more effective approaches to increase asthma resilient outcomes.
Review of Sample and Setting

The target population was ethnically diverse adolescents with asthma living in an urban area. The majority of participants were members of minority ethnic groups based on demographic self-reporting, living with asthma in low-income urban environments based on provided zip code information. Seventy percent reported Medicaid as their source of health insurance. The demographics of the data sample were in accord with expectations for an at-risk population in an urban setting. Male and females were recruited for the study, although the final sample consisted of more females than males (60% vs. 40%, respectively).

Although a sample size of $N = 102$ was obtained, the means and effort to recruit this sample size proved challenging as evidenced by the low return rate of the survey booklets (12%). Several booklets were returned to the researcher as non-deliverable. Of the first set of 200 mailings, approximately 20% were returned due to an incorrect mailing address. The actual number of surveys with non-current addresses is probably higher than this number. The database from which the potential participants were drawn from each healthcare clinic may have had an old address on file and thus were undeliverable. This poor return rate could be due to city transiency: a rapid turnover of residents characteristic of large cities (City-Data, 2012).

The setting was Chicago. It was chosen for the study due to its high asthma prevalence as well as its close proximity to the researcher’s residence. The final four healthcare clinics were chosen for the study due to their location and convenient population served, as this paralleled the desired target population. Lastly, these clinics
were willing to collaborate with the researcher in assisting with collecting data. Prior asthma-related resilience studies have used healthcare clinics as their setting to recruit participants with asthma in low-income areas (Chen et al. 2011; Mitchell at al. 2004; Murdock et al. 2009).

**Discussion of Study Variables**

*Neighborhood Disadvantage*

Although asthma control and asthma-related quality of life are known to be strongly influenced by disease severity, nonmedical or social determinants such as the neighborhood or social context in which the adolescent lives have emerged as important risk factors that influence asthma morbidity. Neighborhood disadvantage has been cited in previous resilience and asthma literature as a risk factor (Byrd & Joad, 2006; DuBow et al. 1997; Mitchell et al. 2004; Pongracic, 2010; Sternthal et al. 2010; Williams et al. 2009). In this research study, however, neighborhood disadvantage was not found to be a significant predictor of asthma-related quality of life or asthma control, in particular when controlling for depression. One explanation for this would be that depression is mediating the risks of neighborhood disadvantage. If this were the case, one would expect a decreased significance from neighborhood disadvantage when controlling for depression. In this scenario, depressed mood would be, in part, caused by neighborhood disadvantage. This would also explain the disagreement with the findings of Chen et al. (2011) who reported low socio-economic status as a risk factor for certain health-related outcomes among adolescents with asthma. Socio-economic status may be seen as similar to neighborhood disadvantage.
Chen et al. (2010) found that higher levels of neighborhood problems were associated with greater asthma symptoms \((p < .05)\) in children and adolescents with asthma \((M = 13\) years). The majority of the sample (approximately 70%) had levels of asthma severity ranging from persistent mild to moderate. In this current research study, the adolescents had similar asthma conditions as observed by Chen et al. Yet, there was no interaction between this risk factor and the study resource factors as noted by DuBow (1997) and Mitchell (2004).

The results of this study for neighborhood disadvantage are also consistent with Mitchell et al. (2004). In their study of asthma-related resilience, neighborhood disadvantage was shown to have no direct effect on positive health outcomes although they did identify it as negatively impacting a separate variable that provided a benefit in and of itself (adaptability).

**Asthma Severity**

Although asthma severity was significantly correlated to the current study variables, further analysis of this variable was excluded due to significant decrease in sample size. This was done to avoid a greater chance of a Type I error (false positive).

**Depression**

The sample population reported an average level of depression as measured with the Kandel Depressive Mood Inventory. Although responses to individual items were similar, the smallest contribution to the measured depression was through the item asking respondents if they “Felt hopeless about the future”. 33% of respondents indicated they agreed in some degree with this sentiment. In contrast, 75% felt similarly about being
“Too tired to do things”, 69% had trouble going to sleep, 54% had feelings of unhappiness, sadness, or depression, 52% felt nervous or tense, and 62% felt they worried too much. Depression is a common and significant problem during the adolescent developmental period (CDC, 2009). According to the 2009, Youth Risk Behavior Survey (YRBS), 26% of students nationwide had felt so sad or hopeless almost every day for two or more weeks in a row that they stopped doing some usual activities.

In this study, depression was a significant risk factor for a negative outcome related to adolescents’ asthma-related quality of life and asthma control. This is consistent with previous research findings by Richardson et al. 2006. In Richardson’s study, youths 11 -17 years with an anxiety or depressive disorder reported more symptom days (M = 5.4) compared with youths without one of these disorders (M = 3.5) and were more likely to report higher levels of asthma symptoms (p < .001). Luthar (1991) also found that depression could emerge as a consequence of the resilience process. This may be part of the reason that no resource factor was found to provide significant moderation of depression as a risk factor.

*Internal Locus of Control*

What is interesting is that the average internal locus of control score reported by this sample was 8.2; that is, the adolescents perceived that they could control certain aspects of their lives to a certain degree but less so in other domains. Internal locus of control as a resource factor had a significant main effect on asthma control, which is consistent with findings from Laforest, El Hasnaoui, Pribil, Ritleng, Schwalm, and Van
Ganse (2009) asthma-related quality of life. At the same time, internal locus of control was shown to provide no moderation on the risk posed by depression.

Internal locus of control, as a resource factor, in resilience research has consistently been noted as a resource factor (Grossman et al. 1992) and as a protective factor (Luthar, 1991). The findings from this study’s research support internal locus of control as a resource factor but not as a protective factor.

**Social Support**

The mean score for social support indicated that adolescents with asthma perceived adequate social support. However, social support was not associated with asthma control or asthma-related quality of life as a main effect. This is inconsistent with results reported by Vinson (2002) in her child asthma resilience model, where social support provided a pivotal role in asthma care and positive health outcomes.

Social and family-support have been previously found to be important, as a resource factor and moderator in asthma resilience research (Chen et al. 2007). Other research emphasized that family became less important for adolescents than for younger children (Werner & Smith, 1982). The findings of this current study are consistent and seem to support that of Werner and Smith. Although there has been extensive research supporting both direct and moderating benefits of family (Garmezy, 1984; Masten, 1988; Vanderbilt-Adriance et al. 2006), the current study measuring the combined social support of family, friends, did not support these previous research studies.
Self-esteem

Self-esteem has been associated as a resource factor for some indices of asthma-related functioning in resilience research (Vinson, 2002). Werner and Smith (1982) reported that self-esteem was important as a resource factor and a protective factor, in particular with high-risk adolescents. Although the high-risk adolescents in this current sample had moderately high levels of self-esteem, self-esteem was not found to have any beneficial role either as a resource or protective factor.

In summary, an unexpected finding was that depression emerged as the sole significant risk factor to asthma-related quality of life and asthma control and there was no significant evidence that factors characteristic of an adolescent or their social support from family and social groups can moderate the negative aspects of this risk on asthma-related health outcomes. The effects of depression on asthma in this study are consistent with previous research (Bender, 2006). Benefits from possible resource factors appear to be confined to internal locus of control.

At the same time, it is possible that the lack of significance of internal locus of control when controlling for depression is due to mediation by depression, a model untested in this study. It may also be the case that depression is a particular risk that is not amenable to moderation, characteristic of resilience studied in the literature. Depression differs from other risks in its chronic and organic relationship to the adolescent. In contrast, many of the risk factors studied by other researchers of resilience have focused on singular events, such as brief hospitalizations, or characteristics of their environments such as parental health or discord. Furthermore, studies in which moderation of risks
associated with mental health have evaluated outcomes from a longitudinal perspective (Hauser, 1999; Werner & Smith, 1982). It may be plausible that resilience in these environments take significant time to emerge. Finally, research has suggested that depression may be an outcome or side effect of processes yielding resilient outcomes (Luthar et al. 1993).

While the impact depression, as a risk factor, mirrors what has been found in the literature, the weak evidence for benefit from the resource factors, seen by lack of correlation with positive health outcomes, lack of direct effects or through moderation of the effects of risk, was somewhat unexpected.

**Limitations**

The findings are qualified by a number of methodological limitations. Limitations of the study included: sample selection, measurement, and cross-sectional design and length. The main limitations in the study were in the sample selection and details of certain measurements. The respondents were selected as those between the ages of 14 and 18 years with asthma. The NHLBI defines adolescence as between 11 and 18 years of age. By expanding the age range, a significantly larger sample could have been obtained increasing power and ability to see an effect. The adolescents in the study were drawn from four community healthcare centers which collectively serve a large number of children with asthma. The community members who visit these healthcare centers are typically minority and low-income but it does not guarantee that it is a fair representation of all such community members. It may be that there is a similar sub-population that does not visit the healthcare clinics and for whom the results would be different. Furthermore,
the general population of children in metropolitan areas, such as Chicago, is often sought out by many simultaneous research studies. At this time, there were at least three ongoing asthma studies targeting large samples that would make it likely for some respondents to have been approached on multiple occasions.

The measurement instruments had acceptable reliability statistics for the current study as evidenced by their Cronbach alpha. A significant instrument limitation was the measurement of the participant’s perceived asthma severity. This was obtained using a Likert-scale questionnaire with definitions paralleled to the NHLBI characterization of asthma. The questionnaire also included the option of *None of the above*—which did not employ measures that assess specific features. Although all of the individuals in the sample were presently receiving healthcare for their asthma, more detailed information about the nature or severity of the disease was unknown by selecting the option of *None of the above*. As a result, this effectively reduced the sample size for analysis that involved this variable and a loss of power. Although the sole reliance on self-report measures provided valuable information about the participant’s symptoms and diagnosis, future studies might employ other objective measure indicators. A more complete survey including recommendations to add screening questions to the demographic form such as when was the patient diagnosed with asthma, how long they have been diagnosed and whether they were currently having acute symptoms, and a setting that allowed for a more detailed and current understanding of each patient’s asthma status, for that time period, would better clarify the severity of their asthma.
The length of the survey packets likely acted to suppress the response rate from the targeted population. Potential participants may also have felt that they could not spare the time to complete the survey booklet (~ 20 minutes). The survey booklet consisted of 15 pages of questions for a total number of 125 questions. Persons may have perceived the survey booklet as a nuisance and that the $20 incentive did not offset the burden of completing it in a timely manner. Although the investigator attempted to follow up on all incomplete data, in some cases these attempts were not successful. This resulted in smaller sample sizes in certain analyses.

A change in asthma status may have lent itself to a possible decrease in return rate. The potential respondent’s current asthma status may not have been reflective of what was listed in the healthcare clinics’ database; that is, the asthma severity level was now well-controlled. With this change in asthma status, the research purpose and study did not apply to them. Lastly, at the time of data collection, it was known to the researcher that at least three other child and adolescent asthma studies were being conducted in metro Chicago. Thus, this population may have been overly manipulated, sensitized, or affected in some undocumented way so as not to render this current study as worthy of additional interest or time.

Another limitation of the study was its cross-sectional design; it only represented a snapshot of the participants’ lives or temporal relationships among variables. The information and experiences may have provided differing results if another time-frame had been chosen such as a prospective analysis of early exposure to risk and resources to capture the dynamic state of resilience.
Certainly, these limitations preclude decisive conclusions about the data; however, it may shed some light on searching for other resource and protective factors that an adolescent at-risk with asthma can draw upon to possibly control their asthma and enhance their health-related quality of life. Despite these limitations, results from the current study contribute to the paucity of existing research examining how risk and resource factors are associated with asthma-related health outcomes and the concept of a resilience based model.

**Summary and Conclusions**

Hypotheses for this study were either partially or not supported at all by the data. The variables as they were measured in this study were reliable as indicated by the Cronbach alpha tests. It is possible that the particular set of variables hypothesized as resource factors for this study do not reflect the aspects that this population might draw on to improve positive health outcomes.

No evidence for significant moderation of risk factors by resource factors for asthma-related outcomes in adolescents was observed. The relationship between the statistical significance and the clinical significance is less clear. Observing a statistically insignificant result can never prove that there is no effect. A sufficiently small effect may still elude detection.

This study was designed to capture a broad set of features that are believed to be important to the relationship between an adolescent’s asthma-related health and important elements of their life such as family and peer relationships, their neighborhood, and their own individual makeup. In particular, the dangers posed to adolescents by depression as a
risk factor does not appear to be sensitive to who the individual is or social support from friends or family. Limits on the size of the interactions should be important for future studies that would seek to build on these findings.

There also appears to be evidence that internal locus of control has a role as providing direct benefit for asthma-related outcomes, but not as a moderator of depression. At the same time, there is no evidence supporting direct beneficial effects due to resource factors of family and peer relationships or self-esteem. These resource factors have been previously identified as important towards both direct protection and moderation of risk in the context of psycho-social and physical health outcomes. It is possible that the selected variables used to characterize potential resource factors were insufficiently sensitive to this population. For example, it is possible that focusing specifically on support due to parents would yield a different result than the broader measurement of parents, teachers, and peers, used in this study. Such a possibility would be consistent with the observation that the outcomes were sensitive to the mother’s work status and father’s education. There may be a need to identify specific rather than global resource factors for at-risk adolescents with asthma. In contrast, it appears that the response to risk that characterizes resilience in those studies may be less useful as a framework for understanding how to moderate poor health outcomes for this population of adolescents with asthma.

For the specific case of internal locus of control, the lack of a significant direct relationship in the presence of depression while being correlated with both asthma-related quality of life and asthma control suggests that a different model might account for the
relationship among the study variables. Resilience-based models generally posit moderation of risk by protective factors and this was specifically tested for in this analysis. However, it is also possible that significant mediating relationships are present. This would be consistent with the observation of significant correlations between internal locus of control and both depression and neighborhood disadvantage.

Other factors which go beyond the traditional triad of factors may also be important. Biomedical factors such as type of medication used to control symptoms – when and how often. Although conventional clinical measures provide valuable information about the status of the adolescent with asthma, they rarely capture the humanistic outcomes, such as asthma-related quality of life. Both clinical and asthma-related quality of life measures are advocated because they provide complementary information about how the condition affects every day functioning for the patient.

The complexity of asthma’s underlying causes and the challenges of managing it as a chronic disease are impacted by many factors. The adolescent’s asthma-related quality of life goes beyond simply managing the severity of the asthma itself. As such, it would seem natural that the concept of resilience would be a suited to help explain the control of this disease. However, the research here does not support this assumption.

**Implications for Clinical Practice and Future Research**

From a clinical perspective, a key finding of the research is the clear importance of depression as a significant risk factor for achieving positive health outcomes in adolescents with asthma in an urban setting. This suggests that a greater awareness is
important for nurses in treating this population and an ability, at a minimum, to make these patients aware of this risk and what resources can be found.

Achieving a deeper understanding of risk factors and broader insights into protective factors are clear goals that should continue to be addressed in future research. There are several ways to target potential protective factors that may exist even while not being noted in the current study. This study was guided in part by an attempt to incorporate a broad set of factors reflective of external and internal facets. Knowing that depression is a key risk factor against which one is seeking protective factors might help provide focus to potential risk factors. Among adolescents, distinguishing external support by its origin, for instance, friends compared to parents, may be important. The CASSS instrument provides subscales for this possibility but at the cost of an instrument that has the most questions. Not surprisingly, it was also associated with the highest prevalence of missing values.

A better focus might also be achieved, and lend more power to the effort to identify resource factors, by more carefully unfolding the link between depression and asthma-related health outcomes.
APPENDIX A

SOCIODEMOGRAPHIC INFORMATION
Please tell me about yourself and your family.

First, let's start with some general questions about you.

1. Circle the number that best describes your asthma condition. Choose only one.

<table>
<thead>
<tr>
<th>Level of Asthma</th>
<th>Description of Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Wheeze or cough more than 2 days a week. Awaken at night 3-4 times a month with breathing problems or coughing. Use pump more than 2 days a week. Activity is usually normal.</td>
</tr>
<tr>
<td>2.</td>
<td>Wheeze or cough daily. Awaken at night greater than once a week with breathing problems or coughing. Use pump daily. Activity is limited or restricted due to breathing problems.</td>
</tr>
<tr>
<td>3.</td>
<td>Wheeze or cough throughout the day. Awaken nightly or seven times a week with breathing problems or coughing. Activity is very limited or restricted due to breathing problems.</td>
</tr>
<tr>
<td>4.</td>
<td>None of the above describes my condition.</td>
</tr>
</tbody>
</table>

2. What is your street address and zip code?
3. Are you Male or Female?
   A. Male   B. Female

4. What is your age?
   A. 14
   B. 15
   C. 16
   D. 17
   E. 18

5. What grade are you in?
   A. 9th
   B. 10th
   C. 11th
   D. 12th

6. Which of the following best describes your Grade Point Average (GPA)?
   A. 4.0/4.0
   B. 3.0/4.0
   C. 2.0/4.0
   D. 1.0/4.0
   E. Less than 1.0
   F. I don’t know
7. Do you think of yourself as….? 
   A. White  
   B. Black or African American 
   C. Hispanic or Latino 
   D. Asian American 
   E. Native American 
   F. Other ____________ 

8. What is your source of healthcare coverage? 
   A. None 
   B. All Kids/Public Aid/Medicaid 
   C. Private Insurance 
   D. I don’t know 

Now, let’s start with some general questions about your family…. 

9. How far did your mother go in school? (Indicate the highest level) 
   A. Completed grade school  
   B. Completed high school or got GED 
   C. Did some college or training after high school 
   D. Finished college 
   E. Master’s degree or PhD 
   F. I don’t know
10. Does your mother....
   A. Work full-time for pay
   B. Work part-time for pay
   C. Stay at home
   D. I don’t know

11. How far did your father go in school? (Indicate the highest level)
   A. Completed grade school
   B. Completed high school or got GED
   C. Did some college or training after high school
   D. Finished college
   E. Master’s degree or PhD
   F. I don’t know

12. Does your father....
   A. Work full-time for pay
   B. Work part-time for pay
   C. Stay at home
   D. I don’t know
APPENDIX B

KANDEL DEPRESSIVE MOOD INVENTORY (DMI)
### Kandel Depressive Mood Inventory

During the past year, how much have you been bothered or troubled by the following? (check one answer for each item)

<table>
<thead>
<tr>
<th>Feeling</th>
<th>MUCH</th>
<th>SOMewhat</th>
<th>NOT AT ALL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feeling too tired to do things</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Having trouble going to sleep or staying asleep</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Feeling unhappy, sad, or depressed</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Feeling hopeless about the future</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Feeling nervous or tense</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Worrying too much about the things</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
</tbody>
</table>

(Instrument used with permission from Dr. D. Kandel, Columbia University, NY)
APPENDIX C

NEIGHBORHOOD DISADVANTAGE ITEMS (DMI)
Next are some questions about your neighborhood.

Read each sentence carefully. Circle the word that best describes your neighborhood.

1. There are plenty of safe places to walk or play outdoors in my neighborhood. YES  NO
2. Every few weeks, some adult gets beaten up or mugged in my neighborhood. YES  NO
3. In my neighborhood, many yards and alleys have broken bottles and trash lying around. YES  NO
4. I have seen people using or selling drugs in my neighborhood. YES  NO
5. Most adults in my neighborhood respect the law. YES  NO
6. The people in my neighborhood often damage or steal each other’s property. YES  NO
7. In my neighborhood, there are a lot of poor people who don’t have enough money for food and basic needs. YES  NO
8. In my neighborhood I have seen or been around people shooting guns. YES  NO
9. I have been afraid to go outside or my parents have made me stay inside because of gangs and/or drugs in my neighborhood. YES  NO

(Instrument used with permission from Dr. E. Dubow, Bowling Green State University)
APPENDIX D

ROSENBER SELF-ESTEEM SCALE (RSES)
Indicate how strongly you agree with the following statements by marking the circle completely. Only mark one circle for each statement.

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. On the whole, I am satisfied with myself.</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>2. At times, I think I am no good at all.</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>3. I feel that I have a number of good qualities.</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>4. I am able to do things as well as most other people.</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>5. I feel I do not have much to be proud of.</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>6. I certainly feel useless at times.</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>7. I feel that I am a person of worth, at least on an equal plane with others.</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>8. I wish I could have more respect for myself.</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>9. All in all, I am inclined to feel that I am a failure.</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>10. I take a positive attitude toward myself.</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
</tbody>
</table>
APPENDIX E

NOWICKI-STRICKLAND LOCUS OF CONTROL
are some questions about the amount of control you feel over different situations. Read each sentence carefully, and then circle your answer.

1. Do you believe that most problems will solve themselves if you just don't fool with them? YES NO

2. Are some kids just born lucky? YES NO

3. Are you often blamed for things that just aren't your fault? YES NO

4. Do you feel that most of the time it doesn't pay to try hard because things never turn out right anyway? YES NO

5. Do you feel that most of the time parents listen to what their children have to say? YES NO

6. When you get punished does it usually seem its for no good reason at all? YES NO

7. Most of the time do you find it hard to change a friend's (mind) opinion? YES NO

8. Do you feel that it's nearly impossible to change your parent's mind about anything? YES NO

9. Do you feel that when you do something wrong there's very little you can do to make it right? YES NO

10. Do you believe that most kids are just born good at sports? YES NO

11. Do you feel that one of the best ways to handle most problems is just not to think about them? YES NO
12. Do you feel that when a kid your age decides to hit you, there's little you can do stop him or her? **YES** **NO**

13. Have you felt that when people were mean to you it was usually for no reason at all? **YES** **NO**

14. Most of the time, do you feel that you can change what might happen tomorrow by what you do today? **YES** **NO**

15. Do you believe that when bad things are going to happen they just are going to happen no matter what you try to do to stop them? **YES** **NO**

16. Most of the time do you find it useless to try to get your own way at home? **YES** **NO**

17. Do you feel that when somebody your age wants to be your enemy there's little you can do to change matters? **YES** **NO**

18. Do you usually feel that you have little to say about what you get to eat at home? **YES** **NO**

19. Do you feel that when someone doesn't like you there's little you can do about it? **YES** **NO**

20. Do you usually feel that it's almost useless to try in school because most other children are just plain smarter than you are? **YES** **NO**

21. Are you the kind of person who believes that planning ahead makes things turn out better? **YES** **NO**

22. Most of the time, do you feel that you have little to say about what your family decides to do? **YES** **NO**
APPENDIX F

CHILD AND ADOLESCENT SOCIAL SUPPORT SCALE (CASSS)
### My Parent(s)...

<table>
<thead>
<tr>
<th></th>
<th>Never</th>
<th>Almost</th>
<th>Some of the Time</th>
<th>Most of the Time</th>
<th>Almost</th>
<th>Always</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
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</tbody>
</table>

### My Teacher(s)...

<table>
<thead>
<tr>
<th></th>
<th>Never</th>
<th>Almost</th>
<th>Some of the Time</th>
<th>Most of the Time</th>
<th>Almost</th>
<th>Always</th>
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<td>6</td>
</tr>
<tr>
<td>16.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>17.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>18.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>19.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>20.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>21.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>22.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>23.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>24.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
</tbody>
</table>
### My Classmates

<table>
<thead>
<tr>
<th>Item</th>
<th>Never</th>
<th>Almost Never</th>
<th>Some of the Time</th>
<th>Most of the Time</th>
<th>Almost Always</th>
<th>Always</th>
</tr>
</thead>
<tbody>
<tr>
<td>25. ...treat me nicely.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>26. ...like most of my ideas and opinions.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>27. ...pay attention to me.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>28. ...give me ideas when I don't know what to do.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>29. ...give me information so I can learn new things.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>30. ...give me good advice.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>31. ...tell me I did a good job when I've done something well.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>32. ...nicely tell me when I make mistakes.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>33. ...notice when I have worked hard.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>34. ...ask me to join activities.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>35. ...spend time doing things with me.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>36. ...help me with projects in class.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
</tbody>
</table>

### My Close Friend

<table>
<thead>
<tr>
<th>Item</th>
<th>Never</th>
<th>Almost Never</th>
<th>Some of the Time</th>
<th>Most of the Time</th>
<th>Almost Always</th>
<th>Always</th>
</tr>
</thead>
<tbody>
<tr>
<td>37. ...understands my feelings.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>38. ...sticks up for me if others are treating me badly.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>39. ...helps me when I'm lonely.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>40. ...gives me ideas when I don't know what to do.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>41. ...gives me good advice.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>42. ...explains things that I don't understand.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>43. ...tells me he or she likes what I do.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>44. ...nicely tells me when I make mistakes.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>45. ...nicely tells me the truth about how I do on things.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>46. ...helps me when I need it.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>47. ...shares his or her things with me.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>48. ...takes time to help me solve my problems.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
</tbody>
</table>

(Instrument used with permission from Dr. C. Malecki, Northern Illinois University)
APPENDIX G

ASTHMA CONTROL TEST™ (ACT)
Take the Asthma Control Test™ (ACT)

Check the box by the number that best matches your experience.

### Asthma Control Test™

1. In the **past 4 weeks**, how much of the time did your **asthma** keep you from getting as much done at work, school or at home?

<table>
<thead>
<tr>
<th></th>
<th>All of the time</th>
<th>Most of the time</th>
<th>Some of the time</th>
<th>A little of the time</th>
<th>None of the time</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>0</strong></td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><strong>1</strong></td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td></td>
</tr>
</tbody>
</table>

2. **During the past 4 weeks**, how often have you had shortness of breath?

<table>
<thead>
<tr>
<th></th>
<th>More than</th>
<th>Once a day</th>
<th>3 to 6 times a week</th>
<th>Once or twice a week</th>
<th>Not at all</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>0</strong></td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><strong>1</strong></td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td></td>
</tr>
</tbody>
</table>

3. During the **past 4 weeks**, how often did your asthma symptoms (wheezing, coughing, shortness of breath, chest tightness or pain) wake you up at night or earlier than usual in the morning?

<table>
<thead>
<tr>
<th></th>
<th>4 or more nights a week</th>
<th>2 to 3 nights a week</th>
<th>Once a week</th>
<th>Once or twice</th>
<th>Not at all</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>0</strong></td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><strong>1</strong></td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td></td>
</tr>
</tbody>
</table>

4. During the **past 4 weeks**, how often have you used your rescue inhaler or nebulizer medication (such as albuterol)?

<table>
<thead>
<tr>
<th></th>
<th>3 or more times per day</th>
<th>1 or 2 times per day</th>
<th>2 or 3 times per week</th>
<th>Once a week or less</th>
<th>Not at all</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>0</strong></td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><strong>1</strong></td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td></td>
</tr>
</tbody>
</table>

5. How would you rate your asthma control during the past 4 weeks?

<table>
<thead>
<tr>
<th></th>
<th>Not Controlled at All</th>
<th>Poorly Controlled</th>
<th>Somewhat Controlled</th>
<th>Well Controlled</th>
<th>Completely Controlled</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>0</strong></td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><strong>1</strong></td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td></td>
</tr>
</tbody>
</table>
APPENDIX H
MINIPAEDIATRIC ASTHMA QUALITY OF LIFE QUESTIONNAIRE
(MiniPAQLQ)
MINI PAEDIATRIC ASTHMA QUALITY OF LIFE QUESTIONNAIRE SELF-ADMINISTERED

PATIENT ID ____________________
DATE ____________________

Page 1 of 2

Please complete all questions by circling the number that best describes how you have been during the last week as a result of your asthma.

HOW BOTHERED HAVE YOU BEEN DURING THE LAST WEEK BY:

<table>
<thead>
<tr>
<th></th>
<th>Extremely Bothered</th>
<th>Very Bothered</th>
<th>Quite Bothered</th>
<th>Somewhat Bothered</th>
<th>Bothered A Bit</th>
<th>Hardly Bothered At All</th>
<th>Not Bothered</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. COUGHING</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>2. WHEEZING</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>3. TIGHTNESS IN YOUR CHEST</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
</tbody>
</table>

IN GENERAL, HOW OFTEN DURING THE LAST WEEK DID YOU:

<table>
<thead>
<tr>
<th></th>
<th>All of the Time</th>
<th>Most of the Time</th>
<th>Quite Often</th>
<th>Some of the Time</th>
<th>Once in a While</th>
<th>Hardly Any of the Time</th>
<th>None of the Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>4. Feel OUT OF BREATH because of your asthma?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>5. Feel TIRED because of your asthma?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>6. Have trouble SLEEPING AT NIGHT because of your asthma?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>7. Feel FRUSTRATED because of your asthma?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>8. Feel FRIGHTENED OR WORRIED because of your asthma?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>9. Feel IRRITABLE (cranky/grouchy) because of your asthma?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
</tbody>
</table>
MINI PAEDIATRIC ASTHMA QUALITY OF LIFE QUESTIONNAIRE
SELF-ADMINISTERED PATIENT ID _______________________

DATE _______________________

Page 2 of 2

IN GENERAL, **HOW OFTEN** DURING THE LAST WEEK DID YOU:

| Question | All of the Time | Most of the Time | Quite Often | Some of the Time | Once in a While | Hardly Any of the Time | None of the Time |
|----------|-----------------|------------------|-------------|------------------|----------------|------------------------|----------------|---|
| 10. Feel DIFFERENT OR LEFT OUT because of your asthma? | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

**HOW BOTHERED** HAVE YOU BEEN DURING THE LAST WEEK DOING:

<table>
<thead>
<tr>
<th>Activity</th>
<th>Extremely Bothered</th>
<th>Very Bothered</th>
<th>Quite Bothered</th>
<th>Somewhat Bothered</th>
<th>A Bit</th>
<th>Hardly Bothered At All</th>
<th>Not Bothered</th>
</tr>
</thead>
<tbody>
<tr>
<td>11. PHYSICAL ACTIVITIES (such as running, swimming, sports, walking uphill/upstairs and bicycling)?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>12. BEING WITH ANIMALS (such as playing with pets and looking after animals)?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>13. ACTIVITIES WITH FRIENDS AND FAMILY (such as playing at recess and doing things with your friends and family)?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
</tbody>
</table>

**DOMAIN CODE:**
- Activity Limitation: 1, 2, 3
- Symptoms: 4, 5, 6, 7, 8, 9
- Emotional Function: 10, 11, 12, 13

(Instrument used with permission from Dr. E. F. Juniper, United Kingdom)
APPENDIX I

LETTER OF INTRODUCTION
Letter of Introduction

Name of Clinic or Hospital
Address

Date

Dear Parent or Guardian:

The purpose of this letter is to invite you and your teen to participate in the “Resilience and Adolescents with Asthma Research Project.” The goal of the study is to evaluate how certain risk and resource factors affect your teen’s asthma control. The research was designed to obtain input from teens with asthma for teens with asthma. Darla DeWolff, Assistant Professor and Pediatric Nurse Practitioner, is conducting the research. She also is a nursing student in the doctoral program at Loyola University – Chicago

“The Resilience and Adolescents with Asthma Research Project” involves your teen completing a survey booklet that asks questions about their asthma, sense of self, neighborhood, family, and school. The survey booklet may be mailed to you or be administered at your primary care clinic.

A $20 ‘thank you’ gift will be mailed to each teen who completes the entire survey booklet.

If you and your teen are interested in participating, please contact Darla DeWolff at (XXX) XXX-XXXX to arrange for either a mailed survey booklet or an appointment to complete the booklet. All information will be kept confidential. The primary investigator would be appreciative if you would share this information with any other families and teens with asthma you think may be interested.

Sincerely,

Name of clinic or hospital
Dear Participant:

Thank you for agreeing to participate in the “Resilience and Adolescents with Asthma Research Project.” This survey booklet contains the Parental Informed Consent, the Adolescent Assent, and 8 questionnaires that will ask you some key factors that may help healthcare providers understand what helps control asthma in adolescents when faced with certain risk factors. The questionnaires ask you about your asthma, sense of self, neighborhood, family, and school.

This booklet contains the following questionnaires:

Sociodemographic Information
Child and Adolescent Social Support Scale (CASSS)
Nowicki-Strickland Locus of Control (LOC)
Rosenberg Self-esteem Scale (RSES)
MiniPaediatric Asthma Quality of Life Questionnaire (MiniPAQLQ)
Kandel Depressive Mood Inventory (DMI)
Neighborhood Disadvantage Items (NDI)
Asthma Control Test

There are 3 important steps to remember:

1. Read each sentence carefully and respond to it honestly.
2. Answer all of the questions on each questionnaire.
3. After completing the survey booklet, return it in the self-addressed, stamped envelope that was provided in this packet.

If you have any questions, I can be reached at (XXX) XXX-XXXX.

Thank you.

Darla K. DeWolff, PhD (Candidate), CPNP, MSN, MPH
APPENDIX K

PARENT/GUARDIAN CONSENT FORM
PARTICIPANT’S NAME: __________________________________________________

PROJECT TITLE: Resilience and Adolescents with Asthma Research Project

PRINCIPLES CONCERNING RESEARCH: Your teen is being asked to take part in a research project. It is important that you read and understand the principles that apply to all individuals who agree to participate in the research project described below:

1. Taking part in the research is voluntary.

2. We do not know if your teen will personally benefit from taking part in the research but the knowledge obtained may help others.

3. Your teen may withdraw from the study at any time without anyone objecting and without penalty or loss of any benefits to which you are otherwise entitled.

The purpose of the research and how it is to be done as well as your and your teen’s role will be described below. Also described are the risks, inconveniences, discomforts and other important information that you will need to make a decision about whether or not you wish to participate. Please take your time to make your decision. You are urged to discuss the research with your teen, and direct any questions you may have to the researcher who explains it to you.

PURPOSE OF THE RESEARCH: The purpose of this study is to evaluate how certain risk and resource factors affect your teen’s asthma control

DESCRIPTION AND EXPLANATION OF PROCEDURES: Teens from local healthcare centers will be asked to participate in the study. We plan to enroll 200 teens aged 14 – 18 years who have a history of asthma, as diagnosed by a physician or healthcare provider. If you agree to have your teen participate in this study, he or she will be asked to complete questions about their asthma, sense of self, neighborhood, family, and school. A survey booklet may be mailed to you or be administered at your primary care clinic. Completing these surveys will take approximately 20 minutes.
POTENTIAL RISKS/DISCOMFORTS: There are no risks involved in participating in this research beyond those experienced in everyday life.

POTENTIAL BENEFITS: There may be no direct benefits to your teen for participating in this study. However, your teen’s participation may help other teens with asthma because the information obtained from this study may be used to develop an asthma program or interventions for teens with asthma.

ALTERNATIVES: Your teen does not have to participate in this research project. Your decision regarding participation will not affect his or her care in any way.

FINANCIAL INFORMATION: Your teen will receive a $20 ‘thank you’ gift for participating and completing the research study.

RESEARCH RELATED INJURY: There is no known research related injury involved in participating in this research.

INFORMATION COLLECTED AND WHAT WILL HAPPEN TO IT: In order to meet the goals of this research study (see Purpose of Research section of this consent), we will collect information about your teen through completion of the questionnaires. Darla K. DeWolff, Pediatric Nurse Practitioner will collect the information. Any information collected about your teen will be confidential and will only be reported in a group format. All data will be stored in a locked file cabinet in the researcher’s office. Only the researcher and dissertation committee will have access to the files.

The results of this research study may be published in a research journal for advancing nursing and medical knowledge. Your teen will not be identified by name or by any other identifying information in any publication or report about this research.

Consent for Loyola University Health System (LUHS) to use and disclose your medical information is required in order for you to participate in the study.

WITHDRAWAL OF CONSENT: Your consent to use and disclose your teen’s medical information for the purpose of this research study is voluntary. You can withdraw your consent for LUHS to use and disclose your teen’s information and your consent for their participation in this study at any time without affecting your teen’s care. Withdrawal means that all study procedures and follow up will stop. However, information already used and disclosed to the researcher prior to the time of your teen’s withdrawal from this study may continue to be used and disclosed by LUHS.

If you withdraw your consent for your teen’s participation in this study, we will ask that you sign the form attached to this consent and send it to Darla K. DeWolff.
withdrawal of your teen from the study will not have any affect on any actions by LUHS taken before Darla K. DeWolff receives the attached form.

The Institutional Review Board (IRB) or the regulatory authorities may terminate the study at any time with or without your consent.

**CONSENT**
I have fully explained to ______________________ the nature and purpose of the above described procedure and the risks that are involved in its performance. I have answered and will answer all questions to the best of my ability.

________________________________________
(Signature)  _________________________
(Date)

Darla K. DeWolff, who is the principal investigator for this study will be available to answer any questions you may have. Darla K. DeWolff can be reached at (XXX) XXX-XXXX.

If you feel that your teen has been injured by participating in this study or if you have questions concerning his or her rights as a research participant, you may contact Dr. Kenneth Micetich, Chairman, Institutional Review Board for the Protection of Human Subjects-Medical Center (708) 216-4608.

You have been fully informed of the above described research program with its possible benefits and risks. Your signature below indicates that you are willing to give consent for your teen’s participation in this research study and agree to the use and disclosure of information about your teen as described above. You do not give up any of your legal rights by signing this consent document.

________________________________________
(Signature: Parent/Legal Representative)  _________________________
(Date)

________________________________________
(Signature: Witness)  _________________________
(Date)
APPENDIX L

ADOLESCENT ASSENT FORM
LOYOLA UNIVERSITY HEALTH SYSTEM
MAYWOOD, ILLINOIS
NIEHOFF SCHOOL OF NURSING

ADOLESCENT ASSENT

PARTICIPANT’S NAME: ____________________________________________

PROJECT TITLE: Asthma Research Project

PRINCIPLES CONCERNING RESEARCH: You are being asked to take part in a research project. It is important that you read and understand the principles that apply to all who agree to participate in the research project described below:

1. Taking part in the research is voluntary.

2. We do not know if you will personally benefit from taking part in the research but the knowledge obtained may help others.

3. You may withdraw from the study at any time without anyone objecting and without penalty or loss of any benefits to which you are otherwise entitled.

The purpose of the research and how it is to be done as well as your role will be described below. Also described are the risks, inconveniences, discomforts and other important information that you will need to make a decision about whether or not you wish to participate. Please take your time to make your decision. You are urged to discuss any questions you may have to the researcher who explains it to you.

PURPOSE OF THE RESEARCH: The purpose of this study is to evaluate how certain risk and resource factors affect your asthma control.

DESCRIPTION AND EXPLANATION OF PROCEDURES: Teens from local healthcare centers will be asked to participate in the study. We plan to enroll 200 teens aged 14 – 18 years who have a history of asthma, as diagnosed by a physician or healthcare provider. If you agree to participate in this study, you will be asked to complete questions about your asthma, sense of self, neighborhood, family, and school. A survey booklet may be mailed to you or be administered at your primary care clinic. Completing these surveys will take approximately 20 minutes.

POTENTIAL RISKS/DISCOMFORTS: There are no risks involved in participating in this research beyond those experienced in everyday life.
POTENTIAL BENEFITS: There may be no direct benefits to you for participating in this study. However, your participation may help other teens with asthma because the information obtained from this study may be used to develop an asthma program or interventions for teens with asthma.

ALTERNATIVES: You do not have to participate in this research project. Your decision regarding participation will not affect your care in any way.

FINANCIAL INFORMATION: You will receive a $20 ‘thank you’ gift for participating and completing the research study.

RESEARCH RELATED INJURY: There is no known research related injury involved in participating in this research.

INFORMATION COLLECTED AND WHAT WILL HAPPEN TO IT: In order to meet the goals of this research study (see Purpose of Research section of this consent), we will collect information about you through completion of the questionnaires. Darla K. DeWolff, Pediatric Nurse Practitioner, will collect the information. Any information collected about you will be confidential and will only be reported in a group format. All data will be stored in a locked file cabinet in the researcher’s office. Only the researcher and dissertation committee will have access to the files.

The results of this research study may be published in a research journal for advancing nursing and medical knowledge. You will not be identified by name or by any other identifying information in any publication or report about this research.

Consent for Loyola University Health System (LUHS) to use and disclose your medical information is required in order for you to participate in the study.

WITHDRAWAL OF CONSENT: Your consent to use and disclose your medical information for the purpose of this research study is voluntary. You can withdraw your consent for LUHS to use and disclose your information and your consent for participation in this study at any time without affecting your care. Withdrawal means that all study procedures and follow up will stop. However, information already used and disclosed to the researcher prior to the time of your withdrawal from this study may continue to be used and disclosed by LUHS.

If you withdraw your consent for participation in this study, we will ask that you sign the form attached to this consent and send it to Darla K. DeWolff. The withdrawal from the study will not have any affect on any actions by LUHS taken before Darla K. DeWolff receives the attached form.
The Institutional Review Board (IRB) or the regulatory authorities may terminate the study at any time with or without your consent.

CONSENT

I have fully explained to ______________________ the nature and purpose of the above described procedure and the risks that are involved in its performance. I have answered and will answer all questions to the best of my ability.

________________________________________  _________________________
(Signature)  (Date)

Darla K. DeWolff, who is the principal investigator for this study will be available to answer any questions you may have. Darla K. DeWolff can be reached at (XXX) XXX-XXXX.

If you feel that you have been injured by participating in this study or if you have questions concerning your rights as a research participant, you may contact Dr. Kenneth Micetich, Chairman, Institutional Review Board for the Protection of Human Subjects-Medical Center (708) 216-4608.

You have been fully informed of the above described research program with its possible benefits and risks. Your signature below indicates that you are willing to participate in this research study and agree to the use and disclosure of information about you as described above. You do not give up any of your legal rights by signing this consent document.

________________________________________  _________________________
(Signature: Participant)  (Date)

________________________________________  _________________________
(Signature: Witness)  (Date)
Questionnaire Booklet

RESILIENCE AND ADOLESCENTS WITH ASTHMA RESEARCH PROJECT

Darla K. DeWolff, PhD (Candidate), CPNP, MSN, MPH
Loyola University – Chicago Niehoff School of Nursing
(XXX) XXX-XXXX
APPENDIX N

THANK YOU BACK PAGE
THANK YOU

For completing the

Resilience and Adolescents with Asthma Research

Program Surveys!

Your participation was important.

Return the survey booklet in the self-addressed, postage paid envelope to receive your $20 ‘thank you’ gift

If you have any questions about the research project, you may contact the primary investigator, Darla DeWolff, by phone (XXX) XXX-XXXX

or e-mail at XXXXXXXX@XXXXXXXXX.net

If you have any questions or concerns about your asthma, please contact your primary care physician.
REFERENCE LIST


VITA

Darla K. DeWolff was raised in Kalamazoo, Michigan by her parents William N. DeWolff (deceased) and Dorothy L. DeWolff. She was awarded a Master of Science in Nursing from Wayne State University, Detroit, Michigan in 1997, a Master of Public Health in Health Behavior and Health Education from the University of Michigan, Ann Arbor, Michigan in 1990, and a Bachelor of Science in Nursing from Hope College, Holland, Michigan in 1987. In addition, Ms. DeWolff is a Certified Pediatric Nurse Practitioner.

While at Loyola, Ms. DeWolff received the Illinois Board of Higher Education Nurse Educator Fellowship (2010), Albert Schweitzer Fellowship (2008), and Loyola Community Scholars Fellowship Award (2007).

Currently, Ms. DeWolff is an Assistant Professor of Nursing at Resurrection University (formerly West Suburban College of Nursing). She lives in Oak Park, Illinois.