EXAMINATION OF A COGNITIVE DIATHESIS STRESS MODEL OF DEPRESSION IN CHILDREN AND ADOLESCENTS WITH JUVENILE RHEUMATIC DISEASE

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Submitted to the Faculty of the
Graduate College of the
Oklahoma State University
in partial fulfillment of
the requirements for
the Degree of
DOCTOR OF PHILOSOPHY
July, 2004

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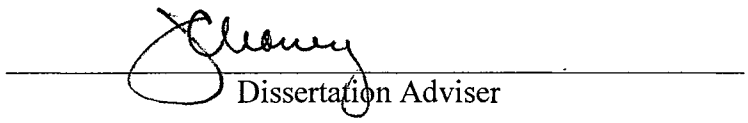
Dissertation Approved:



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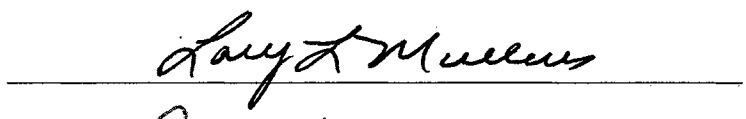

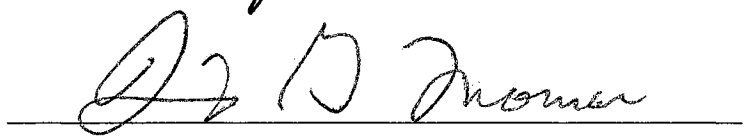

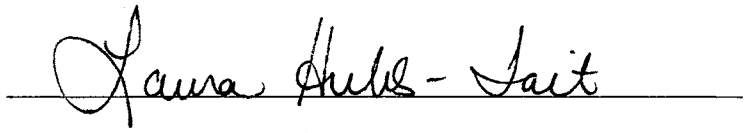

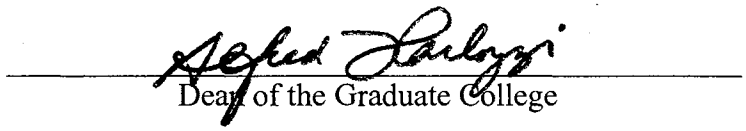

Dean of the Graduate College

ACKNOWLEDGEMENTS

I would like to thank my major advisor, Dr. John Chaney, for his expertise and encouragement on this project. I am sincerely grateful for his invaluable mentorship style. By fostering an independent work ethic and encouraging creativity, John provided the opportunity for professional and research growth.

I would also like to express my appreciation for my other committee members, Drs. Larry Mullins, David Thomas, and Laura Hubbs Tait. Their suggestions and discussions were quite helpful and thought provoking. In addition, I would like to express my gratitude to Dr. James Jarvis who was so generous to provide access to his rheumatology clinic and to offer his medical expertise. In addition, I thank my fellow lab members for their dedication to the lab and assistance with data collection.

Finally, I would like to express my appreciation to my loving family. My sincere gratitude goes to my husband, Jared, for his patience and encouragement. His faith in me meant more than I could ever express, and I will forever be thankful to him. The faith and support of my parents, Ken and Lois Stern, and brother, Aaron, were also invaluable to me.

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CHAPTER I

INTRODUCTION

The Juvenile Rheumatic Diseases (JRD) represent a heterogeneous group of auto immune disorders, yet they are characterized by similar symptoms, which often interfere with differential diagnosis (Vandvik & Hoyeraal, 1993), and include intermittent and sometimes chronic episodes of joint swelling and pain. JRD have some disease manifestations similar to adult rheumatoid arthritis (RA); however, the degree of skeletal immaturity is one of the most important and yet most poorly understood differences between adult and child rheumatic diseases (Cassidy & Petty, 2001). Not surprisingly, disease manifestation of JRD can be associated with psychological (David et al., 1994; Noll, Kozlowski et al., 2000) and social (Adams et al., 2002) difficulties. In addition, children with JRA have restricted functional ability and report significantly fewer physical activities, sleep more hours during the day, and spend less time participating in strenuous activities compared to healthy controls (Henderson, Lovell, Specker, & Campaigne, 1995). Thus, it is important to examine specific clinical and psychological outcomes in JRD. Juvenile rheumatoid arthritis, systemic lupus erthematosus, the juvenile spondylarthropathies, and juvenile dermatomyositis are the most common of the JRD, and will be individually covered in the following paragraphs.

Juvenile rheumatoid arthritis (JRA) is an autoimmune disorder that affects approximately between 16 and 150 children per 100,000 in the United States, making it one of the most prevalent chronic childhood illnesses (Cassidy & Petty, 2001). Distinctive characteristics of JRA include persistent inflammation of joints, restricted

functional ability, and pain. The origin of JRA is unknown; however, there is support for various immunological and environmental factors. These factors, including viruses, bacteria, nutrition, and toxins, are thought to possibly trigger the disease or maintain its process in predisposed individuals. There are few reported incidences of JRA among family members, and only on rare occasions are there documentations of JRA and adult RA in the same family (Cassidy & Petty, 2001). The onset of inflammatory arthritis typically occurs before age 16, with peak occurrences between the ages of one and three and at age nine. In general, JRA is twice as common in girls as boys; however, both sex and age ratios differ across the three subtypes of JRA: systemic, polyarticular, and pauciarticular (Cassidy & Petty, 2001).

Pauciarticular, or oligoarticular, JRA is characterized by arthritis in four or fewer joints and occurs in up to 60% of children with JRA. In one half of children with pauciarticular JRA, only one joint is involved, most commonly the knee, followed by the ankles and elbows. According to Cassidy & Petty (2001), it is unusual for children with pauciarticular JRA to experience disease manifestations (e.g., growth retardation, cardiac involvement, subcutaneous nodules) other than arthritis. This type of JRA usually occurs before the age of 10, and girls are affected three times more than boys.

Polyarticular JRA occurs in about 25-28% of children with JRA and consists of arthritis in at least five joints, with most cases involving more than 20 joints. Seventy-five percent of these patients have symmetric joint involvement. Children with this subtype of JRA often present with weight loss, low-grade fever, anemia, and growth retardation. Polyarticular JRA affects girls three times more than boys and may begin at any age. Further, girls who have later onset of polyarticular JRA in association with

rheumatoid factor seropositivity may develop a pattern similar to that of adult RA (Cassidy & Petty, 2001). In fact, teenage onset for girls and subcutaneous nodules (painless nodules often on the heel or elbow) indicate poor prognosis as the course of arthritis often involves progressive and deforming disease activity (Calabro et al., 1989); however, pericarditis and chronic uveitis are infrequent (Cassidy & Petty, 2001).

Systemic JRA can develop at any age, affects approximately 10-12% of children with JRA, and is equally common in boys and girls. Children with this subtype of JRA often experience spiked fevers and pink rashes in the late afternoon and evening. About fifty percent of these children will have more than one systemic attack, which may last from days to months and is unexpected. In addition, 50% of children with systemic JRA will have severe, chronic arthritis, which continues after a remission of systemic symptoms, and visceral involvement.

Another class of juvenile rheumatic diseases, the juvenile spondylarthropathies, affect the joints of the axial skeleton and peripheral joints. A subtype of the spondylarthropathies, juvenile ankylosing spondylitis (JAS) may be present in 10% of children with arthritis and is conservatively estimated to occur in 11 to 86 per 100,000 children. JAS occurs more often in boys than girls and usually onsets in late childhood or adolescence (Cassidy & Petty, 2001). Symptoms frequently include asymmetry in the lower extremities, arthritis of the sacroiliac joints, and are mistaken for JRA. The spine is first affected, and peripheral arthritis is common, with the hips most often affected. About one fourth of children will exhibit polyarticular arthritis. The course of JAS is generally favorable but is characterized by unexpected remissions and exacerbations.

Systemic lupus erythematosus (SLE), a multisystem autoimmune disease characterized by widespread inflammation of blood vessels and connective tissue as well as the presence of antinuclear antibodies (ANAs), is manifested by a butterfly rash, arthritis, and arthralgias. Prevalence estimates range from 12 to 50 per 100,000. Females are more commonly affected than males by a ratio of 4.5 to 1, and the onset of SLE occurs predominantly in adolescence. Familial aggregations of SLE have been reported (Cassidy & Petty, 2001). Children with SLE may experience photosensitivity, fever, lymphadenopathy, nephritis, and arthritis. However, unlike JRA, arthritis in patients with SLE is not destructive to the bone.

Finally, juvenile dermatomyositis (JDM) is a disease of the connective tissues characterized by vasculitis of the skin, muscle, and the gastrointestinal tract. JDM is more common in girls and occurs most often in children ages 10 to 14. Genetics and infectious agents are hypothesized to contribute to onset. Patients with JDM commonly present with a rash displayed as a heliotrope discoloration of the eye lids and fever. The majority of patients with JDM present with muscle weakness and tenderness, and as many as 20% of children with JDM have arthritis (Cassidy & Petty, 2001). Thus, JDM represents a disease characterized by substantial functional disability.

Given the unpredictable course of JRD and illness associated concomitants (e.g., pain, disability, functional limitations), it is not surprising that children may experience psychosocial maladjustment. In fact, the relationship of psychosocial variables to adjustment in JRA has been widely examined. For example, in a sample of children with JRA, 63% demonstrated difficulty in psychological functioning, and 51% met criteria for at least one DSM-III diagnosis (Vandvik, 1990). Similarly, children with severe JRA

have demonstrated increased levels of anxiety, depression, and other psychological problems in comparison to those with mild or inactive JRA and healthy controls (Billings, Moos, Miller, & Gottlieb, 1987), and 21% of JRA patients were clinically depressed 10-39 years after disease onset (David et al., 1994). There have been far fewer studies examining adjustment in children with a JRD other than JRA. However, in a review of studies examining the psychological and psychiatric aspects of systemic lupus erythematosus (SLE), Chaney and Youll (1994) indicated that the clinical course and disease management of SLE contain many obstacles for the patient. In addition, Cornwell and Schmitt (1990) demonstrated that SLE and its treatments may have profound effects on adolescents' perceptions of their body images.

More recent research examining adjustment in JRD appears to reveal results contradictory to those just described. For example, Noll , Kozlowski, Gerhardt, Vannatta, Taylor, and Passo (2000) found that mothers rated their children with JRA as being less adaptive and having less positive affect than controls; however, they did not find significant differences on child-report measures of peer relationship and overall adjustment. In addition, nonsignificant differences were reported between children with JRD and controls on measures of depression, anxiety, number of missed school days, self-esteem and parent reported behavior problems (Brace, Smith, McCauley, & Sherry, 2000; Hygen, Kuis, & Sinnema, 2000). Thus, findings regarding adjustment outcomes in children with rheumatic disease are somewhat inconclusive. A possible reason for this discrepancy involves the use of different methodologies (i.e., parent vs. child report, questionnaire vs. interview), and caution should therefore be taken when interpreting these results. Perhaps, a different focus for researching adjustment to JRD is warranted.

In fact, as a response to the apparent inconclusive findings, Dahlquist (2003) recommends that future research focus on specific adaptational processes (e.g., coping strategies, cognitive appraisals) related to adjustment and not on overall adjustment.

It is widely acknowledged that child adjustment to pediatric chronic illness cannot be explained by one single factor but instead involves multiple influences (see Thompson & Gustafson, 1996 for a review). Contemporary multivariate models (e.g., Thompson, Gil, Burbach, Keith, & Kinney, 1993a; Wallander & Varni, 1992) acknowledge these multiple influences and incorporate a host of variables, including disease states, parent and family adjustment, and individual cognitive appraisal factors. Thus, the illness-outcome relationship is rarely direct but is instead a function of multiple relationships among a variety of potential variables. To illustrate, researchers have shown that disease features (i.e., pain and disability) provide only a limited explanation for depression in individuals with chronic diseases (see Wallander and Varni, 1998 for a review). On the other hand, studies have shown that parents' coping behavior is a robust predictor of children's adjustment to the disease, beyond the influence of demographic and disease factors (Gil, Williams, Thompson, & Kinney, 1991; Thompson, Gustafson, Hamlett, & Spock, 1992).

Finally, cognitive appraisal mechanisms, such as causal attributions and perceived control, appear to be salient to adjustment in a variety of pediatric chronic illnesses (e.g., Mullins et al., 1997, Frank, Blount, & Brown, 1997), including rheumatoid arthritis (Schiaffino & Revenson, 1995; Chaney et al., 1996). Given the increased probability of behavior-outcome noncontingency in JRD, the learned helplessness theory of depression (Abramson, Seligman, & Teasdale, 1978; Abramson, Metalksy, & Alloy, 1989) seems

particularly relevant in this context. Indeed, it is somewhat surprising that the diathesis-stress component of learned helplessness theory has yet to be examined in pediatric rheumatic disease despite its demonstrated utility in the adult rheumatic diseases (e.g., Chaney et al., 1996) and the apparent relevance of this model to JRD, which is similarly characterized by a variable and often uncontrollable course.

The aim of the present study is to examine the applicability of learned helplessness theory to depression in children with JRD. Specifically, this study incorporates the diathesis-stress components of the model by examining the combined influence of children's attributions for negative events as cognitive diatheses and perceived control over illness as a proximal stressor in predicting children's depressive symptoms. To accomplish this, a comprehensive review of the relevant literature is presented. First, a review of the literature associated with medical and clinical aspects (e.g., diagnosis, disease course, and treatment) of JRD is presented. Second, literature examining psychological comorbidity and factors associated with adjustment in JRD are reviewed. The theory of learned helplessness, which appears particularly relevant to the experience of depression in JRD, is presented next, and the major tenets of attributional style and perceived control are emphasized within this cognitive diathesis framework. Finally, a study has been completed that examined the relationship of attributional style to child-report depressive symptoms under varying conditions of perceived control. In other words, the potential moderating influence of perceived control on the explanatory style- child depressive symptom relationship was examined in a sample of children and adolescents with juvenile rheumatic diseases.

CHAPTER II

REVIEW OF THE LITERATURE

Medical and Clinical Issues in JRD

Diagnostic Issues. JRD as a group are highly unpredictable, and the variable nature of these diseases often leads to diagnostic ambiguity for physicians, impeding their ability to make a diagnosis at the early stages of symptom presentation (Anderson, 1997). Therefore, symptoms may go undiagnosed for months or even years before a diagnosis is given. More specifically, similar clinical manifestations and lack of accurate objective medical indices often prevent physicians from making clear distinctions between rheumatic and other symptoms as well as between the subclasses of rheumatic disease, suggesting that JRA is possibly a diagnosis of exclusion (Fishbach, 1991; Vandvik & Hoyeraal, 1993; Cassidy & Petty, 2001). For example, symptoms that initially appear to be markers of juvenile rheumatoid arthritis, may later be identified as manifestations of another rheumatic disease. Arthritis in SLE is quite similar to that of JRA, and often the correct diagnosis is given only once the characteristic clinical presentation of SLE later appears (Cassidy & Petty, 2001). Further, Calabro, Marchesano, and Parrino (1989) noted that 20% of male patients were misdiagnosed with pauciarticular JRA and later diagnosed with juvenile ankylosing spondylitis instead. Similarly, Flato, Aasland, Vinje, and Forre (1998) reported that 22% of patients who were initially diagnosed with JRA had received a new rheumatic diagnosis 10 years later. To add to the confusion, there is not worldwide agreement on classification and use of diagnostic terms for JRA (Cassidy & Petty, 2001). Finally, due to the uncertainty surrounding rheumatic symptoms, delays in referrals to

rheumatic specialists and implementation of therapeutic interventions are common and are not surprisingly associated with poorer functional ability (Cassidy & Petty, 2001).

Biological Indices, Disease Course, and Complications. Several objective methods for diagnosing rheumatic diseases and assessing disease severity are available to rheumatologists; however, these biological indices are only marginally useful in determining outcome (Graham & Lovell, 1997). One method, erythrocyte sedimentation rate (ESR) is a measure of active disease that can be helpful in monitoring the efficacy of a medication program; however, ESR does not necessarily correlate with improvement in articular responses to medication. Further, a normal ESR in children with JAS may accompany clinically active disease (Cassidy & Petty, 2001). Abnormalities in hematology usually reflect inflammation, and increased serum levels of immunoglobins can also be used to measure disease activity.

Fifteen to 20% of patients with JRA test positive for rheumatoid factors (RF) or seropositivity; however, RFs are unusual in young children, and observations suggest that seropositivity may be the result of prolonged disease activity and not a determining factor in the diagnosis of JRA. On the other hand, tests for antinuclear antibodies (ANA) have been shown to be more useful with children. In fact, positive results for ANA are associated with a diagnosis of JRA and increased risk for the development of uveitis (eye inflammation). Detection of ANA is also critical to the diagnosis of SLE (Cassidy & Petty, 2001). On the other hand, there are even fewer distinguishable laboratory findings that signify JAS and JDM as RFs are usually absent in JAS and JDM. Further, ANAs do not occur in JAS and are reported with variable frequency in JDM. A final diagnostic tool, radiology, allows for the examination of soft tissue swelling, widening of joint

spaces, osteoporosis, and growth disturbances in JRA and other rheumatic diseases (Cassidy & Petty, 2001). Thus, diagnosis and assessment of disease activity are unfortunately somewhat ambiguous.

The joint inflammation and arthritic qualities of pediatric rheumatic diseases are sometimes accompanied by other clinical manifestations of rheumatism, including growth retardation, subcutaneous nodules, muscle disease, cardiac involvement, lymphadenopathy (enlarged lymph nodes), renal disease, and vasculitis. For example, growth and development in children with JRA may be delayed for two reasons: progressive disease activity and/or prolonged use of corticosteroids. Usually, once rheumatoid disease is in remission, children achieve normal development; however, if the disease remains active for a prolonged period of time, growth and secondary sex characteristics may be permanently impaired. Secondly, subcutaneous nodules occur in 5-10% of cases, most commonly in polyarthritis, and atrophy of the muscles around inflamed joints is characteristic of JRA. In children with systemic JRA, complications such as lymphadenopathy, pericarditis, and hepatosplenomegaly (enlargement of spleen and liver) are common. Finally, uveitis can lead to glaucoma (Cassidy & Petty, 2001)

Complications related to SLE include cardiac, pulmonary, lymphatic, renal, vascular, gastrointestinal, and central nervous system involvement (Cassidy & Petty, 2001). Subtle cognitive disturbances, and pulmonary symptoms can be found in 19-36% of cases (Lehman, 1997). In addition, skin lesions may spread to mucous membranes and other tissues of the body. The most common causes of death are infection and renal failure, but fortunately, the prognosis for children diagnosed with SLE has improved (Lehman, 1997). Less information is available concerning JAS and JDM; however, due

to the systemic nature of JAS, the eyes and heart are often affected, and inflammatory bowel disease is common (Kahn, 1993). In addition, as many as 50% of children with JDM who have abnormal electrocardiograms will develop myocarditis. The prognosis for JDM is good with less than seven percent mortality (Lehman, 1997).

Disabling arthritis as well as the host of potential complications associated with JRD combine to influence disease outcome. In fact, Calabro and colleagues (1989) demonstrated that the combination of systemic onset and multiple joint arthritis predicted poor functioning; 40% of their patients with this pattern were incapacitated later in their young adult life. Mortality rates for JRA are relatively low, ranging from 2%-4%, and when fatalities occur, complications are usually due to myocarditis (Cassidy & Petty, 2001). However, French, Mason, Nelson, O'Fallon, & Gabriel (2001) reported that adults with a history of JRA showed an increase in mortality compared with the general population. Indeed, polyarticular and systemic forms of JRA are more likely than pauciarticular JRA to end in fatality. Children with SLE have a higher rate of mortality (estimated at approximately 16%), but long-term survival in JDM is better than 90 percent (Cassidy & Petty, 2001).

While fatality is relatively uncommon in children with JRD, quite the opposite is true for the occurrence of unpredictable episodes of remission and exacerbation. Unfortunately, there are no uniformly accepted symptoms or medical tests that can reliably predict which patients will do well and which ones will do poorly (Vandvik & Hoyeraal, 1993). However, several studies have examined the effects of JRA on individuals throughout their adult lives. For example, in a study of adults who were diagnosed with JRA as children, 65.9% reported active arthritis, and 38.6% reported

physical limitations due to JRA. Further, compared to controls, the JRA cohort perceived poorer health, less energy, more pain, and increased limitations in physical functioning (Peterson, Mason, Nelson, O'Fallon, & Gabriel, 1997). Similarly, Minden et al. (2000) found that more than half of patients with juvenile chronic arthritis or juvenile spondyloarthropathy had active arthritis in adulthood and required further rheumatological care. In another study, 36% of participants had active chronic arthritis 26 years after juvenile disease onset, 22% had undergone arthritis related surgery, and increased disability with time was reported (Zak & Pederson, 2000). On the other hand, Flato, Aasland, Vinje, and Forre (1998) reported that 60% of individuals diagnosed with JRA in childhood were in remission 10 years later. In any case, JRA is not just a disease of childhood as there is no cure, and disease complications often continue throughout the adult life. In fact, Ansell and Chamberlain (1998) emphasized the importance of developmental considerations (e.g., medical, psychological, functional status) for the transition from childhood to adulthood in individuals with JRD.

Treatment Issues

As previously mentioned, the JRD are a group of diseases characterized by a variable and unpredictable disease course. Unfortunately, the time lapse between symptom onset and diagnosis suggests that patients may display more severe symptoms by the time diagnoses are given, and thus, the disease may have progressed to a later stage. Given the reality that uncertainty often delays diagnosis and treatment, once a diagnosis is made, adherence to the treatment regime is quite critical to the management of disease activity and symptoms.

In a review of medical treatment for juvenile rheumatoid arthritis, Singsen (1993) states that due to the perceived alarming nature of the diagnosis of JRA, parents, children, and teachers should be educated on the disease process. In addition, the primary goals of treating JRA should be relief of symptoms because this disease is incurable. For those in the early stages of the illness, maintenance of joint range of motion and muscle strength are the focus; whereas, rehabilitation should be the focus for those in later disease stages. Singsen (1993) noted that diagnosis and assessment of responses to treatment should include evaluation of age appropriate functional abilities, assessment of movement, and parental information about changes in the child's activity. Lovell (1997) further suggested that promotion of positive self-image and encouragement of productive family dynamics should be included in therapeutic goals to provide a comprehensive plan for treatment. He divided the treatment program into the following three components: pharmacologic, physical, and social, all of which will be discussed in the following paragraphs.

Aspirin is the single most effective and least expensive anti-inflammatory medication in the treatment of JRA. However, many children are now treated with ibuprofen, tolmentin, and naproxen because of the threat of Reye's syndrome in children who use aspirin. Use of these nonsteriodal anti-inflammatory drugs (NSAIDs) should be continued for 12-18 months after symptoms have disappeared. The average time to demonstrate clinical response to NSAIDs in JRA patients is one month, and most children tolerate NSAID therapy well (Lovell, 1997). NSAIDs provide symptomatic relief but do not influence the underlying disease process. If aspirin or the NSAIDs are ineffective, disease-modifying antirheumatic drugs (DMARDs), most commonly

methotrexate (MTX), can be used. DMARDs do not produce immediate effects but exert their benefits weeks to months after the onset of use. There has been a recent shift toward using MTX earlier in treatment because of the knowledge that irreversible damage occurs early in the disease course, and MTX is an effective and relatively safe drug. On the other hand, gluticosteriods (e.g., hydrocortisone, prednisone) are the strongest anti-inflammatory drugs used to treat rheumatic diseases and have adverse side effects such as Cushing's Syndrome, growth suppression, osteoporosis, and immunosuppressant effects. Finally, cytotoxic or immunosuppressive agents, and biologic response modifiers are also occasionally used.

In addition to pharmacological treatment as part of the medical regimen, JRA patients should attend regularly scheduled opthamology appointments to monitor possible ocular inflammation. And, dietary intervention may be necessary for patients who have difficulty maintaining appropriate caloric and protein intake and are at risk for stunted growth.

As part of the physical component of the treatment regimen, Singsen (1993) and Lovell (1997) stated that children should be encouraged to remain as physically active as possible, and to be independent and responsible for adhering to the treatment if age appropriate. For example, many children experience morning stiffness and can initiate symptom relief by taking warm baths or using electric blankets. For some children, physical therapy may be recommended as exercise and activity are of primary importance for children with JRD to maintain or improve functional mobility (Rhodes, 1991). In fact, Klepper (1999) demonstrated that children and adolescents with JRA can improve their aerobic endurance through an eight week physical conditioning program without

increased pain. Thus, explaining the necessities of therapy to a child or adolescent is not sufficient. They must also be shown how they can become an active partner in self-management (Kroll, Barlow, & Shaw, 1999), and parents, relatives, caregivers, schools, etc. must also adopt the treatment plan and actively participate. For example, parental involvement may even involve massage therapy. Field and colleagues (1997) found that children whose parents massaged them for 15 minutes per day immediately demonstrated significantly lower anxiety and cortisol levels, and reported significant decreases in levels of pain over a 30 day time period.

Finally, in more severe cases of arthritis or prolonged disease activity, orthopedic surgery is an option. As Cassidy and Petty (2001) summarized, reconstructive surgery and rehabilitation have provided a great benefit to older patients with marked disability due to JRA. However, surgery is recommended only once bone growth has ceased.

Treatment for other juvenile rheumatic diseases is similar to that of JRA. Disease education for parents and children is imperative. NSAIDs, corticosteriods, methotrexate, are commonly used. In addition, patients with SLE often experience photosensitivity and should be instructed to limit sun exposure. Infections are also common; therefore, physicians should be attentive to fever symptoms, etc. (Kippel, 1993). Treatment of ankylosing spondylitis should include physical activity as permitted, attention to development, including in the school setting (e.g., cognitive and social), and physical treatments. Finally, the focus of treatment on patients with JDM is to improve muscle strength and reduce swelling; therefore, physical therapy is often incorporated (Cassidy & Petty, 2001).

A multidisciplinary team consisting of medical and psychological professionals is optimal for a comprehensive treatment program. As the third component of Lovell's (1997) inclusive program, providers should facilitate school adaptation and psychological adjustment. Indeed, psychological and vocational programs are beneficial to help a child and his/her family cope with the disease and make necessary adjustments (Lovell, 1997). In fact, the Arthritis Foundation sponsors activities of the American Juvenile Arthritis Organization (AJAO) to facilitate adjustment to the academic, emotional, and physical challenges associated with rheumatic disease. The AJAO has also developed written materials and training workshops for parents and health care professionals to provide specific recommendations for optimal school and social functioning. These workshops and recommendations are salient in light of evidence that only 47% of students with rheumatic disease were receiving services through the school and 33% of children with rheumatic disease had an absence rate of more than twice the national average (Lovell et al., 1990). Further, Lovell and colleagues reported that. Not surprisingly, Sturge, Garralda, Boissin, Dore, and Woo (1997) reported that school absence was related to noncompliance with physical treatment and psychological maladjustment, suggesting the need for comprehensive treatment programs which target all aspects of life for a child with rheumatic disease.

In summary, the diagnosis and treatment of JRDs are associated with ambiguity given the symptom overlap and lack of clear biological indices. A delay between symptom onset and diagnosis suggests that the disease may be present in a more severe form by the time a diagnosis is finally confirmed. Once a diagnosis is given, despite adherence to the treatment protocol, symptoms often persist and unpredictably worsen,

providing a context of uncontrollability (Young, 1992). Finally, given this variable nature of pediatric rheumatic disease, researchers and clinicians alike have noted the importance of a multidisciplinary approach to the treatment.

Psychological Comorbidity

Research in general supports that both children and adults who have chronic illnesses are at increased risk for depression, anxiety, and lower self-esteem (Ireys, Werthamer-Larsson, Kolodner, & Gross, 1994; Chaney et al., 1996, 1999). In a review of the literature, Burke and Elliott (1999) reported that between 5% and 23% of children with a chronic illness meet criteria for major depression. Unfortunately, it appears that children and adolescents with JRD are not exempt from increased psychosocial adjustment difficulties. In fact, due to the unpredictable course and chronic nature of juvenile rheumatic diseases, it is not surprising that many of these children are at risk for psychosocial difficulties. For example, Adams, Streisand, Zawacki, and Joseph (2002) reported that children with chronic illness, including lupus, experienced significant social difficulties. Because rheumatic diseases place physical limitations on children's behavior and frequently lead to restrictions in a variety of activities, there is the potential for these perceived illness-induced limitations to generalize to disease unrelated events (Adams, et al, 2002; Pimm & Weinman, 1998) and result in a concomitant decrease in activities across a wide range of life domains.

Indeed, children with juvenile rheumatic disease appear to experience considerable stress in their lives, and increased anxiety and depression have been associated with JRD. For example, Vandvik (1990) found that half of children with rheumatic disease met criteria for a psychiatric diagnosis, and 64% demonstrated at least

mild maladjustment. In support of Vandvik's findings, David and colleagues (1994) found that 21% of JRA patients were clinically depressed 10 years later; the rate of depression and anxiety increased with the degree of disability. Finally, Ennett and colleagues (1991) revealed that children with a more negative disease experience reported diminished perceptions of competence and self worth as well as felt less well liked by peers and less physically attractive. Thus, it appears that children with JRA may be more likely to internalize psychological difficulties more than they externalize them (Daltroy et al., 1992).

The disease constraints that children with JRD experience and affect adjustment are often continual as the disease exacerbates, remits, and remains. Thus it is not surprising that psychosocial maladjustment can both be stable over time and show fluctuation. In fact, Timko and colleagues demonstrated the stability of distressed mood over a one year (Timko, Stovel, Moos, & Miller, 1992) and four year (Timko, Baumgartner, Moos, & Miller, 1993) time period in children with JRD. On the other hand, social functioning deteriorated slightly over a two year time period for children with more severe JRA (Reiter-Purtill, Gerhardt, Vannatta, Passo & Noll, 2003).

In contrast to the results presented previously (e.g., Vandvik, 1990), other findings suggest a substantial degree of variability with respect to emotional maladjustment in children with JRD. In other words, some studies of children with JRD have reported depression and anxiety scores to be within the normal range and not suggestive of maladjustment. For example, Schanberg et al. (2000) reported no evidence of clinical depression in a small sample of children with JRD; however, they found that daily mood significantly predicted daily symptoms, including fatigue, stiffness, and

activity interference. Thus, even though clinical levels of depression were not reported, subthreshold depressive symptoms appear to impact daily functioning in children with JRD and subsequently suggest the importance of depressive symptoms as a focus of assessment and treatment. Similarly, Dahlquist (2003) posited that researchers should look at specific adaptational processes likely to be disrupted by JRD instead of studying global indicators of adjustment.

In addition to studies designed to document potential clinical levels of depression and anxiety in children with JRD as well as stability in adjustment over time, several studies have compared adjustment in children with JRD to that of healthy controls. To illustrate, Daniels and colleagues (1987) demonstrated a significant difference between adjustment problems in children with JRD and controls, with significantly greater maladjustment reported by mothers of children with JRD compared to mothers of control children. In another study, Noll, Kozlowski, Gerhardt, Vannatta, Taylor, and Passo (2000) found that mothers rated their children with JRA as being less adaptive and having less positive affect than controls; however, no significant differences were found on child-report measures of peer relationship and overall adjustment. In a follow up to the 2000 study, Reiter-Purtill et al., (2003) revealed that children with JRA were not different from controls on measures of social reputation and social acceptance. In addition, according to parental reports, children with JRA have demonstrated significantly more aggressive, antisocial, and uncontrolled behavior compared to healthy controls; however, the scores of children with JRA were still within the normal range (Harris, Newcomb, & Gewanter, 1991). Finally, Wallander et al. (1988) revealed significantly more parent-reported behavior and social competence problems in children with chronic illness,

including JRA, compared to healthy children. In summary, there is some evidence in the extant literature to suggest increased psychosocial maladjustment in children with JRD compared to healthy controls.

Conversely, other studies have not demonstrated significant differences between children with JRD and healthy controls. For example, Brace, Smith, McCauley, and Sherry (2000) reported nonsignificant differences between children with JRD and controls on measures of depression, anxiety, and number of missed school days. In another study, Hygen, Kuis, and Sinnema (2000) found no differences between children with JRD and healthy controls on measures of child-report depression and self-esteem and parent-report behavior problems. However, as noted previously (e.g., Schanberg et al., 2000), it is not necessarily the severity of emotional maladjustment in children with chronic illness that is of valuable concern, but instead the presence of adjustment problems and the manner in which they play out in the context of chronic illness.

In a recent meta-analysis of 21 studies, parent reports of child overall maladjustment and internalizing behaviors were significantly higher than study-recruited controls but not normative controls; however results were inconclusive regarding differences between children with arthritis and controls on self-concept (LeBovidge, Lavigne, Donenberg, and Miller, 2003). No analyses were performed on child-report measures because only two studies included in the meta-analysis utilized them. Further, LeBovidge and colleagues (2003) revealed higher levels of overall adjustment difficulties but not self-concept among children in mixed disease groups compared to children in arthritis only groups, suggesting potential increased adjustment difficulties in children with rheumatic disease other than JRA.

As is evident from the above literature review, findings regarding increased psychosocial maladjustment in children with JRD are mixed (see LeBovidge et al., 2003; Miller, 1993; Quirk & Young, 1988 for reviews). Some studies find a significant relationship between JRD and increased depression (i.e., Vandvik, 1990); others do not (i.e., Noll et al., 2000). A likely explanation for these inconclusive findings involves methodological deviations. Some studies utilized paper and pencil measures of depression (i.e., Kozlowski et al., 2000), whereas others used an interview format (i.e., Vandvik, 1990). Further, studies in the extant literature have utilized parental reports of child adjustment (Daltroy, et al. 1992; Vandvik, 1990), child reports of their own adjustment (i.e., Ennett, et al., 1991), and both parent and child report (Noll et al., 2000). Thus, differences in methodology may account for the discrepant findings.

In fact, one critical limitation in the extant literature involves the paucity of studies examining children's report of their own symptoms. Most studies have measured child adjustment by parent report (i.e., Daltroy et al., 1992), which is concerning given that parental reports due not always match child reports of adjustment. For example, Ennett et al. (1991) found that mothers rated child's perceived competence more negatively than children rated themselves. Mothers also reported that children had diminished athletic competence and felt less well liked by other children; children did not report significant difficulties in these areas, but rated daily experiences as significantly worse than did mothers. In another study, Billings et al. (1987) revealed that mothers ascribed more psychological deficits to children than did the children themselves. Finally, Vandvik (1990) found that children rated disease as less severe than did parents and physicians. Acknowledgement of cognitive development may provide potential insight

into these differences. Perhaps, children deny implications of disease (Miller, 1993) or do not understand the pervasiveness of illness related difficulties. On the other hand, perhaps as a function of their own distress, mothers have a tendency to over report maladjustment in their children. Either way, mothers and children have different perceptions of children's psychosocial functioning, and when only parental perceptions have been examined, a potentially skewed depiction of disease as it is experienced and interpreted by children may have resulted. Thus, it is imperative that studies examine cognitive appraisal variables in children by utilizing child self-report data to more accurately represent children's perception of their disease.

Factors Associated with Psychosocial Adjustment

The emotional impact of a chronic illness is complex; therefore, models of adjustment in JRD should be conceptualized as multifaceted with interactions among components. It is only the combination of these factors that presents a realistic picture of adjustment in JRD. In fact, contemporary conceptualizations of adjustment to chronic illness are characterized by multivariate models (i.e., Thompson and colleagues, 1993a,b; Wallander & Varni, 1992), which acknowledge that child adjustment to pediatric chronic illness involves multiple influences (see also Brown, 2002; Thompson & Gustafson, 1996 for a review). These multivariate models take into account a host of variables, including disease states, parent and family adjustment, and individual cognitive appraisal factors. Thus, the illness-outcome relationship is not direct but is a function of the relationships among the above-mentioned variables.

One measure of disease activity in JRD that has been researched is pain. Data suggest that child-reported pain can be used to assess and manage disease outcome (Ross,

Lavigne, Hayford, Dyer, & Pachman, 1989). However, the relationship between joint inflammation and pain intensity is not direct (Ilowite, Walco, & Pochaczevsky, 1992), suggesting the influence of other intervening factors (Schanberg, Lefebvre, Keefe, Kredich, & Gil, 1997). Some studies have revealed a significant relationship between child distress and pain (i.e., Ross, Lavigne, Hayford, Berry, Sinacore, & Pachman, 1993; Benestad, Vinje, Veierod, & Vandvik, 1996); others have not, suggesting that additional variables, such as family environment and individual difference variables, are more salient to the examination of adjustment in JRD (Thompson et al., 1987). Indeed, findings regarding the relationship between pain and psychological adjustment are inconclusive, and pain does not appear to be a direct indicator of disease activity (Rapoff & Lindsley, 2000).

On the other hand, disease severity and functional disability are two disease features that demonstrated a significant association with adjustment in JRD. In fact, children with JRD who show greater disease severity and functional limitations have more adjustment difficulties than children with mild disease status (Timko, Stovel, Moos, & Miller, 1992). In addition, children with severe JRD showed more psychological (Billings et al., 1987), social (Reiter-Purtill et al., 2003), and parent-child interaction (Power, Dahlquist, Thompson, & Warren, 2003) problems than children with mild JRD or healthy controls. Further, Lavigne and Faier-Routman (1993) reviewed 38 studies that included a host of pediatric chronic illnesses, including JRA. Results of this meta-analysis suggested that disease severity and functional ability contribute to adjustment. These findings must be qualified by the fact that disease and disability risk factors showed significantly lower correlations with children's adjustment than did family or

child characteristics; child characteristics showed the strongest correlation to adjustment. Indeed, research has demonstrated that these disease features (i.e., disability, severity) alone provide a limited explanation for adjustment in children with chronic diseases and their families (Gerhardt et al., 2003; Wagner et al., in press).

A second element of the multivariate models explaining adjustment in chronic illness is parent and family adjustment. A recent study found significantly more mothers and fathers of children with JRA to have overall distress scores in the clinical range than comparison mothers and fathers (Gerhardt, et al., 2003). Indeed, Thompson and colleagues (Thompson, Gil, Burbach, Keith, & Kinney, 1993a,b) have demonstrated significant relationships between elevated parental distress and an increase in child maladjustment in children with chronic illness. These significant relationships have been demonstrated cross-sectionally (Wagner et al., in press; Frank et al., 1998; Daniels, Moos, Billings, & Miller, 1987) as well as longitudinally (Timko, et al., 1993; Timko, Stovel, Moos, & Miller, 1992; Timko, Stovel, & Moos, 1992) in families of children with JRD. In addition, Hagglund, Vieth, Sadler, Johnson & Hewett, 2000 revealed that higher parental neuroticism was associated with poorer child emotional and behavioral functioning, and greater conscientiousness was related to lower depression scores in a sample of children with JRD and their parents, suggesting a relationship between more trait-like parental variables and child adjustment. On the other hand, relationships between a child with JRA and a sibling appear to be healthy (Weiss, Schiaffino, & Illowite, 2001).

A similar but less well-known multivariate model specific to JRD has been proposed by Vandvik and Hoyeraal (1993). This model also includes biological,

developmental, psychological, and social factors and proposes that these variables may interact to influence short and long term outcome; however, no known studies have utilized this specific model in their conceptualization.

Specific pieces of these hypothesized transactional patterns in JRD, including illness appraisal, treatment compliance, and parent support, have been examined. For example, more objective measures of JRA disease status (biological and functional severity) of a child's JRA condition have been shown to be partially mediated by maternal appraisals of illness impact on the family (Lustig, Ireys, Sills, & Walsh, 1996). Similarly, parental perception of a child's vulnerability to illness was shown to be a significant predictor of child-reported social anxiety (Anthony, Gil, & Schanberg, 2003). Not surprisingly, another study revelaed that as the number of parent reported family stressors increased, compliance with JRD treatment regimen decreased (Chaney & Peterson, 1989). Finally, some studies have demonstrated that the presence of parental support serves as a resilience factor for children with JRD (von Weiss et al., 2002; Miller, 1993).

A host of child cognitive variables comprise the third component of the multivariate models. Examination of self-report cognitive appraisal variables allows for insight into children's perceptions of outcomes in general and more specifically, of their illness. To illustrate, in a sample of children and adolescents with JRD, illness intrusiveness moderated the parental distress-child depressive symptoms relationship (Wagner et al., in press). Perhaps, perceptions of illness intrusiveness may have created an emotional vulnerability to the effects of parent distress. In another study, Ireys et al. (1994) revealed a mediating effect of perceived illness impact on the relationship

between specific disease variables and psychosocial adjustment. In other words, how a child perceives his/her condition as impacting vital tasks and pleasurable life domains alters the disease outcome-psychosocial adjustment association. Thus, even when disease variables are significantly correlated with psychological outcome, cognitive variables are at play.

In more general terms, cognitive appraisals appear to play a critical role in shaping adaptation to chronic health related stressors (Lazarus & Folkman, 1984). Unfortunately, few studies of specific cognitive mechanisms exist despite evidence supporting the relevancy of cognitive processes in children's adjustment to chronic illness. Acknowledging the importance of cognitive processes and limitations in the literature in their review, Wallander and Varni (1998) called for future examinations of the most relevant dimensions of cognitive style that interact with stress (psychological or biological) to influence adjustment in pediatric chronic illness. Similarly, in response to a review of adjustment in JRD, Dahlquist (2003) proposed that future research examine the adaptational processes likely to be disrupted by JRD instead of potential overall maladjustment.

One cognitive appraisal factor that appears particularly relevant to the illness experience in JRD, but has not been empirically examined in this population, is pessimistic attributional style. Unlike the paucity of research in the JRD literature, pessimistic appraisals and learned helplessness have been investigated extensively in depression in adults with rheumatic disease (Chaney et al., 1996; Smith, Peck, Milano, & Ward, 1988; Smith, Peck, & Ward, 1990). This makes sense in light of the general research literature demonstrating a robust relationship between pessimistic cognitive

appraisals and emotional distress when individuals perceive low control over important events or when they cannot readily determine essential behavior-outcome contingencies in their environment (Peterson, Maier, & Seligman, 1993). Thus, because of the unpredictable nature of rheumatic disease, individuals must face a variety of situations in which their behavior does not affect disease outcome, and they are left to make sense of the ambiguity (Smith, Peck, & Ward, 1990; Smith, Peck, Milano, & Ward, 1988). These circumstances increase the potential for individuals with rheumatic disease to make negative inferences about illness-related events, which may provide conditions in which general negative appraisals and overall emotional maladjustment are likely. Indeed, Clemmey and Nicassio (1997) found that depressed adults with RA showed a generalized bias toward negative self-description after exposure to negative illness stimuli, providing evidence of an association between illness perceptions and universal negative appraisals. Before discussing more specific applications of pessimistic appraisals and learned helplessness to rheumatic disease, an overview of learned helplessness theory is provided below.

In summary, multivariate models (e.g., Thompson et al., 1993) conceptualize adjustment to pediatric chronic illness to be influenced by disease, family, and child cognitive appraisal variables. Further, the pediatric chronic illness literature has neglected children's report of their own internalizing symptoms, and studies suggest both the relevance of child report as well as differences between mother and child report (e.g., Ennett et al., 1991). Finally, within the disease, family, and child appraisal domains, specific disease features may imply examination of particular variables relative to the disease presentation and/or related challenges. For example, the cognitive appraisal

variables explanatory style and perceived control appear relevant to rheumatic disease with its variable and unexpected nature.

Learned Helplessness Theory of Depression: A Cognitive Diathesis-Stress Model

Expanding on Peterson and Seligman's (1976) original cognitive learned helplessness theory, Abramson and colleagues' (Abramson, Seligman, & Teasdale, 1978; Peterson & Seligman, 1984; Abramson, Metalsky, & Alloy, 1989) conceptualization of depression involves the key processes (uncontrollable negative outcomes) often experienced by children with rheumatic disease. To illustrate, the learned helplessness model of depression (Abramson et al., 1978) posits that once a person expects responses and outcomes to be independent, he/she is more likely to display three types of helplessness deficits: motivational, cognitive, and emotional. Thus, mere exposure to uncontrollable outcomes does not necessarily result in helplessness; rather, one must expect (cognitive component) that outcomes are uncontrollable. If response-outcome independence is experienced over multiple exposures, individuals may come to see outcomes as uncontrollable, and these attributions of noncontingency between personal behavior and outcomes are projected forward to define subsequent expectations for future noncontingency. These expectations in turn determine the stability, pervasiveness, and type of helplessness symptoms. Therefore, the reformulation of helplessness theory retained much of Seligman's original model because events that are uncontrollable were still hypothesized to produce deficits when they create an expectation of noncontingency. However, the nature of deficits was now understood to be influenced by individual causal attributions. Thus, the attributional reformulation accounted for individual differences in

response to uncontrollability as a function of intervening cognitive appraisals, namely causal attributions (Peterson et al., 1993).

Attributions. There are three hypothesized dimensions of attributions for negative events: a) internal-external, b) stable-unstable, and c) global-specific. An internal attribution explains the cause of an event as residing within the self, whereas an external attribution assigns cause to outside factors. A stable attribution explains the cause of an event in terms of temporal permanence, whereas unstable attributions explain the event as due to temporary factors. Finally, a global attribution explains cause in terms that are pervasive, or as affecting multiple situations; a specific attribution explains events in limited terms, or as affecting only one or a circumscribed category of events. These attributions help individuals make sense of events when the situation itself provides few clues for why the event occurred. Explanatory style is not the cause of, but instead a risk factor for problems (Peterson & Seligman, 1984).

The reformulated helplessness theory proposes that individuals who attribute uncontrollable negative events to internal, stable, and global causes will be more vulnerable to depression than those who make external, unstable, and specific attributions. More specifically, Abramson et al. (1978) proposed that when an internal attribution is made, personal helplessness can result because the expectancy is such that one's individual responses are futile in obtaining the desired outcome. However, others would be able to achieve the desired outcome. In other words, problems can arise when individuals make dispositional (ability) attributions for negative events. Further, stable attributions lead to chronic deficits because the individual perceives negative outcome expectancies for future as well as current outcomes. Finally, global attributions create the

expectation that outcomes in most, if not all, domains of life will be independent of one's response. This model has received substantial empirical support (see Peterson & Seligman, 1984 for a review) in the explanation of depressive symptoms and has undergone several revisions. For example, Peterson & Seligman (1984) replaced "attributional style" with "explanatory style" and began to use "negative events" in place of "uncontrollable events" to distinguish between negative events that are controllable and those that are uncontrollable.

A more recent version of the theory, the hopelessness theory of depression (Abramson, Metalsky, & Alloy, 1989), as its name would suggest, places focus on the hopeless subtype of depression, which is defined to include two components: a) an expectation that highly desired outcomes will not occur or that aversive ones will occur (negative outcome expectancy) and b) nothing is going to change for the better (helplessness expectancy). The concept of hopelessness does include helplessness (inability to control outcome) but adds the expectation that negative outcomes will occur. Hopelessness is viewed as a proximal, sufficient cause of depressive symptoms. In other words, once hopelessness occurs, depression follows (proximal relationship), and if hopelessness occurs, depression will, too (sufficiency). On the other hand, a pessimistic attributional style (tendency to attribute negative events to stable and global causes) is viewed as a distal and contributory cause of hopelessness. In other words, attributional style occurs earlier in the causal chain (distal), and is neither necessary nor sufficient for the development of hopelessness (contributory). According to the hopelessness theory, explanatory style influences the perceived cause an individual ascribes to a situation. It is

the perception of events as bad and uncontrollable that is the immediate cause of depression (Peterson et al., 1993).

The hopelessness theory also incorporates diathesis-stress and causal mediation components. The diathesis stress model of depression suggests that the tendency to attribute negative events to stable and global causes contributes to the development and maintenance of depressive symptomatology only in the presence of perceived negative life events (e.g., moderation effects). Notably, the hopelessness theory distinguishes perceived negative events from uncontrollable events. The diathesis-stress component has received empirical support. For example, Alloy, Kayne, Romer, and Crocker (1992) revealed a significant interaction between attributional style and midterm grades in the prediction of depressive symptoms in a sample of college students. Further, using a longitudinal design, Alloy, Albright, Fresco, and Whitehouse (1992a, b), found that a pessimistic attributional style at Time 1 interacted with negative events to predict changes in depressive symptoms over a nine month period.

The second component of the hopelessness theory, the concept of causal mediation, is hypothesized to occur by the indirect influence of attributional style on depression; pessimistic attributions lead to hopelessness, which leads to depression. Therefore, as the theory suggests, a person with a pessimistic attributional style who encounters negative events will become hopeless, and thus depressed (i.e., Metalsky & Joiner, 1992). Further, students who show a pessimistic attributional style for negative achievement events become more hopeless upon receiving a low grade, and this increase in hopelessness mediates the depressive reaction to the low grade (Metalsky, Joiner, Hardin, & Abramson, 1993). However, it should be noted that the hopelessness theory

(Abramson et al., 1989) places emphasis only on global and stable attributions and less on internal attributions as did the helplessness theory. According to the hopelessness theory, the internal dimension of attribution poses only a risk for low self-esteem. On the other hand, stable and global attributions are hypothesized to lead to hopelessness, which then leads to depression.

In summary, the reformulated learned helplessness/hopelessness theory hypothesizes a significant association between an individual's pessimistic attributions and depressive symptoms when that individual is faced with uncontrollable negative events. More specifically, the hopelessness theory proposes that stable and global attributions for negative events lead to hopelessness depression, whereas internal negative attributions are associated with low self-esteem.

RA Specific Applications of the Learned Helplessness Model

As previously mentioned, the relationship of general explanatory style to depression in adults with rheumatoid disease has been extensively examined. The variable course of RA provides a context of ambiguity in which an individual makes causal explanations that are risk factors for depression. For example, Affleck, Tennen, and Apter (2001) revealed that individuals with RA who were pessimistic reported more negative daily mood, pain-related activity, negative daily events, and poorer sleep, regardless of their level of optimism. Schiaffino and Revenson (1995) demonstrated that internal, stable, and global attributions were associated with greater depression 18 months later in individuals with RA. Hommel, Chaney, Mullins, Palmer, Wees, and Klein (1998) replicated their findings, and further reported that these general causal attributions were more reliable predictors of depression than arthritis-specific helplessness. In addition,

learned helplessness has been shown to be associated with disability, dissatisfaction, pain, and activities of daily living in individuals with RA (Engle, Callahan, Pincus, Hochberg, 1990). Finally, using a measure that specifically tapped into arthritis-specific attributions, Affleck, Pfieffer, Tennen, and Fifield (1987) revealed that patients who were more actively searching for causes of illness reported greater functional disability and helplessness and exhibited less positive psychosocial adjustment as rated by health care providers. Further, patients who continued to ask the question "Why me?" expressed greater functional problems and helplessness. Thus it appears that explanatory style is relevant to the explanation of adjustment in adult rheumatic disease.

The association between attributional style for disease-unrelated events and disease-specific outcomes has also been examined. Hommel, Wagner, Chaney, and Mullins (2001) revealed that a depressogenic explanatory style and arthritis helplessness significantly influenced self- and physician- rated disability, respectively. In an examination of the three different attributional dimensions, internal and stable attributions made independent contributions to disability ratings; global attributions did not (Hommel, Chaney, Mullins, Palmer, Wees, & Klein, 2000). Thus, it appears possible that the response-outcome independence commonly perceived by individuals with RA may provide the opportunity for an association between disease variables and a more general pessimistic attributional style.

Studies have also demonstrated a significant relationship between explanatory style and depression in adult RA; however, the diathesis-stress component of hopelessness depression suggests that this relationship may not always be apparent. In fact, according to the theory, the relationship between pessimistic attributions and

depression is only significant in the presence of negative events. Thus, several studies have examined the diathesis-stress and mediational components of the hopelessness theory in RA. For example, Chaney et al. (1996) demonstrated support for a cognitive diathesis conceptualization of adjustment to RA. To illustrate, internal and global attributions for negative events were associated with increased levels of depression under conditions of decreased perceived illness control. In other words, a negative explanatory style may act as a cognitive diathesis, which is activated when individuals come into contact with more proximal stressors (i.e., low perceived control over negative events; Metalsky & Joiner, 1992). Similarly, Schiaffino and Revenson (1992) reported that when RA controllability was low, internal, global, and stable attributions for the cause of illness symptoms were linked to greater depression but less disability. On the other hand, Smith, Christensen, Peck, and Ward (1994) found that the interactions of both cognitive distortion and disability and helplessness and disability did not significantly predict changes in depression four years later.

To summarize, the noncontingent nature of rheumatic disease with its characteristic intermittent disease course appears to be a salient context in which to examine pessimistic explanatory style. Indeed, several studies (Schiaffino & Revenson, 1995; Chaney et al., 1996) have shown support for the cognitive hopelessness/helplessness conceptualization of depression in rheumatic disease.

Explanatory Style in Children

Similar to the adult literature, numerous studies exist examining explanatory style as a risk factor for depression in children (see Gladstone & Kaslow, 1995 for a review). In fact, Gladstone and Kaslow reported moderate to large effect sizes for negative,

positive, and overall composite attributions in the prediction of depression. Much of the research on helplessness behaviors in children has been conducted within the context of academic stressors and achievement. For example, in the examination of achievement-related helpless behaviors, Nolen-Hoksema et al. (1992) suggest that the relationship between explanatory style (using the overall composite score) and depression becomes stronger as children get older. However, this may be an artifact of cognitive development because explanatory style is not well established until the age of nine (Burns & Seligman, 1987), and attributions become more salient to the production of helplessness deficits during middle childhood as attributional style is not likely to emerge until a more stable understanding of the self develops (Fincham & Cain, 1986).

Children with pessimistic explanatory styles at one point in time are more likely to be depressed at a later point in time, after controlling for initial depression levels (Nolen-Hoeskema et al., 1992). Similarly, Seligman, Peterson, Kaslow, Alloy, and Abramson (1984) demonstrated that a depressive attributional style predicted depressive symptoms six months later in 8-13 year old children. Further, the responses of helpless children to vignettes portraying the efforts of others showed that attribution patterns were relatively stable over six months (Fincham, Diener, & Hokoda, 1987). Finally, Schwartz, Kaslow, Seeley, and Lewinsohn (2000) indicated that pessimistic attributions were associated with psychological maladjustment (depressive symptoms, suicidal ideation), impaired cognitive (low self-esteem, maladaptive coping skills), and interpersonal (low social competence, increased conflict with parents, lack of social support) functioning. In summary, evidence is suggestive of a significant relationship between pessimistic attributional style and psychosocial maladjustment in children.

In a meta-analysis, Joiner and Wagner (1995) presented a review of 27 studies examining the attributional style-depression relationship in children. For cross-sectional studies, the combined effect size for the relationship of composite negative attributions (internal, stable, global attributions for negative events) to depression was large. Further, depressed children evidenced a more negative attributional style than nondepressed controls, and attributional style correlated more strongly with depression versus anxiety. Results of studies examining the diathesis stress component of hopelessness depression were equivocal (i.e., Dixon & Ahrens, 1992; Cole & Turner, 1993).

Given the mixed findings for diathesis-stress conceptualizations of depression reported in the Joiner and Wagner (1995) meta-analysis, it is important to discuss these studies in detail. For example, Dixon and Ahrens (1992) found a significant interaction of attributional style and daily stress; those with a pessimistic attributional style and high levels of stress were more likely to be depressed over time, lending support for a diathesis stress conceptualization of depression. In contrast, using structural equation modeling, Cole and Turner (1993) instead found support for a cognitive mediational model of depression in children. In a study of 356 fourth, sixth, and eighth graders, they demonstrated the mediating influence of attributional style/cognitive errors on the relationship between self-reported depression and both peer ratings of competence and positive/negative events. Further, they found no support for the moderating influence of cognitive errors and attributional style on event-depression and competence-depression relationships. Cole and Turner offered the following interpretation for the mediational model: the consequences of adverse events are first internalized by children as negative cognitions and in turn produce depression. As an explanation of moderation, they suggest

that negative events have a stronger effect on depression-prone children who have developed a negative cognitive style in response to previous aversive experiences. On the surface, this conceptualization appears contrary to that posited by Dixon and Ahrens (1992) and the original hopelessness theory (Abramson et al., 1989) because Cole and Turner conceptualize pessimistic attributions as mediators in the relationship between negative events and depression. However, these are actually complementary characterizations of a similar process, in that Cole and Turner's (1993) explanation describes the development of pessimistic causal attributions (in response to events), which serve to determine emotional outcomes in response to future negative events (e.g., Dixon & Ahrens, 1992).

Several other studies not included in the Joiner and Wagner meta analysis also provide support for the cognitive-diathesis stress model of depression in children. For example, Hilsman and Garber (1995) reported that both a negative explanatory style and lack of academic control interacted with receiving a poor grade to significantly predict depressive symptoms in a large sample of 5th and 6th grade children. In another study, internal, stable, and global attributions made in conjunction with low perceived control were found to be positively related to increases in depression (Brown & Seigel, 1988), lending support to the diathesis stress component of depression.

The original helplessness theory as summarized by Buchanan and Seligman (1995), suggests that attributions should be measured in the specific domain in which the stress occurs; however, many studies have not been designed to capture domain specific attributions. Frequently, the questionnaires used to measure explanatory style are composed of attributions for general situations (Kaslow & Nolen-Hoeksema, 1991). In

one study, however, Turner and Cole (1994) examined cognitive style and negative events in specific social, academic and sports domains. Importantly, they also examined potential developmental differences in the role of cognitions in negative event-depression relationships. They suggest that in early childhood cognitions develop as a consequence of negative events (mediation), but later they serve to moderate the effect of negative events on depression. Children must receive feedback to develop a specific type of attributional style, which must predate stressful events if it is to serve as a diathesis. Indeed, these authors found that the cognitive-diathesis stress model was supported for older children and adolescents, whereas evidence was weaker for younger children. Further, they found that in domains specified by children as important to them, the interaction of cognitive style and negative events was more robust. Thus, it appears that the 8-11 year old age range is a time in which cognitive vulnerability to helplessness emerges and explanatory style begins to interact with negative events to predict increases in depression (Turner & Cole, 1994; Nolen-Hoeksema, 1992).

More recent research has noted the limitations in previous literature and sought to reveal potential support for the diathesis-stress and mediational components of the hopelessness theory in children. As mentioned earlier, due to the apparent developmental considerations in emergence and stability of attributional style, more recent studies have incorporated age into the components of the hopelessness theory. For example, Abela (2001) revealed that a depressogenic attributional style interacted with negative events to predict an increase in depressive symptoms for seventh graders (mean age was 11) but not for third graders (mean age was 8), providing support for the Cole and Turner (1994) developmental hypothesis. Further, children who did not encounter negative events did

not show increases in depression even if they possessed a pessimistic attributional style. The cognitive-diathesis stress model was confirmed; however, this interaction was not mediated by hopelessness. In another study of 60 child psychiatric inpatients, Joiner (2000) demonstrated a significant relationship between negative attributional style and both depressive and anxious symptoms. More importantly, he revealed that children with a negative attributional style who reported more negative events were prone to increased depression but not anxiety, providing support for the diathesis-stress component specific to depression (i.e., Joiner & Wagner, 1995). Results also supported partial mediation for hopelessness between attributional style and depression.

In yet another study, evidence was provided for the reformulated hopelessness theory. Conley, Haines, Hilt, & Metalsky (2001) utilized a child interview to assess attributions related to interpersonal and achievement events. They demonstrated that, in younger children (ages 5-7), increases in depression were associated with the combination of a pessimistic attributional style, low self-esteem, and stress, which is consistent with the integrated hopelessness/self-esteem theory. On the other hand, in older children ages 8-10, external, unstable, and specific attributions for positive events showed greater increases in depressive symptoms over time; however, only participants who experienced high levels of stress showed this relationship. Thus, support was provided for developmental considerations in attributional style as well as the diathesis-stress model of depression in children.

Finally, Spence, Sheffield, & Donovan (2002) provided support for the interaction between pessimistic attributional style and negative life events as significant predictor of depressive symptoms in adolescents. However, a one year follow up revealed only a

significant interaction for negative problem solving orientation and negative life events in the prediction of depressive symptoms. On the other hand, when attributional style was entered as a predictor in the longitudinal design, the diathesis-stress model was not supported. Instead, pessimistic attributions predicted future increases in depression irrespective of negative life events. It is important to note that Spence and colleagues (2002) used a composite score of attributional style that included both pessimistic and optimistic attributions. In other words, they subtracted the composite negative score from the composite positive score and claimed that lower scores indicated a more depressive attributional style. However, Spence et al. are assuming that adolescents who give pessimistic explanations for negative events will also give pessimistic explanations for good events when, in fact, Gillam, Shatte, Reivich, and Seligman (2001) demonstrated that explanatory style for positive events was generally only weakly correlated with explanatory style for negative events. Thus, these may be separate constructs with different correlates and are related to different outcomes; consequently, they should not be combined into a single score (Affleck et al., 2001).

Researchers have criticized the literature in this area by questioning causal pathways for depression and explanatory style and stability of explanatory style over time. However, Nolen-Hoeskema and colleagues (1992) found that after children's depression levels decreased, their explanatory styles remained just as pessimistic as they previously were. Thus, Nolen-Hoeskema and colleagues posit that depression seems to lead children to develop a more pessimistic explanatory style, which remains even after depression has subsided. Similarly, Schwartz et al. (2000) found that adolescents who initially had adaptive explanatory styles but later developed more maladaptive styles

were initially more depressed than those who maintained adaptive explanatory styles and provided evidence for relatively stable attributional styles over time.

To this point the reviewed literature has examined the diathesis-stress component to child depression in well and psychiatric children. However, several studies have incorporated this helplessness/hopelessness model of depression into explanations of adjustment to pediatric chronic illness. Indeed, Peterson and Seligman (1987) concluded that internal, stable, and global attributions for negative events increase vulnerability for subsequent illnesses. Specifically, children with chronic illness and their families must face many stressors associated with illness (Thompson, 1985), and those who have difficulty coping with their illness show increased depression (Bennett, 1994). Indeed, chronic illness is associated with increased stress and psychosocial maladjustment and can provide a context in which individuals perceive noncontingency between their behaviors and illness outcome. In fact, Burke and Elliott (1999) presented pessimistic attributional style as a cognitive vulnerability, that can be activated in the presence of stress to predict increased depressive symptoms in children with chronic illness

Surprisingly, the few studies that have examined attribution theory and the helplessness model of depression in children with a chronic illness have shown mixed results. In a study of diabetic youths, internal, stable, and global attributions (helplessness) for negative events were associated with greater levels of depression (Kuttner, Delamater, & Santiago, 1990). Further, the more helpless the child felt, the poorer the metabolic control. In support of these findings, Schoenherrr, Brown, Baldwin, and Kaslow (1992) demonstrated a significant relationship between pessimistic attributional style and increased depression in a sample of children with chronic illness.

Similarly, Frank, Blount, and Brown (1997) found that a pessimistic explanatory style significantly predicted anxiety and depression in children with cancer.

However, some studies have revealed results contrary to helplessness theory, suggesting that internal attributions for negative disease outcomes are adaptive. For example, Brown, Kaslow, Sansbury, Meacham, and Culler (1991) found that children with diabetes who reported internal attributions for negative events actually had better metabolic control. Similarly, Murphy, Thompson, and Morris (1997) demonstrated that adolescents with diabetes who perceive low control over their health and have an external attributional style for negative events were at greatest risk for poor compliance. Thus, some degree of control over negative outcomes appears to be adaptive for chronically ill children, at least for those with diabetes. Unfortunately, the few studies reviewed here preclude us from making generalizations, but the relationship of perceived control and negative attributions to psychological and disease outcome appears quite complex.

Only a handful of studies have examined the diathesis-stress component in chronically ill children. Mullins, Chaney, Pace, and Hartman (1997) provide support for diathesis-stress conceptualizations of adjustment in asthma. Specifically, they revealed that the relationship between global negative attributions and general psychological adjustment was accentuated under conditions of perceived illness uncertainty. The significant association between greater illness uncertainty and increased distress could suggest potential ambiguity between disease management and outcome, providing salient conditions for helplessness, though the construct of helplessness was not specifically examined. Further the authors suggest that perhaps the repeated conditions of uncontrollability present in asthma may generalize to an overall pessimistic style, which

is then applied to future situations and provides for negative expectations in general. In the only known study that was designed to experimentally induce learned helplessness in individuals with asthma, Chaney and colleagues (1999) demonstrated that older adolescents and young adults who received noncontingent feedback on a computerized task committed significantly more errors on an anagram task than healthy control participants. Further, greater treatment effects (contingent vs. noncontingent feedback) were observed within the asthma group compared to healthy controls, and this effect was significant after controlling for depression levels. Thus, it appears that disease features associated with asthma appear to increase vulnerability to induced learned helplessness in individuals with asthma.

The few studies described here provide evidence for the importance of examining helplessness deficits in children with chronic illness; however, these studies represent the entirety of the extant literature in this area despite the unpredictable nature of some chronic illnesses. Pessimistic explanatory style and helplessness have yet to be examined in children with juvenile rheumatic disease despite the highly variable nature of the disease and support for the importance of examining perceived control and attributional style in adults with rheumatic disease (i.e., Chaney et al., 1996; Schiffiano & Revenson, 1992; Affleck, Tennen, Pfieffer, & Fifield., 1987).

Perceived Control. Another cognitive variable, perceived control, also appears salient to adjustment in chronic illness, particularly JRD, as there are aspects of illness which are controllable (e.g., daily routine, regimen adherence) and those which are clearly uncontrollable (e.g., unpredictable exacerbations; Young, 1993). Further, the crux of the reformulated theory of helplessness rests on the perceived uncontrollability of

negative events; however few studies have specifically examined perceptions of perceived control. Indeed, attributions and control are interrelated; however, they are separate constructs. Peterson and colleagues (1993) point out that attributions are judgments about the causes of events, whereas, locus of control is a belief about the nature of reinforcement. Further, Peterson (1991) found that the stability and globality of explanations did not load onto the same factor with perceptions of control. The few studies which have examined the relationship between perceived control and adjustment in chronic illness have produced mixed results (i.e., Helgeson, 1992; Affleck, Tennen et al., 1987). For example, Affleck, et al. (1987) demonstrated that patients who had severe daily symptoms of RA and expressed greater personal control over the symptoms reported less mood disturbance. Similarly, Helgeson (1992) found that perceptions of greater personal control were more strongly associated with better adjustment to illness for patients with a poorer prognosis. And, greater arthritis helplessness was significantly associated with lower internal health locus of control (Nicassio, Wallston, Callahan, Herbert, & Pincus, 1985). These findings are in contrast to the well documented relationship between negative events, internal attributions, and depression (Peterson et al., 1993). Thus, it appears that the relationship between perceived control and adjustment is not always clear within the context of chronic illness, particularly rheumatic disease (Affleck et al., 1987).

The construct of perceived control has been extensively examined from a developmental perspective, and children are able to report on perceived control (Weisz & Stipek, 1982; Weisz, 1990). Borrowing from Bandura's (1977) theory of self-efficacy, Weisz and Stipek (1982) developed a two dimensional model of perceived control.

Control is defined as the capacity to cause an intended outcome and is the result of contingency and personal competence. Contingency is defined as the causal relation between the behavior of an individual and the outcome, and competence is conceptualized as one's belief in his/her ability to produce the behavior on which the outcome is contingent. Perceived contingency and competence are hypothesized to significantly predict control.

Weisz and Stipek (1982) draw a parallel between the learned helplessness reformulation (Abramson et al., 1978) and their definition of control. They equate universal helplessness, or the lack of ability of anyone to produce outcome contingent on behavior, to the contingency aspect of control. On the other hand, they tie personal helplessness, or the belief that one cannot produce important outcomes that others can, to competence. Further, the hopelessness theory of depression (Abramson et al., 1989) posits that stable and global attributions (which likely suggest low perceived control) result in hopelessness. Relatedly, the model of Weisz and colleagues links low perceived contingency and competence to depressive thoughts. Finally, Weisz (1990) distinguished between measures of "locus of control" and perceived control. He noted that locus of control questionnaires focus only on judgments of the causality of events, and by including competency in the conceptualization of perceived control, one's belief in one's own ability to produce the intended effect is measured.

Weisz and colleagues have conducted a number of studies to examine the dimensions of control in children and have repeatedly demonstrated a significant relationship between control and depression (Han, Weisz, & Weiss, 2001; Weisz, Weiss, Wasserman, & Rintoul, 1987; Weisz et al., 1989). More specifically, strong relationships

between depression and both competency and contingency were found in children ages 8-12 (Weisz, Sweeney, Proffitt, & Carr, 1993). Further, using structural equation modeling, Weisz, Southam-Gerow, and McCarty (2001) reported that dimensions of control accounted for 43% of depression in children (ages 8-11), and predicted 36% of depression in adolescents (ages 12-17).

Noting the importance of perceived control in the understanding of depression in childhood, several studies have examined perceived control in the context of psychotherapy for depression. For example, problem resolution in therapy was predicted by control and competence (Weisz, 1986). Further, a CBT intervention with an emphasis on control significantly reduced depressive symptoms in children compared to children who did not receive treatment (Weisz, Thurber, Sweeney, Proffitt, & LeGagnoux, 1997). Finally, in a review of treatment for childhood depression, Weisz, Valeri, McCarty, and Moore (1999) list perceived control as a potential moderator for depression treatment outcome.

Strong support has been provided for the two dimensional model of perceived control in children (i.e., Weisz et al., 1993; 2001); however, there are some limitations of this model. First, the questionnaire(s) used to assess perceived control in the above studies are broad measures that assess general control over outcomes in academic, social, and behavioral domains (Weisz et al., 1991). Thus, there are no established measures of perceptions of control in illness-related domains. However, there are a few studies which assess perceived control in pediatric chronic illness. For example, Kellerman (1980) found that chronically ill adolescents, including those with arthritic disorders experienced a reduction in their feelings of control over their future as it relates to health; significant

differences between adolescents with JRA and controls were found on a measure of perceived control. In addition, using single questions to assess perceived control and perceived coping efficacy, Band and Weisz (1990) demonstrated that both constructs significantly predicted sociobehavioral adjustment. Finally, in a study of adherence to diabetes regimen in adolescents, Bennett Murphy et al. (1997) revealed that perceived control (as measured by health locus of control) accounted for a significant amount of variance in diabetes adherence behavior; however, the diathesis-stress model was not examined.

Summary and Limitations in the Extant Literature

The previously reviewed extant literature provides a sound empirical base for the theoretical basis of the reformulated helplessness/hopelessness theory of depression in children. However, despite the uncontrollable nature of some pediatric chronic illnesses, there are limited studies examining helplessness theory within this context. In addition, research has revealed the importance of examining this model within adult rheumatic disease as a function of the variable nature of RA (Affleck et al., 1987; Shiffiano & Revenson, 1992). However, surprisingly there are no known examinations of the model in pediatric rheumatic diseases. More specifically, the diathesis-stress model outlined in the hopelessness theory (Abramson et al., 1989) has yet to be examined in children with pediatric rheumatic disease. The exclusion of the diathesis-stress model is remarkable given the apparent saliency of assessing perceived control as a proximal stressor (i.e., Chaney et al., 1996) that can activate pessimistic cognitions leading to depression. Further, studies suggest the importance of developmental considerations when examining the relationship between pessimistic attributions, negative events, and depressive

symptoms. It does appear that children do not have the potential for cognitive vulnerability to helplessness until age nine or 10. Finally, extant literature has neglected to examine perceived control as a separate construct but has instead inferred levels of control from helplessness cognitive deficits, such as causal attributions (e.g., Mullins et al., 1997; Schoenherr et al., 1992).

A more general limitation in the pediatric chronic illness literature, which was alluded to previously, involves the almost exclusive examination of child adjustment by mother report, despite support for differences between parent and child report of depression, disease impact and competence (Bennett, 1994; Overholser, Spirito, & DiFillippo, 2000). In fact, Overholser, et al. (2000) outlined a consensus for discrepancies between parental and child ratings of children's behavior in the pediatric literature. Children appear to provide more informative reports of their depressive symptomatology than do their mothers, and parents do not show much agreement with their child's report of depression severity. Thus, children tend to report more subjective symptoms and covert behaviors; parents report more behavioral symptoms, particularly the ones that they find disturbing. Similarly, in a review of the extant literature, Silverman and Rabian (1999) suggested that children and adolescents are more accurate reporters of their own internal states, and Kazdin and Marciano (1998) argued that self-report is particularly important in assessing depressive symptoms because key symptoms (e.g., sadness, feelings of worthlessness, etc.) reflect subjective feelings. Similarly, Kronenberger and Thompson (1992) argued for child-report of adjustment to chronic illness because the very nature of coping involves appraisal, and consequently necessitates the inclusion of self-report measures. Thus, it appears that parents and children may provide different, yet

valuable information regarding children's behaviors. In other words, each informant's contribution is important, with the focus of the research question designating whose report may be more salient in any given situation. Indeed, just as Gil and colleagues (1991) suggested over a decade ago, due to the discrepancy between parents' and children's reports and the reliability of child-report methodology in assessing adjustment, there still remains a need for child-reported adjustment to chronic illness to be included in such investigations (LeBovidge et al., 2003).

The goal of the present study was to address the above-mentioned limitations in the literature and to examine the application of learned helplessness theory of depression in children with juvenile rheumatic disease. Specifically, present study examined children's general causal attributions (internal, stable, and global) for negative events as cognitive diatheses to depressive symptoms. Further, children's perceptions of both daily and long-term disease control were evaluated as proximal stressors to test for the combined influence of pessimistic attributional style and low perceived illness control on child-reported depressive symptoms.

CHAPTER III

THE PRESENT STUDY

The preceding review of literature examining adjustment in children with Juvenile Rheumatic Diseases (JRD) suggests that children with JRD may be at increased risk for psychosocial maladjustment, including social difficulties (Adams et al., 2002), poorer adaptation, and mood difficulties (Noll et al., 2000). Even though JRD are somewhat heterogeneous, they are characterized by similar symptoms, and previous studies have shown similar patterns of psychosocial adjustment among JRD, thus collapsing them across subtypes (e.g., LeBovidge et al., 2003; Hagglund et al., 2000; Vandvik & Hoyeraal, 1993). Further, research has shown that demographic and disease variables often do not account for significant variance in psychosocial adjustment in children with JRD and their families (Gerhardt et al., 2003, Wagner et al., in press); these findings necessitate the search for other intervening variables that contribute to adjustment. In fact, multivariate models of adjustment (see Thompson & Gustafson, 1996 for a review) to chronic illness suggest that a host of variables, including parental adjustment and children's cognitive appraisals may contribute to the psychological well-being of children beyond the influence of demographic and disease variables.

Certain components of these multivariate conceptualizations have been tested in JRD populations (Timko et al., 1992; von Weiss et al., 2002; Manuel, 2001); however, cognitive process variables have not been examined despite the apparent relevance of assessing children's perceptions of their internal psychological states (Ennett et al., 1991) as well as their illness (Beales, Keen, Holt, 1983; Berry, Hayford, Ross, Pachman, & Lavigne, 1993).

Further, research has supported the learned helplessness model of depression (Abramson et al., 1978; 1989) by demonstrating a robust relationship between cognitive variables and emotional distress when individuals perceive low control over important events or when they cannot readily determine essential behavior-outcome contingencies in their environment (i.e., diathesis-stress conceptualization; Peterson, Maier, & Seligman, 1993). Because of the unpredictable nature of rheumatic disease, individuals must face a variety of situations in which their behavior does not affect disease outcome, and they are left to make sense of the ambiguity (Smith, et al., 1990). These circumstances increase the potential for individuals with rheumatic disease to make negative inferences about illness-related events, which may provide conditions in which general negative appraisals and overall emotional maladjustment are likely. In fact, cognitive mechanisms are considered to be an essential contributor to depression in adults with rheumatic disease, due to the episodic and uncontrollable aspects of RA (Chaney et al., 1996; Smith, Peck, & Ward, 1990).

Despite the uncontrollable and unpredictable nature of rheumatic disease, the cognitive diathesis-stress component of the learned helplessness/hopelessness theory of depression has yet to be examined in children with pediatric rheumatic disease. Further, neither component of learned helplessness, perceived control over illness symptoms nor attributional style, has been previously measured in children with rheumatic disease. Even in the few studies of learned helplessness in other pediatric chronic illnesses, perceived control has not been directly assessed but has instead been inferred. Finally, Dahlquist (2003) suggests that a closer examination of specific adaptational processes (e.g., cognitive appraisals) may tell us more about emotional experiences of children with

JRA than do global assessments of adjustment, which have primarily been the focus of previous investigations.

Primary Hypotheses

Hypothesis 1. Consistent with cognitive diathesis-stress conceptualizations of depression, it was anticipated that the interaction of children's pessimistic explanatory style (global, stable, and internal attributions) and children's perceived **control over daily symptoms** would be significantly associated with depressive symptomatology, after controlling for demographic, disease, and parent distress variables. Specifically, it was anticipated that children's causal attributions (internal, stable, and global) for negative events would contribute significant variance to depression under conditions of low perceived control; under conditions of high perceived control, attributions and depression will be unrelated. Thus, it was hypothesized that perceived control over daily illness symptoms would moderate the attribution-depressive symptom relationship.

Hypothesis 2. It was also hypothesized that the interaction of children's pessimistic explanatory style and children's perceived **control over long-term illness outcome** would be significantly associated with depressive symptomatology, after controlling for demographic, disease, and parent distress variables. It was anticipated that children's causal attributions for negative events would contribute significant variance to depressive symptoms under conditions of low perceived control; under conditions of high perceived control, attributions and depression would be unrelated. Thus, it was hypothesized that perceived control over long-term illness outcome would moderate the attribution-depressive symptom relationship.

CHAPTER IV

METHOD

Participants

Participants were 50 children and adolescents (31 females; 19 males) between the ages of nine and 17 ($M = 13.66$, $SD = 2.42$), who had been diagnosed with JRA ($N = 29$), lupus ($N = 12$), JDM ($N = 7$), or JAS ($N = 2$) and their parents. The majority of child participants identified themselves as Caucasian (46%), followed by Native American (26%), Hispanic (10%), African American (8%), Biracial (8%), and Asian (2%).

Participants were recruited from the pediatric rheumatology clinic at Children's Hospital of Oklahoma. Inclusion criteria for participation included the following: 1) diagnosis of one of the above-mentioned illnesses and between the ages of nine and 17, and 2) the duration of the child's symptoms had been at least one year. The age range was selected based on the following developmental considerations: 1) attributional style is not stable until age nine (Burns & Seligman, 1987), 2) children are reliable reporters of their internalizing problems by this age (Silverman & Rabin, 1999), and 3) a valid age range for use of certain self-report measures (e.g., the Children's Depression Inventory). Illness duration was calculated by subtracting the date of diagnosis from the date of participation and ranged from .04 – 15.73 years ($M = 2.67$; $SD = 3.35$); therefore, some participants experienced symptoms for at least a year but had been diagnosed only for a few weeks and still qualified for the study. Exclusion criteria were as follows: 1) the child has comorbid cognitive deficits (e.g., mental retardation), and 2) the child has a comborbid chronic illness. The primary rheumatologist verified the inclusion criteria before eligible participants were contacted. Participants were compensated monetarily with $10.00.

Instruments

Child-Report Measures

The *Children's Depression Inventory* (CDI; Kovacs, 1983; 1992) is a 27-item scale designed for use with children ages 7-17 that measures depressive symptoms over the previous two weeks (see Appendix A). Each of the items on the CDI includes three statements that combine to measure the severity of a depressive symptom on a 0 to 2 scale. Scores were calculated by summing the 27 items for an overall index and were used as the primary outcome measure. Raw scores can be converted to T-scores, and a T-score of 66 or greater is considered clinically elevated. The average CDI scores for females ($M = 9.10$) and males ($M = 8.47$) in the present sample were equivalent to T-scores of 50 and 48, respectively, indicating that the present sample was fairly well adjusted with respect to depressive symptoms. The CDI has been shown to be a reliable scale, with internal consistencies ranging from .71 to .89, and a valid measure of depressive symptomatology in children (Kovacs, 1992). For example, the CDI has been demonstrated to be a valid outcome measure with previous JRD samples (e.g., Hagglund et al., 2000). Internal consistency for the present sample was high ($\alpha = .91$).

The *Children's Attributional Style Questionnaire-Revised* (CASQ-R; Kaslow & Nolen-Hoeksema, 1991) is a 24-item questionnaire used to assess attributional style in children (see Appendix B). The items measure the extent to which the participant explains causes of events across three dimensions of attributional style (i.e., internal, stable, global). Respondents were given twelve positive and twelve negative hypothetical events, each followed by a binary causal explanation; however, only the 12 negative events were scored in the present study because attributions for negative events have

been more reliable predictors of depressive symptoms than positive attributions (Gladstone et al., 1995; Seligman et al., 1984). The CASQ-R yields three attribution dimension scores [i.e., internal (IN), stable (SN), and global (GN)] for negative events, each with possible scores ranging from 0-4 (see Table 1); a composite negative score can be obtained by summing the three scale scores for negative events.

Research suggests stronger reliability for composite versus individual dimension scores of the CASQ and CASQ-R (Sweeney, Anderson, & Bailey, 1986); however, there is considerable debate over the validity of composite scores because correlations between the explanatory dimensions are low (Gillham et al., 2001), and the dimensions load on separate factors (Joiner & Rudd, 1996). Thus, only dimension scores were used in the present analyses. No reliability estimates for the dimensions have been reported for the CASQ-R; for the original 48-item CASQ, reliability estimates range from .43-.56 for the internal (IN), from .13-.42 for stable (SN), and from .31 to.39 for global (GN) dimensions for negative events (Seligman et al., 1984). In the present study internal consistency estimates for internal, stable, and global dimensions for negative events were low (.47, .33, .26, respectively) but were similar to those reported for the original CASQ.

Perceived Control. Two questions, specific to control over illness, were used to assess perceived control. Children were asked to rate on a scale from one (no control) to 7 (complete control) how much control they have over the daily symptoms of their JRD and over the long term-course of JRD. Specifically, question one asked, " How much control do you think you have over the daily symptoms of your JRD?" Question two asked, "How much control do you think you have over the long-term course of your JRD?" (see Appendix C). These questions were adapted from items demonstrating utility

in previous investigations of perceived illness control in adult rheumatic disease populations (e.g., Affleck, Tennen et al., 1987; Chaney et al., 1996; Schiaffino & Revenson, 1992) and include both perceptions of contingency and personal competence (see Weisz & Stipek, 1982).

Similar single item measures of control have shown significant predictive utility in determining psychological adjustment (Band & Weisz, 1990; Helgeson, 1992; Brown & Siegel, 1988). Further, it is important to assess perceived control within the particular domain in which the stressor occurs (Hilsman & Garber, 1995); thus, in the absence of an illness control measure, the above-mentioned questions were chosen due to their domain specificity. Finally, both control over daily symptoms and control over the long-term course of the illness was assessed because differences in the relationship of these specific control perceptions to adjustment have been demonstrated. Specifically, greater control over daily RA symptoms has been shown to correlate with positive psychosocial adjustment, whereas, greater control over the course of RA was shown to correlate with greater mood disturbance (Affleck, Tennen et al., 1987).

The *Juvenile Arthritis Functional Assessment Report-Child* (JAFAR-C; Howe et al., 1991) was completed by children to provide information about subjective perceptions of functional ability (see Appendix D). The JAFAR-C is a 23-item measure designed specifically to assess functional ability in JRD patients. Respondents rate how often they should be able to perform 23 daily tasks (e.g., button shirt, get into bed) on a three point Likert scale, ranging from 0 (all the time) to 2 (almost never). Therefore, a higher score indicates greater disability, and the amount of functional disability is represented by the sum of the items (see Table 1). JAFAR-C scores were covaried in the primary analyses to

control for its potential influence on child depressive symptoms. The JAFAR has demonstrated good internal reliability coefficients for child-report (.85) and parent-report (.93) and construct validity (Howe et al., 1991). Internal consistency for the present study was .92.

Parent-Report Measures

The Brief Symptom Inventory (BSI; Derogatis, 1993) is a 53-item questionnaire that assesses global psychological adjustment (see Appendix E). Respondents rate the degree to which they are distressed by each psychological symptom in the past seven days. Rating is done on a Likert scale, ranging from 1 (not a lot) to 4 (extremely). The global severity index (GSI) is the average score of the items and was used as the measure of parent distress. Previous studies have used the GSI as a measure of overall distress in parents of children with JRD (e.g., Gerhardt et al., 2003). In the present study parent GSI scores were used as a covariate to control for the influence of parent distress on child depressive symptoms (see Mullins, et al., 1995; Thompson, Gustafson, Hamlett, & Spock, 1992). The BSI has demonstrated acceptable internal consistency; alpha coefficients range from .71 to .85 (Derogatis, 1993). Chronbach's alpha for the present study was high ($\alpha = .97$).

Physician-Report Measure

Provider Questionnaire. This questionnaire was designed to obtain information from the physician regarding patient diagnosis, date of diagnosis, current medications, and functional ability and was completed following a routine physical exam. Given the poor reliability of biological indices in explaining clinical presentation and disease outcome (i.e., Giannini, Ruperto, Ravelli, Lovell, Felson, & Martini, 1997; Lovell &

Graham, 1997; van der Net et al., 1997), physician-rated functional disability (PRFD) was determined through rheumatologist classification of patients into one of four functional classes. These functional classes range from Class I (limited to no disability in vocational and self-care activities) to Class IV (severe disability in these same activities; e.g., Hochberg, Chang, Dwosh, Lindsey, Pincus, & Wolfe, 1992; see Appendix F). This classification system has been widely used and shown to be a valid indicator of functional disability, specifically in JRD (Gerhardt et al., 2003; Baildam, Holt, Conway, & Morton, 1995; Hochberg et al., 1992). Physician-rated disability was used as the index of objective disease activity; scores were covaried in the primary analyses to control for the influence of disease on child depressive symptomatology.

Procedure

Eligible participants were recruited in one of the two following ways. Some participants, who were not scheduled for upcoming appointments in the rheumatology clinic, were contacted by phone. (These patients had met the researchers during a previous appointment; however, patients were not recruited during their first appointment in the rheumatology clinic. Further, some patients did not receive a diagnosis for some time, and it was only after a diagnosis had been given that patients were contacted.) If a family indicated they were willing to participate, a packet was sent with the following information enclosed: parental consent form, BSI, the assent form, CASQ-R, CDI, JAFAR-C, and Background Information Questionnaire. Once participants mailed the completed packet back to the investigators, they received $10 compensation in the form of a gift card. Other participants were approached during a routine visit in rheumatology clinic. If they were willing to participate, children and their parents were asked to fill out

the packets and return them at their next clinic appointment or via postage-paid mail. Again, upon receipt of the study packet, $10 compensation was given to the child.

No significant differences were observed across psychosocial variables ($F = .37$, $p = .87$) for participants recruited by mail (N = 32) versus those recruited in the clinic (N = 18); therefore, recruitment was not included as a covariate in the primary regression analyses.

CHAPTER V

RESULTS

Preliminary Analyses and Selection of Covariates

Preliminary analyses were conducted to examine potential differences in depressive symptoms across disease subtype, gender, and ethnicity. One-way multivariate analyses of variance (MANOVAs) revealed no significant effects for ethnicity (Caucasian vs. Non-Caucasian) on psychosocial variables (SN, GN, IN, daily control, long term control, and CDI; p's > .05). Similarly, one-way MANOVAs revealed no significant effects for gender on psychosocial variables (p's > .05). Thus, further analyses were performed collapsing across ethnicity and gender. However, a significant difference between children diagnosed with JRA (M = 6.31) and children diagnosed with another rheumatic disease (lupus, JDM, JAS; M = 12.38) was found on the CDI (F = 6.87, p = .012); therefore, diagnosis was included in the regression analyses. No significant effects for diagnosis were found on any other psychosocial variables. Finally, illness duration was not included as a covariate because it was unrelated to the other disease and psychosocial variables (r's ranged from .10 - .25, all p's > .05).

In addition, the covariates described in the Method section (parent distress and both child and physician-rated disability), were selected based on theoretical rationale and on findings in the extant literature. Numerous studies have demonstrated the influence of parent distress on child adjustment to JRD (Timko et al., 1992; Wagner et al., in press), and a significant zero-order correlation was found in the present study (r = .41, p < .01). Further, both objective (physician) and subjective (child, parent) ratings of functional ability have been demonstrated as independent constructs related to JRD

outcome (Ravelli, Viola, Ruperto, Corsi, & Ballardini, 1997; Baildam et al., 1995). Finally, because research suggests the need to take into consideration potential developmental differences in children's perceptions of control (Weisz et al., 1987; Weisz et al., 2001), children's cognitive appraisals of illness (Berry et al., 1993), and the role of attributions in diathesis-stress relationships in depression in children (Cole & Turner, 1993), children's age was also utilized as a covariate. These variables were included in the primary regression analyses to provide for a more conservative test of anticipated relationships among variables and to control for potential shared variance among variables, which could influence the contributions of key predictor variables (i.e., CASQ-R, perceived control) to child depressive symptoms.

Primary Analyses

Hypothesis 1. It was anticipated that the interaction of children's pessimistic explanatory style and children's perceived **control over daily symptoms** would be significantly associated with depressive symptomatology, after controlling for demographic, disease, and parent distress variables. To examine this hypothesis, three regression equations were constructed in which demographic [age, diagnoses (JRA/non JRA)] variables were entered as a block on Step 1. On Step 2, disease variables [child-report functional ability (JAFAR), physician-report functional ability] were entered as a block, and on Step 3, parental distress (BSI) was entered. For all equations, Steps 1, 2, and 3 were identical. On Step 4 of each equation, an attribution dimension (internal, stable, or global) for negative events and perceived control over daily illness symptoms were entered, and on Step 5, the interaction of an attribution dimension and daily perceived control were entered. Thus, the regression equations were hierarchical between

steps and simultaneous within steps (Cohen & Cohen, 1983). CASQ-R dimensions and daily perceived control were centered to reduce multicollinearity with the interaction term (see Aiken & West, 1991).

Specifically, on Step 4 of equation one, internal attributions for negative events (IN) and perceived control over daily illness symptoms were entered, and on Step 5, the interaction of IN and daily perceived control was entered. The IN X daily perceived control interaction term was nonsignificant ($t(1) = -.11$, $p = .91$; see Table 3), and the effect size was close to zero.

In equation two, Steps 1-3 were identical to those in equation one. However, on Step 4, stable attributions for negative events (SN) and perceived control over daily symptoms were entered, and on Step 5, the interaction of SN and perceived control over daily symptoms was entered. Results revealed a significant SN X daily perceived control interaction ($t(1) = -2.28$, $p = .028$, see Table 3), contributing an additional 12.6% of the residual variance (see Cohen, 1988) to child depressive symptoms beyond the influence of demographic variables, disease parameters, and the main effects of stable attributions for negative events and perceived control over daily symptoms. Power for this interaction was conservatively estimated at 0.64 (Cohen, 1988).

In equation three, Steps 1-3 were identical to those in the first two equations. However, on Step 4, global attributions for negative events (GN) and perceived control over daily symptoms were entered, and on Step 5, the interaction of GN and daily perceived control was entered. Results revealed a significant effect of GN X daily perceived control ($t = -2.31$, $p = .026$; see Table 4) contributing an additional 11.5% of the residual variance to child depressive symptoms beyond the influence of demographic

variables, disease parameters, and the main effects of global attributions for negative events and perceived control over daily symptoms. Power for this interaction was conservatively estimated at 0.69 (Cohen, 1988).

Hypothesis 2. It was anticipated that the interaction of children's pessimistic explanatory style (global, stable, and internal attributions) and children's perceived **control over long-term illness** would be significantly associated with depressive symptomatology, after controlling for demographic, disease, and parent distress variables. To examine this hypothesis, three regression equations were constructed in which demographic [age, diagnoses (JRA/non JRA)] variables were entered as a block on Step 1. On Step 2, disease variables [child-reported functional ability (JAFAR), physician report functional ability] were entered as a block, and on Step 3, parental distress (BSI) was entered. For all equations, Steps 1, 2, and 3 were identical. On Step 4, an attribution dimension (internal, stable, or global) for negative events and perceived control over long-term illness were entered, and on Step 5, the interaction of an attribution dimension and long-term perceived control were entered. Thus, the regression equations were hierarchical between steps and stepwise within steps (Cohen & Cohen, 1983). CASQ-R dimensions and long-term perceived control were centered to reduce multicollinearity with the interaction term (see Aiken & West, 1991).

Specifically, on Step 4 of equation one, internal attributions for negative events (IN) and perceived control over long-term illness symptoms were entered, and on Step 5, the interaction of IN and long-term perceived control was entered. The IN X long-term perceived control interaction term was nonsignificant ($t(1) = -.73$, $p = .47$; see Table 4), and the effect size was .013.

In equation two, Steps 1-3 were identical to those in equation one. However, on Step 4, stable attributions for negative events (SN) and perceived control over long-term illness symptoms were entered, and on Step 5, the interaction of SN and perceived control over long-term illness symptoms was entered. Results revealed a significant SN X long-term perceived control interaction ($t(1) = -2.85$, $p = .007$), contributing an additional 25% of the residual variance (see Cohen, 1988) to child depressive symptoms beyond the influence of demographic variables, disease parameters, and the main effects of stable attributions for negative events and perceived control over long-term symptoms. Power for this interaction was conservatively estimated at 0.85 (Cohen, 1988).

In equation three, Steps 1-3 were identical to those of the first two equations. However, on Step 4, global attributions for negative events (GN) and perceived control over long-term illness symptoms were entered, and on Step 5, the interaction of GN and long-term perceived control was entered. Results revealed a significant GN X long-term perceived control interaction ($t(1) = -2.38$, $p = .022$), contributing an additional 13.7% of the residual variance (see Cohen, 1988) to child depressive symptoms beyond the influence of demographic variables, disease parameters, and the main effects of global attributions for negative events and perceived control over long-term symptoms. Power for this interaction was conservatively estimated at 0.69 (Cohen, 1988).

Post-hoc Probes: Conditional Moderators

Consistent with Holmbeck (2002; see also Aiken & West, 1991), post-hoc probes were conducted to further examine the significant moderator effect of perceived control on the pessimistic attribution-depressive symptom relationships observed for the SN and GN dimensions. First, conditional moderator variables were computed for high (HI-daily)

and low (LO-daily) perceived control over **daily illness symptoms**. By computing HI (- 1 SD) and LO (+ 1 SD) variables, the zero point of the moderator was manipulated, and conditional effects of the predictor on the outcome could be examined (see Holmbeck, 2002). Thus, HI-daily equals zero when daily control (centered) is one SD above the mean. Similarly, LO-daily equals zero when daily control (centered) is one SD below the mean. Using these conditional variables, two new interaction terms for each attribution dimension (SN, GN) were also computed. Two separate regression analyses [one to generate the slope for the Hi-daily condition (i.e., when daily control is 1 SD above the mean) and one to generate the slope for the low daily control condition (i.e., when daily control is 1 SD below the mean)] for each attribution dimension were conducted, with the same entry of demographic and disease covariates on steps 1, 2, and 3 as previously described.

In addition, conditional moderator variables were computed for high (HI-long) and low (LO-long) perceived control over **long-term illness symptoms**, and using these conditional variables, two new interaction terms for both the GN and SN attribution dimensions were also computed. Two separate regression analyses [one to generate the slope for the Hi-long condition (i.e., when long-term control is 1 SD above the mean) and one to generate the slope for the Lo-long condition (i.e., when long-term control is 1 SD below the mean)] for each attribution dimension were conducted, with the same entry of demographic and disease covariates on steps 1, 2, and 3 as previously described.

On Step 4 of each of these new equations, the main effects and interaction were entered simultaneously; although this does not change the results, it allows for ease of interpretation. [In the previous regression equations (see Tables 3 and 4), main effects

were entered on Step 4 and the interaction term on Step 5. This was done to allow for a more thorough investigation of the main effects and additional variance accounted for by the interaction term.]

Daily perceived control X stable negative attribution. In step 4 of the first equation, HI-daily, SN, and the HI-daily X SN interaction term were simultaneously entered. In step 4 of the second equation, LO-daily, SN, and the LO-daily X SN interaction term were simultaneously entered. The following two equations were generated from these analyses:

For high daily control (1 SD above the mean):

CDI = 4.73(DX) + .48(AGE) –2.38(PRFD) + .28(JAFAR) + 1.67(BSI) -0.54(SN) – 0.40

For low daily control (1 SD below the mean):

CDI = 4.73(DX) + .48(AGE) –2.38(PRFD) + .28(JAFAR) + 1.67(BSI) + 4.66(SN) + 2.80

(When zero is substituted for the conditional daily control variable in each of these equations, we are left with only the SN term, the covariates, and the intercept for each equation.)

Significance tests indicated that the simple slope for the SN regression line under the condition of HI-daily control was nonsignificant, $t(1)= -0.35$, $p = .73$; the simple slope for the SN regression line under LO-daily control conditions was significant, $t(1)= 2.90$, $p = .006$ (see Table 5; Aiken & West, 1991). Specifically, the influence of stable negative attributions on child depressive symptoms was enhanced under conditions of low perceived control over daily illness symptoms. Under conditions of high perceived control, stable negative attributions were unrelated to child depressive symptomatology. To graph the results, regression lines were derived and plotted by substituting high (one

SD above the mean) and low (one SD below the mean) values of SN and the average mean for the covariates (see Figure 1) into each of the above stated equations.

Daily perceived control X global negative attribution. In step 4 of the first equation, HI-daily, GN, and the HI-daily X GN interaction term were simultaneously entered. In step 4 of the second equation, LO-daily, GN, and the LO-daily X GN interaction term were simultaneously entered. The following two equations were generated from these analyses:

For high daily control (1 SD above the mean):

CDI = 7.13(DX) - .25(AGE) – .91(PRFD) + .18(JAFAR) - .44(BSI) + 3.92(GN) + 8.14

For low daily control (1 SD below the mean):

CDI = 7.13(DX) - .25(AGE) – .91(PRFD) + .18(JAFAR) - .44(BSI) + 8.36(GN) +11.16

(When zero is substituted for the conditional daily control variable in each of these equations, we are left with only the GN term, the covariates, and the intercept for each equation.)

Significance tests indicated that the simple slope for the GN regression line under HI-daily control conditions was significant, $t(1)= 2.74$, $p = .009$; the simple slope for the GN regression line under LO-daily control conditions was also significant, $t(1)= 5.75$, $p = .001$ (see Table 5; Aiken & West, 1991). Though the slopes of both regression lines are significantly different from zero (i.e., post-hoc probing), the significant overall interaction (see Table 3) reveals that the regression lines are significantly different from each other. More specifically, the slope of the LO-daily control line is steeper than the HI-daily control line, suggesting a sharper increase in depressive symptoms under conditions of low perceived daily control. To graph these results, regression lines were

derived and plotted by substituting high (one SD above the mean) and low (one SD below the mean) values of GN and the average mean for the covariates (see Figure 2) into each of the above stated equations.

Long-term perceived control X stable negative attribution. In step 4 of the first equation, HI-long, SN, and the HI-long X SN interaction term were simultaneously entered. In step 4 of the second equation, LO-long, SN, and the LO-long X SN interaction term were simultaneously entered. The following two equations were generated from these analyses:

For high long-term control (one SD above the mean):

CDI = 5.12(DX) + .31(AGE) – 1.91(PRFD) + .27(JAFAR) + 2.11(BSI) -1.54(SN) + 0.30

For low long-term control (one SD below the mean):

CDI = 5.12(DX) + .31(AGE) – 1.91(PRFD) + .27(JAFAR) + 2.11(BSI) + 5.08(SN) +4.49

(When zero is substituted for the conditional long-term control variable in each of these equations, we are left with only the SN term, the covariates, and the intercept for each equation.)

Significance tests indicated that the simple slope for the SN regression line under HI-long control conditions was nonsignificant, $t(1)= -0.96$, $p = .34$; the simple slope for the GN regression line under LO-long control conditions was significant, $t(1)= 3.38$, $p = .002$ (see Table 6; Aiken & West, 1991). Specifically, the influence of stable negative attributions on child depressive symptoms was enhanced under conditions of low perceived control over long-term illness symptoms. Under conditions of high perceived control, stable negative attributions were unrelated to child depressive symptomatology. To graph the results, regression lines were derived and plotted by substituting high (one

SD above the mean) and low (one SD below the mean) values of SN and the average mean for the covariates (see Figure 3) into each of the above stated formulas.

Long-term perceived control X global negative attribution. In step 4 of the first equation, HI-long, GN, and the HI-long X GN interaction term were simultaneously entered. In step 4 of the second equation, LO-long, GN, and the LO-long X GN interaction term were simultaneously entered. The following two equations were generated from these analyses:

For high long-term control (one SD above the mean):

CDI = 6.92(DX) - .18(AGE) – .99(PRFD) + .18(JAFAR) + .49(BSI) + 2.35(GN) + 6.41

For low long-term control (one SD below the mean):

CDI = 6.92(DX) - .18(AGE) – .99(PRFD) + .18(JAFAR) + .49(BSI) + 7.55 (GN) + 9.79

(When zero is substituted for the conditional daily control variable in each of these equations, we are left with only the GN term, the covariates, and the intercept for each equation.)

Significance tests indicated that the simple slope for the GN regression line under HI-long control conditions was nonsignificant, $t(1)= 1.31$, $p = .20$; the simple slope for the GN regression line under LO-long control conditions was significant, $t(1)= 5.62$, $p = .001$ (see Table 6; Aiken & West, 1991). Specifically, the influence of global negative attributions on child depressive symptoms was enhanced under conditions of low perceived control over long-term illness symptoms. Under conditions of high perceived control, global negative attributions were unrelated to child depressive symptomatology. To graph the results, regression lines were derived and plotted by substituting high (one

SD above the mean) and low (one SD below the mean) values of GN and the average mean for the covariates (see Figure 4) into each of the above-mentioned formulas.

Mediation Analyses

Because the daily control X internal negative attribution and long-term control X internal negative attribution interactions were nonsignificant, no post-hoc probing was necessary. However, previous research has suggested attributional style as a potential mediator in the relationship between psychosocial stressors and depressive symptoms in children (Cole & Turner, 1993). In the present study significant zero-order correlations were found between internal negative attributions (IN) and depression and between IN and both control over daily symptoms and control over long-term symptoms (see Table 2). Therefore, IN was tested as a potential mediator in the daily control-depressive symptoms and long-term control-depressive symptoms relationships. [Because both dimensions of perceived control were correlated only with internal negative attributions, the other two attribution dimensions (SN and GN) were not explored as potential mediators.]

To test for partial mediation Sobel's (1982) method was utilized to see if the indirect effect of the predictor on the outcome via the mediator is significantly different from zero. The following regression equations were constructed according to Sobel's (1982) method:

1. Hypothesized mediator regressed on the predictor
2. Outcome regressed on the mediator, controlling for the predictor and other covariates

Daily perceived control. First, IN (potential mediator) was regressed on daily control (predictor; $B = -.21$, $SE = .09$, $p = .02$). Next, CDI (outcome) was regressed on IN, after controlling for the influence of daily perceived control (predictor) and other covariates (JRA/non JRA, age, physician rated functional ability, JAFAR-C, and BSI; $B = 2.47$, $SE = 1.00$, $p = .018$). Results revealed a non-significant mediated effect ($z = -1.63$, $p = .10$).

Long-term perceived control. In the first equation, IN (potential mediator) was regressed on long-term control (predictor; $B = -.20$, $SE = .10$, $p = .04$). In the second equation, CDI (outcome) was regressed on IN, after controlling for the influence of long-term perceived control (predictor) and other covariates (JRA/non JRA, age, physician rated functional ability, JAFAR-C, and BSI; $B = 2.30$, $SE = 0.98$, $p = .023$). Results revealed a significant mediated effect ($z = -1.99$, $p = .046$). The influence of long-term perceived control on depressive symptoms was mediated by internal attributions for negative events. Thus, it appears that for children with JRD, low perceived control over the long-term illness course leads to increased internal attributions for negative events, which lead to increased depressive symptoms.

Exploratory Analyses

Because the sample in this study was comprised of a wide age range, potential developmental differences among the participants on the key study variables (perceived control, attributions, and depressive symptoms) were explored, even though age was already included as a covariate in the primary analyses based on its significant zero-order correlation with depressive symptoms. Participants were separated into two groups: ages 9-12 ($N = 18$) and ages 13-17 ($N = 32$) based on previously documented differences in

general cognitive functioning (Piaget & Inhelder, 1969) and illness perceptions (Berry et al., 1993). Several one-way MANOVAs revealed nonsignificant differences (all p's > .05) between the two age groups on the CDI, daily and long-term perceived control, and attributions for negative events (internal, stable, and global). A 2 X 2 Mixed ANOVA, with age as the between factor and perceived control (daily, long-term) as the within factor, revealed a nonsignificant age X perceived control interaction ($F = 2.85$, $p = .10$). Thus, both age groups responded similarly to both the long term and daily perceived control questions. However, a significant difference between long-term and daily perceived control was revealed for the entire sample ($F = 5.30$, $p = .02$). Upon examination of the means, it was discovered that participants rated themselves as having more control over daily illness symptoms ($M = 4.56$) than over their long-term disease course ($M = 4.12$). This finding has been reported in previous investigations of perceived control in adults with rheumatic disease (Affleck, Tennen, et al., 1987).

The dichotomous diagnosis variable (JRA/non JRA), which was included in the primary analyses because of significant differences between groups on the CDI, was created based on the distribution of CDI scores separated by disease subtypes. Children and adolescents with JRA ($M = 6.31$) scored lower on the CDI than those with lupus (M =13.83), JAS ($M = 10.5$), and JDM ($M = 10.4$). However, the CDI differences could also be accounted for by ages of the participants in each disease subgroup because diseases such as lupus and JDM are more likely to be diagnosed in adolescence. Examining the distribution of diagnoses across the two age groups, revealed that whereas only five of 18 in the younger group had a diagnosis other than JRA, half of the participants ($N = 16$) in the older group were diagnosed with JDM, lupus, or JAS (all three characterized by

elevated CDI scores). Thus, the significant age-CDI correlation could actually be due to the natural distribution of JRD diagnostic subtypes and not necessarily to developmental differences. In fact, results revealed a significant partial correlation between JRA/ non JRA and CDI, controlling for age ($pr = .31$, $p = .03$); however the partial correlation between age and CDI, controlling for JRA/ non JRA was nonsignificant ($pr = .25$, $p = .08$). Therefore, it appears that age is confounded with disease subtype and that differences in CDI scores were best accounted for by diagnostic classification. Consequently, by controlling for both age and diagnostic subtype in the primary regression analyses, a more conservative test of potential cognition-depressive symptoms relationships was provided.

CHAPTER VI

DISCUSSION

The present study was designed within the multivariate framework of adjustment to pediatric chronic illness and with recognition of the necessary exploration of moderator/mediator relationships among variables (Holmbeck, 2002). Initially, relationships between depressive symptoms and demographic, disease, and parental distress variables were examined in a sample of children and adolescents with JRD. Disease subtype was a significant predictor of depressive symptoms; however age was not a significant predictor after controlling for disease subtype. Neither physician-rated nor child-rated functional ability were significant predictors of depressive symptoms. A zero-order correlation revealed a significant relationship between parental distress and child depressive symptoms; however, this relationship was non significant after controlling for disease and demographic variables.

More importantly, this study examined the incremental predictive utility of cognitive appraisal variables to child depressive symptoms, controlling for the above-mentioned disease and demographic variables. Specifically, the present study examined a cognitive diathesis-stress model of depression in children and adolescents with juvenile rheumatic diseases. Two specific hypotheses were proposed: 1.) internal, stable, and global attributions for negative events would be significantly associated with depressive symptoms only under conditions of low perceived control over daily illness symptoms; and, 2.) internal, stable, and global attributions for negative events would be significantly associated with depressive symptoms only under conditions of low perceived control over long-term disease course.

Consistent with the first hypothesis, multiple regression analyses revealed that stable pessimistic attributions were associated with increased depressive symptoms, but only under conditions of low perceived control over daily illness. This significant interaction was observed after controlling for demographic, disease, and parental distress variables as well as the main effects of attributions and perceived daily control. A significant interaction between global negative attributions and daily control was also revealed, but post-hoc probes revealed significant global negative attributions-depressive symptoms relationships under conditions of both low and high control. However, the increase in depressive symptoms predicted by global negative attributions was significantly sharper for the children who reported low daily illness control. Results also revealed a significant main effect of internal negative attributions on depressive symptoms; however, contrary to the hypothesis, the interaction of internal attributions for negative events and daily perceived control was non significant.

Results provided similar support for the second hypothesis. Specifically, regression analyses revealed that stable and global attributions for negative events were significantly related to an increase in depressive symptoms, after controlling for parent distress, disease and demographic variables. These relationships were significant only under conditions of low perceived control over long-term disease course. In addition, the main effect of internal negative attributions was significant; however, in contradiction of the second hypothesis, the interaction of internal negative attributions and long-term control over disease course was non significant. Further analyses revealed that the influence of long-term perceived control on depressive symptoms was instead mediated by internal attributions for negative events.

The findings in this study support the widely acknowledged body of learned helplessness/hopelessness literature (e.g., Abramson et al., 1989), which posits that global and stable attributions for negative events predict depressive symptoms. In fact, Alloy, Peterson, Abramson, and Seligman (1984) demonstrated that individuals who attribute negative events to global causes show a wider generalization of learned helplessness deficits (i.e., depressive symptoms) to new situations when confronted with uncontrollability. Treatment outcome studies have demonstrated the presence of learned helplessness in children. For example, Gillam and colleagues (2001) demonstrated that a cognitive treatment that alters explanatory style and reduces stressors leads to a decrease in depressive symptoms. Further, Seligman (1995) has created a treatment protocol specifically to help children change their stable and global explanations for negative events to more adaptive ones. Perhaps, as a function of their illness, children with JRD generalize their disease experience to disease unrelated aspects of life (e.g., when they make global attributions) and display learned helplessness deficits (e.g., depression) when they encounter novel life events that are perceived as uncontrollable.

Indeed, the helplessness/hopelessness theory also includes a diathesis-stress component. In other words, explanatory style is not a cause of symptoms but instead is a risk factor. Only in the presence of uncontrollable negative events are global and stable negative attributions hypothesized to predict depression. Results of the present study demonstrated that global and stable negative attributions predicted increased depressive symptoms in children and adolescents with JRD in the presence of low perceived illness control, supporting previous investigations demonstrating that global and stable

attributions for negative events have the greatest impact on depression in the presence of proximal stressors in the environment (e.g., Metalsky & Joiner, 1992).

The non significant interaction of internal negative attributions in predicting depressive symptoms in the present study provided further support for the helplessness/hopelessness theory of depression, as this theory implies that internal attributions are associated more with loss in self-esteem, but is not a necessary condition for depression. However, the significant main effect of internal negative attributions on depressive symptoms cannot not be ignored. This significant relationship may indicate that children and adolescents with JRD who make ability ("I'm no good") and not effort ("I didn't try") attributions for negative events may be more vulnerable to depression (Peterson et al., 1993). In the context of rheumatic disease uncontrollability, internal explanations often take on a sense of permanence (i.e., "What is wrong with me?"), resulting in decreased perceptions of personal agency for modifying negative situations (e.g., Schiaffino & Revenson, 1992). It is plausible that children with JRD exhibit this "characterological self-blame" (Shaver & Drown, 1986) in response to negative events as a result of multiple confrontations with seemingly uncontrollable illness circumstances, which are then generalized to future situations. Indeed, results of the present study revealed that for children with JRD, low perceived control over the long-term illness course leads to increased internal attributions for negative events, which lead to increased depressive symptoms (attributional style mediated the relationship between long-term illness control and depressive symptoms).

Given discrepancies in previous investigations of the diathesis-stress model of depression in children (e.g., Conley et al., 2001; Abela, 2001), the robust support for this

model in the present pediatric chronic illness population warrants a more detailed discussion. The moderating effect of perceived control on the pessimistic explanatory style-depressive symptom relationship provides an interesting framework for conceptualizing depressive symptoms in JRD and perhaps, in the general pediatric chronic illness population. Presumably, information that children receive about their disease must be processed and organized like any other type of information, and stable mental representations based on past experiences will guide future perception and interpretation (Williams, Wasserman, & Lotto, 2003). Perhaps, JRD serves as the learning context from which children generalize negative cognitions about their illness and incorporate them into a more pervasive and general cognitive style (e.g., pessimistic attributional style), which is activated when they encounter uncontrollability over their illness (see Pimm & Weinman, 1998). Thus, once established, global and stable attributions (the diatheses) operate as distal contributory causes of depressive symptoms when a proximal stressor in an important life domain, perceived illness uncontrollability, is present (e.g., Schiaffino & Revenson, 1995). Abramson and colleagues (1989) emphasized that this relationship is present only when the encountered stress is meaningful to the person, and one can surmise that controllability over a chronic illness is quite significant to children.

Several recent studies may shed some light on the salience of perceived control in JRD. Anthony and colleagues (2003) demonstrated increases in generalized social distress and distress related to novel social situations in children whose parents perceived them as more vulnerable. They hypothesized that parental cognitions (perceptions of vulnerability) may affect parenting behaviors, such as overprotection, which in turn

influences how children respond to novel situations. Perhaps, in an attempt to "help," parents of children who encounter the characteristic unexpected disease exacerbations of JRD actually prohibit their children from establishing autonomy and control over their disease. These children perceive low control over their illness, which provides the context for activation of pessimistic attributions to predict depressive symptoms. Indeed, research has shown that parents of chronically ill children often discourage the development of autonomous behavior (Wright, Mullen, West, & Wyatt, 1993). By shielding their children from potential consequences of JRD, parents may inadvertently interfere with their child's sense of control over the illness, setting the occasion for distal cognitive appraisal mechanisms to come into play.

In another recent study, Power, Dahlquist, Thompson, and Warren (2003) similarly revealed that mothers of children with JRA were more directive (e.g., provided more clues, prompts, and structure) when interacting with their children compared to mothers of healthy children. Because parents often burden themselves with more responsibility for their child's illness management than is necessary (Wright et al., 1993), this may also generalize to other aspects of parenting a child with JRD. Powers et al. proposed that the increased frequency of feedback on disease unrelated cognitive tasks may reflect parents' attempts to provide contingencies for children who often experience behavior-outcome noncontingency as a result of their rheumatic disease. The net result, however, is that children may feel inadequate about their ability to complete these tasks on their own. Certainly, this exaggerated parental responsibility for disease management could provide a plausible explanation for the development of children's perceived

uncontrollability of disease symptoms, which provides the context for activation of pessimistic attributions and increased depressive symptoms.

Finally, results of the present study demonstrated that children and adolescents with JRD perceived significantly greater control over daily symptoms compared to long-term symptoms. Affleck and colleagues (1987) previously revealed these same results in a sample of adults with RA. Thus, it appears that both children and adults with rheumatic disease perceive themselves as having less control over the long-term disease course than daily symptoms. This discrepancy suggests the necessity for illness specific assessments of perceived control and the inclusion of both long-term and daily measure of perceived control in populations with rheumatic disease.

Strengths and Limitations

There are several strengths to the present study, including the significant attribution-depressive symptom findings after taking into account the effects of parental distress on child depressive symptoms. Numerous studies have consistently demonstrated the significant impact of parent distress on child adjustment (e.g., Thompson et al., 1993; Wagner et al., in press). That the present study demonstrated significant effects of cognitive appraisal variables after controlling for parent adjustment adds to the robustness of the findings.

Another strength involves the utilization of both parent and child-report measures. Previous research has almost exclusively examined child adjustment by mother report, and results have demonstrated a discrepancy between parent and child report of child distress (Overholser et al., 2000). In the present study, the confound of parent distress influencing parent-reported child distress was eliminated by assessing child-reported

depressive symptoms separately. Therefore, the present study provides a more accurate report of subjective distress and cognitive appraisals by utilizing children's self-report measures for these constructs (Silverman & Rabian, 1999). In addition, the present study makes an important contribution to the existing body of literature on the helplessness conceptualization of depression in children with a chronic illness. The present study represents the only known examination of attributional style and perceived control within a cognitive diathesis-stress framework in children with JRD.

The findings of this study must be qualified by several limitations. One limitation involves the exclusive use of self-report inventories, which may have resulted in significant correlations due to shared method variance and not to the predicted associations between the variables under study. Further, although attributions were considered distal causal antecedents to depression, the cross-sectional nature of this study does not allow for determining the causal direction of relationships between variables. It could be argued that the pessimistic attributions assessed in this study were actually the result of, or concomitant to, existing depressive symptoms (Ackerman-Engel & DeRubeis, 1993). Although prospective studies would be needed to determine the temporal nature of attribution-depression relationships in JRD, recent evidence indicates that, indeed, causal attributions precede the development of depressive symptoms in adults with rheumatoid arthritis (Chaney, Mullins, Wagner, Hommel, Page, & Doppler, in press).

In addition, the relatively small sample size may have contributed to moderate power estimates, and thus relationships between the predictor and outcome variables may not have been appropriately represented. Further, interpretation and generalization of

these results remain limited because of the inclusion of a modest, self-selected sample of individuals. It is possible that the present sample of children with JRD and their parents felt significantly distressed and thus chose to participate in this study. This self-selection bias may have resulted in simultaneous elevations in parental distress and both pessimistic child cognitive appraisals and depressive symptoms, resulting in the observed significant associations. Unfortunately, the procedure for data collection did not allow for examination of potential differences between those patients with JRD who participated and those who did not.

Also, the sample comprised a heterogeneous group of children and adolescents with different JRD subtypes. Specifically, children with JRA represented almost sixty-percent of the sample, and children with JAS, JDM, and lupus were underrepresented. Although disease subtype was controlled for in the regression analyses, it is possible that systematic differences in cognitive appraisals and/or depressive symptoms across disease types may have been mitigated by their low representation in the study. Finally, although the reliability estimates for the individual dimensions (GN, SN, and IN) on the measure of attributional style (CASQ-R) were similar to estimates reported in other investigations (Seligman et al., 1984), they were poor and raise questions regarding the validity of the findings. Without a doubt, the reliability estimates for the individual dimensions reported for the present study were low; however, previous studies have shown that the correlations between the three dimensions are also relatively low in magnitude (Robins & Block, 1989), which discounts the use of the composite negative attribution score. Thus, future research on causal attributions would benefit from developing a more

psychometrically sound self-report measure of attributional style in children and adolescents.

Unfortunately, the scope of this study did not allow for further examination of potential developmental differences in children's understanding of the distinction between daily and long-term perceived control. Future studies should focus on potential developmental differences in illness cognitions and perhaps include measures of children's understanding of their disease. Results of the present study also indicate that future studies examining developmental considerations in JRD need to be aware of potential age-disease confounds that can occur as a function of the natural age distributions across different disease subtypes.

Clinical Implications

The results of this present study provide support for specific clinical interventions. Given that response-contingent reinforcement appears to be a critical factor in determining psychological outcome in children and adolescents with JRD, clinical interventions should focus on helping children identify illness-related and illness-unrelated aspects of functioning over which they can realistically exercise control. Similarly, parents should be educated on realistic expectations for their children and promotion of age-appropriate levels of autonomy. For example, children and adolescents, who demonstrate treatment non-adherence because of unpopular treatment components (Kroll, Barlow, & Shaw, 1999) could benefit from compliance interventions aimed at increasing personal agency over daily illness management immediately following diagnosis (Kroll et al., 1999; Rapoff, 2000). Similarly, it appears helpful to have children and adolescents with JRD actively participate in treatment decisions and skills to enhance

and maintain efficacy for self-management (Loscalzo, 1996). Behavioral pain management techniques can equip children with skills to control their pain experiences (Walco, Varni, & Ilowite, 1992; Lavigne, Ross, Berry, & Hayford, &Pachman 1992). Finally, the findings of the present study suggest that therapeutic interventions aimed at increasing perceived control should differentiate between daily and long-term control and assist children in developing expectations for aspects of the disease over which they can realistically have control.

The relationship between stable and global attributions for negative events and depressive symptoms suggest that cognitive restructuring techniques may be useful; however, most studies demonstrating the effectiveness of cognitive-behavior therapies in reducing depression, anxiety, and helplessness have focused on adults with rheumatic disease (e.g., Bradly & Alberts, 1999; Leibing, Pfingsten, Bartmann, Rueger, and Schuessler, 1999). Arthritis camps have shown to be effective in helping families adjust to JRD and empowering them to develop realistic goals for aspects of the disease over which they can have control (e.g., Hagglund, Doyle, Clay, Frank, Johnson, & Pressly, 1996), though study sample sizes are low and arthritis camps are not readily accessible to most families of children with JRD. In conclusion, findings of the present study support the use of cognitive-behavioral interventions for depression in children with JRD and suggest that treatments aimed at targeting both increased control over daily aspects of illness management and appraisals of illness-unrelated domains of functioning may prove most effective.

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Table 1.

Disease, Demographic, and Psychosocial Variables

Variables	Frequency	M	%	SD	Range
Child's Gender					
Male	19		38%		
Female	31		62%		
Child's Ethnicity					
Caucasian	23		46%		
Native American	13		26%		
Hispanic	05		10%		
African American	04		8%		
Biracial	04		8%		
Asian	01		2%		
Diagnosis					
JRA	29		58%		
Lupus	12		24%		
JDM	07		14%		
JAS	02		4%		
Child's Age		13.66		(2.42)	9-17
Illness Duration (years)		2.67		(3.35)	.04-15.73
PRFD		1.50		(0.61)	1-3
JAFAR-C		4.85		(6.35)	0-27
BSI		0.58		(0.58)	0-3.13
CASQ-R (IN)		0.92		(1.05)	0-4
CASQ-R (SN)		1.46		(0.91)	0-4
CASQ-R (GN)		0.76		(0.87)	0-4
Daily Control		4.55		(1.60)	1-7
Long-term Control		4.18		(1.49)	1-7
CDI		8.86		(8.56)	0-44

Note. PRFD = Physician-rated functional disability; JAFAR-C = Juvenile Arthritis Functional Assessment Report; BSI = Brief Symptom Inventory; CASQ-R = Children's

Attributional Style Questionnaire-Revised, IN = Internal Negative, GN = Global Negative, SN = Stable Negative; CDI = Children's Depression Inventory.

Table 2.

Zero-order Correlation for Selected Study Variables.

Variables	1	2	3	4	5	6	7	8
1. Child's Age	_							
2. BSI	.29*	_						
3. Daily Control	-.26	-.29*	_					
4. Long Control	-.21	-.17	.59**	_				
5. CASQ-R (IN)	.13	.12	.33*	-.29*	_			
6. CASQ-R (SN)	-.01	.09	-.18	-.14	.04	_		
7. CASQ-R (GN)	-.39**	.45**	-.21	-.31**	.38**	.14	_	
8. CDI	.31*	.41**	-.30*	-.35*	.41**	.28*	.66**	_

Note. BSI = Brief Symptom Inventory; CASQ-R = Children's Attributional Style Questionnaire-Revised, IN = Internal Negative, SN = Stable Negative, GN = Global Negative; CDI = Children's Depression Inventory.

*$p < .05$. **$p < .01$.

Table 3.

Hierarchical Regression Analyses of Children's Depression Inventory on Daily Control

Step	Variable	β	t for within-step predictors	R^2 Change for step	Cumulative R^2	F Change for step
	Equation 1					
1	Age	.85	1.78	.18	.18	5.17**
	Diagnosis	5.15	2.22*			
2	JAFAR-C	.43	2.47*	.11	.29	3.42*
	PRFD	-2.36	-1.27			
3	BSI	3.50	1.75	.05	.34	3.07
4	CASQ-R (IN)	2.47	2.46*	.11	.45	4.26*
	Daily Control	-0.55	-0.78			
5	IN X Daily	-.08	-0.11	.00	.45	.01
	Equation 2					
4	CASQ-R (SN)	1.96	1.15	.07	.41	2.61
	Daily Control	-0.85	-1.20			
5	SN X Daily	-1.63	-2.28*	.07	.48	5.21*
	Equation 3					
4	CASQ-R (GN)	6.10	5.41***	.29	.63	16.44***
	Daily Control	-1.10	-1.98			
5	GN X Daily	-1.39	-2.31*	.04	.67	5.34*

Note: Steps 1,2, and 3 were the same in all three equations and are shown only once. JAFAR-C = Juvenile Arthritis Functional Assessment Report-Child; PRFD = Physician-rated functional disability; BSI = Brief Symptom Inventory; CASQ-R = Children's Attributional Style Questionnaire-Revised, IN = Internal Negative, GN = Global Negative, SN = Stable Negative.

$^{*}p < .05$. $^{**}p < .01$. $^{***}p < .001$

Table 4.

Hierarchical Regression Analyses of Children's Depression Inventory on Long-term Control

Step	Variable	β	t for within-step predictors	R^2 Change for step	Cumulative R^2	F Change for step
	Equation 1					
1	Age	0.85	1.78	.18	.18	5.17**
	Diagnosis	5.15	2.22*			
2	JAFAR-C	0.43	2.47*	.11	.29	3.42*
	PRFD	-2.36	-1.27			
3	BSI	3.50	1.75	.05	.34	3.07
4	CASQ-R (IN)	2.30	2.36*	.13	.47	5.24**
	Long Control	-1.07	-1.51			
5	IN X Long	-0.50	-0.73	.01	.48	0.53
	Equation 2					
4	CASQ-R (SN)	1.95	1.76	.10	.44	3.87*
	Long Control	-1.37	-1.93			
5	SN X Long	-2.22	-2.85**	.09	.53	8.10**
	Equation 3					
4	CASQ-R (GN)	5.72	4.92***	.28	.62	15.54***
	Long Control	-0.99	-1.68			
5	GN X Long	-1.74	-2.38*	.05	.66	5.68*

Note: Steps 1, 2, and 3 were the same in all three equations and are shown only once. JAFAR-C = Juvenile Arthritis Functional Assessment Report-Child; PRFD = Physician-rated functional disability; BSI = Brief Symptom Inventory; CASQ-R = Children's Attributional Style Questionnaire-Revised, IN = Internal Negative, GN = Global Negative, SN = Stable Negative.

$^{*}p < .05$. $^{**}p < .01$. $^{***}p < .001$

Table 5.

Hierarchical Regression Analyses of Children's Depression Inventory– Daily Control as a Conditional Moderator

Step	Variable	β	t	p
4	**CASQ-R (SN)**	**4.66**	**2.89****	**.006**
	LO-daily	-1.00	-1.46	.151
	SN X LO-daily	-1.62	-2.28	.028
4	**CASQ-R (SN)**	**-0.54**	**-0.35**	**.728**
	HI-daily	-1.00	-1.46	.151
	SN X HI-daily	-1.62	-2.28	.028
4	**CASQ-R (GN)**	**8.36**	**5.75*****	**.001**
	LO-daily	-0.94	-1.76	.089
	SN X LO-daily	-1.39	-2.31	.026
4	**CASQ-R (GN)**	**3.92**	**2.75****	**.009**
	HI-daily	-0.94	-1.76	.089
	GN X HI-daily	-1.39	-2.31	.026

Note: Steps 1, 2, and 3 were the same as those in Tables 3 and 4 and are not shown here. CASQ-R = Children's Attributional Style Questionnaire-Revised, SN = Stable Negative, GN = Global Negative; LO-daily = low daily control; HI-daily = high daily control. $*p < .05$. $**p < .01$. $***p < .001$ (Only simple slopes for GN and SN are highlighted here; in Tables 3 & 4 the interactions are emphasized.)

Table 6.

Hierarchical Regression Analyses of Children's Depression Inventory– Long-term Control as a Conditional Moderator

Step	Variable	β	t	p
4	**CASQ-R (SN)**	**5.08**	**3.38****	**.002**
	LO-long	-1.42	-2.15	.038
	SN X LO-long	-2.22	-2.85	.007
4	**CASQ-R (SN)**	**-1.54**	**-0.96**	**.342**
	HI-long	-1.41	-2.15	.038
	SN X HI-daily	-2.22	-2.85	.007
4	**CASQ-R (GN)**	**7.55**	**5.62*****	**.001**
	LO-long	-1.13	-2.02	.050
	SN X LO-long	-1.74	-2.38	.022
4	**CASQ-R (GN)**	**2.35**	**1.31**	**.197**
	HI-long	-1.13	-2.02	.050
	GN X HI-long	-1.74	-2.38	.022

Note: Steps 1, 2, and 3 were the same as those in Tables 3 & 4 and are not shown here. CASQ-R = Children's Attributional Style Questionnaire-Revised, SN = Stable Negative, GN= Global Negative; LO-long = lo long-term control; HI-long = high long-term control. *$p < .05$. **$p < .01$. ***$p < .001$

(Only simple slopes for GN and SN are highlighted here; in Tables 3 & 4 the interactions are emphasized.)

Figure 1.

Interaction of Stable Negative Attributions and Daily Perceived Control on Child Depressive Symptoms.

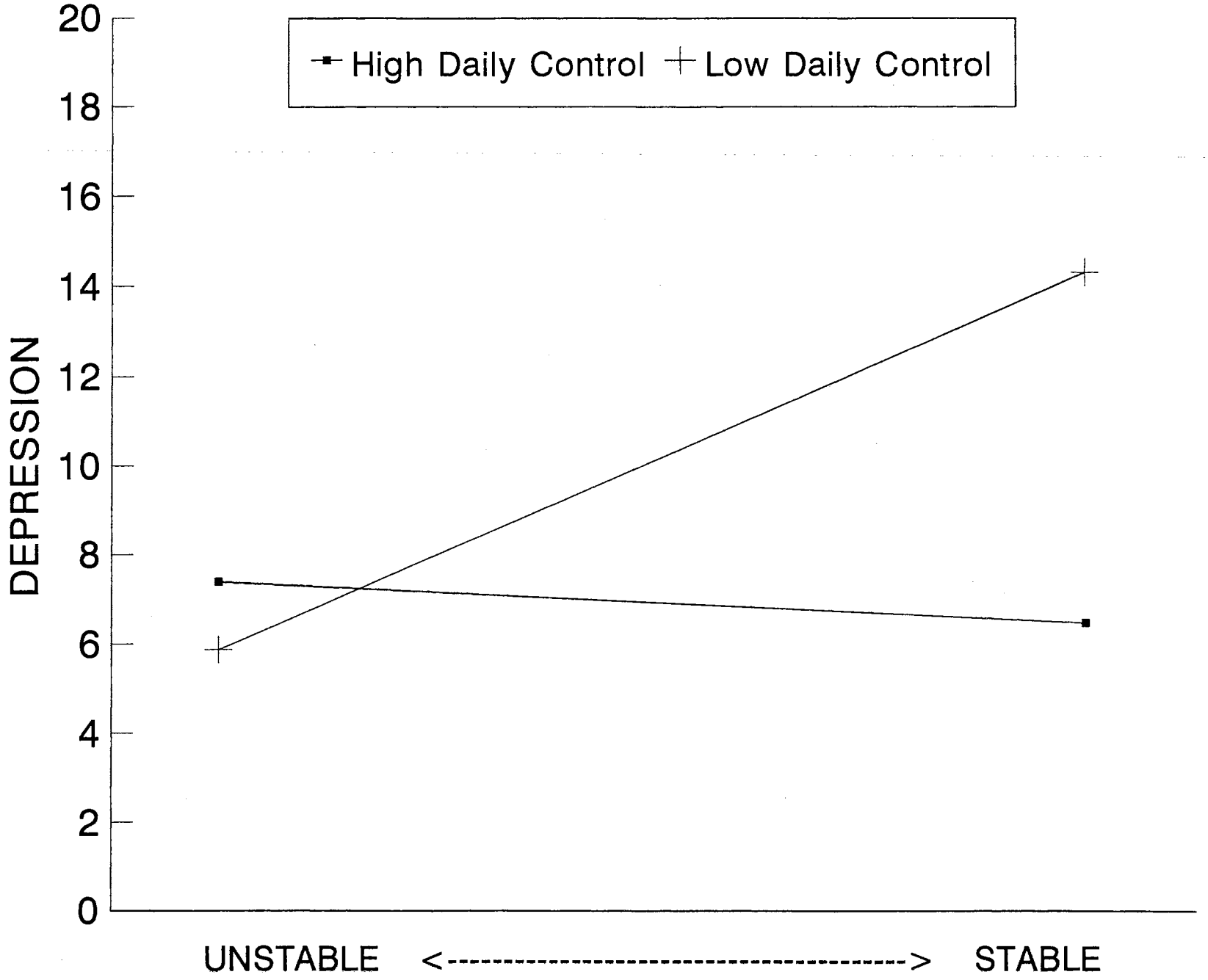
High Daily Control
Low Daily Control
DEPRESSION
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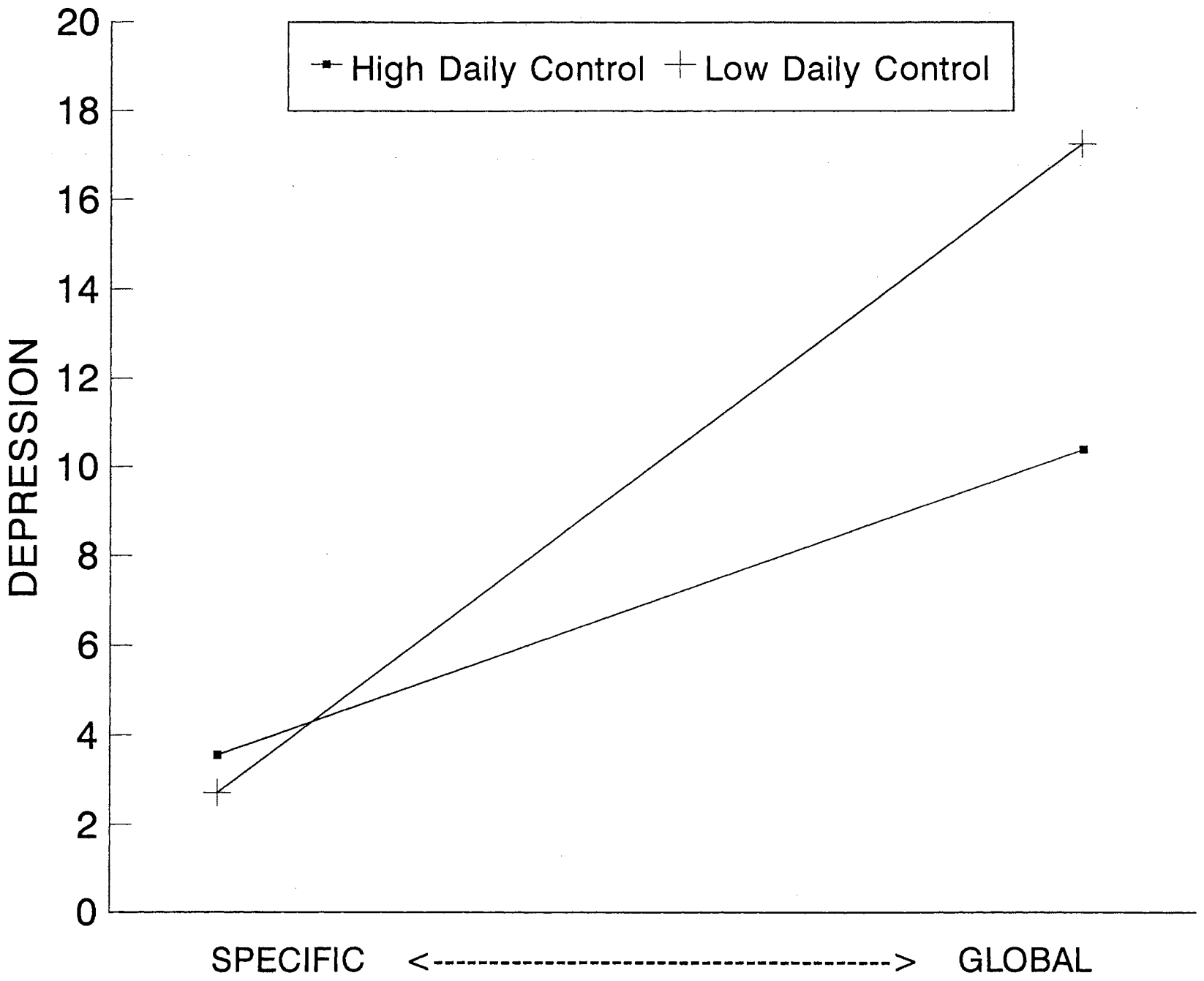
Figure 2.

Interaction of Global Negative Attributions and Daily Perceived Control on Child Depressive Symptoms.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Low Daily Control
DEPRESSION
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Figure 3.

Interaction of Stable Negative Attributions and Long-term Perceived Control on Child Depressive Symptoms.

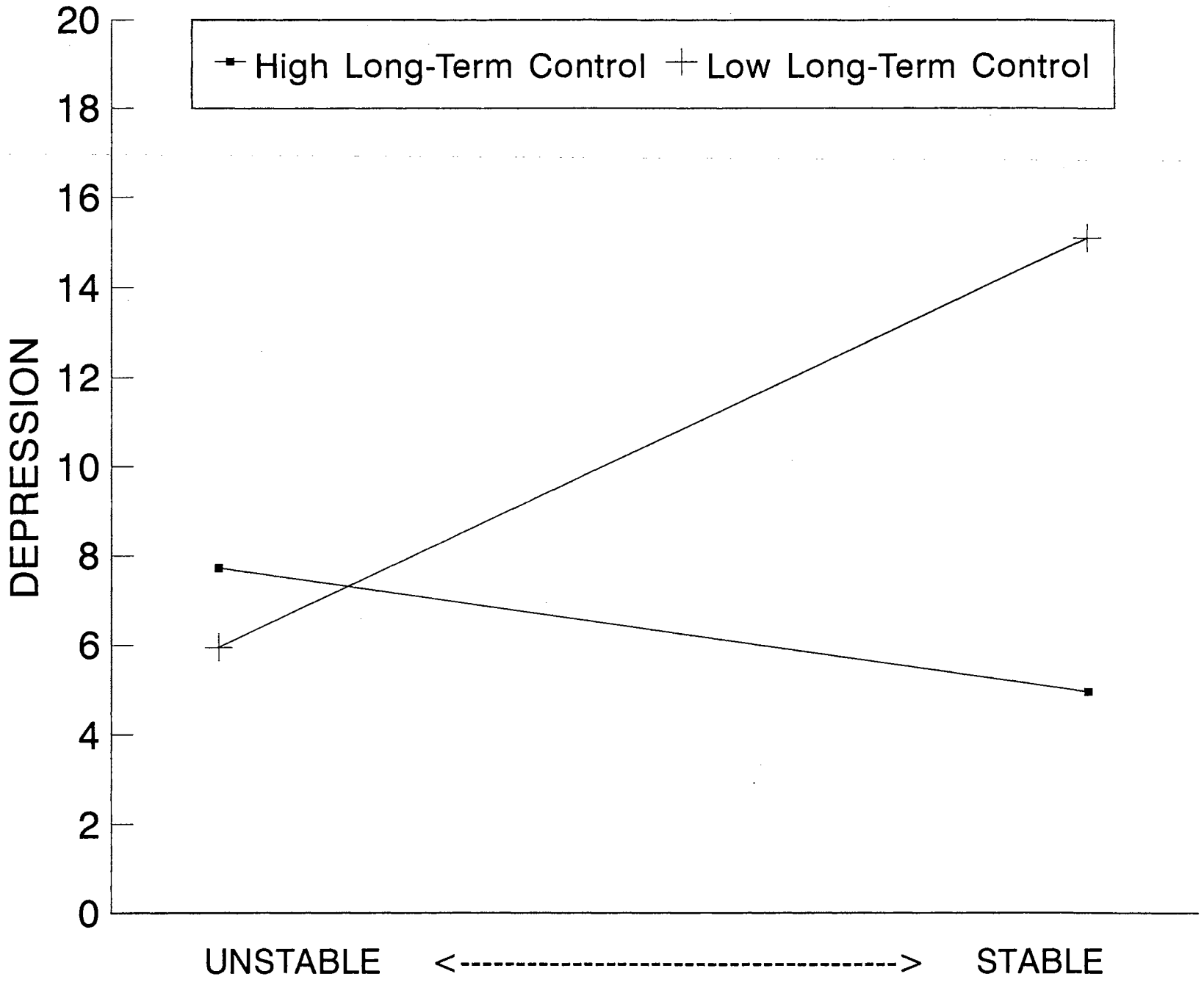
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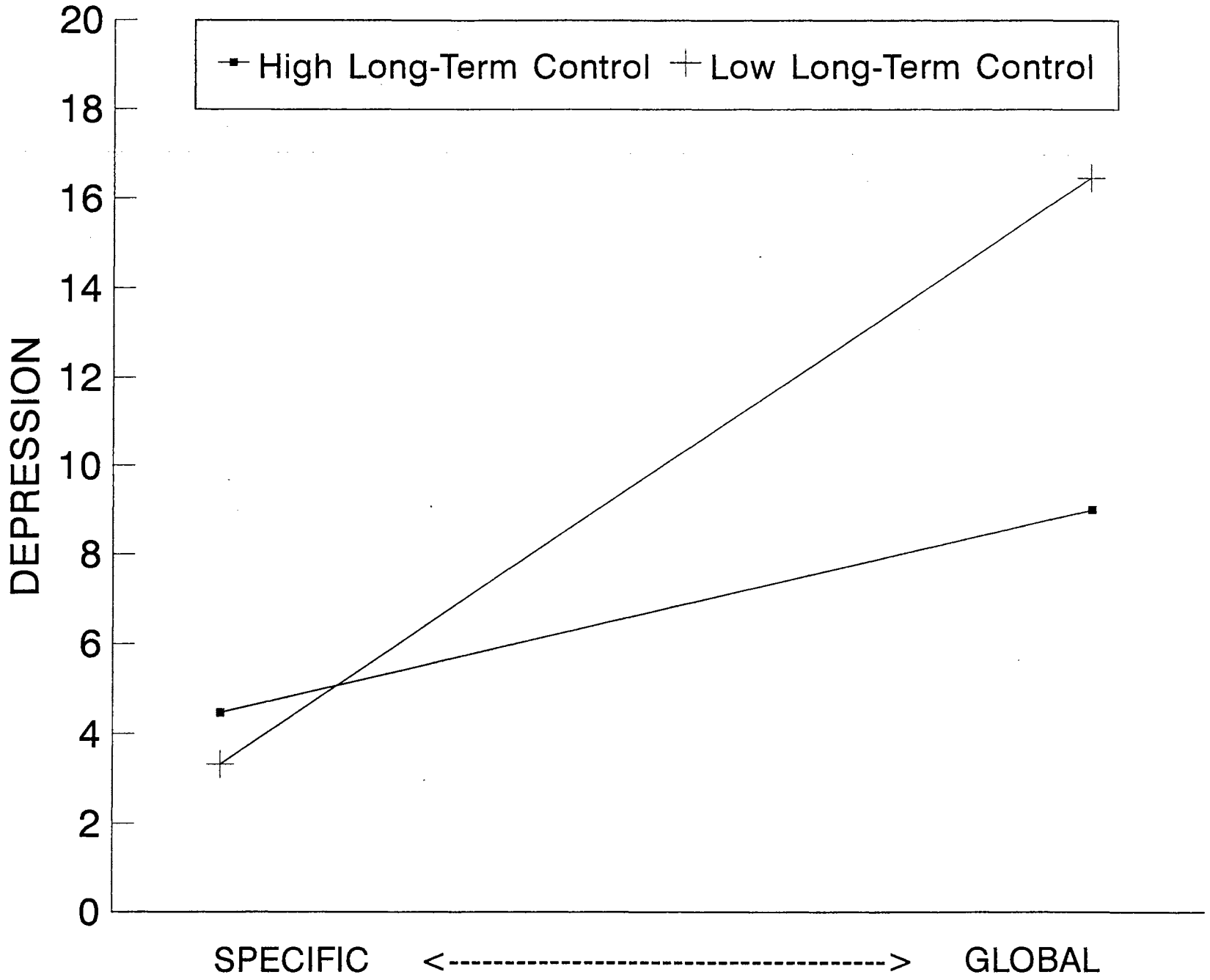
Figure 4.

Interaction of Global Negative Attributions and Long-term Perceived Control on Child Depressive Symptoms.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GLOBAL

APPENDIX A

Children's Depression Inventory

Kids sometimes have different feelings and ideas.

This form lists the feelings and ideas in groups. From each group, pick one sentence that describes you best for the past two weeks. After you pick a sentence from the first group, go on to the next group.

There is no right answer or wrong answer. Just pick the sentence that best describes the way you have been recently. Put a mark like this X next to your answer. Put the mark in the box next to the sentence that you pick.

Here is an example of how this form works. Try it. Put a mark next to the sentence that describes you best.

EXAMPLE:

_____ I read books all the time

_____ I read books once in a while

_____ I never read books

Remember, pick out the sentence that describes your feelings and ideas in the PAST TWO WEEKS.

1. _____ I am sad once in a while

   _____ I am sad many times

   _____ I am sad all the time

2. _____ Nothing will work out for me

   _____ I am not sure if things will work out for me

   _____ Things will work out for me O.K.

3. _____ I do most things O.K.

_____ I do many things wrong

_____ I do everything wrong

4. _____ I have fun in many things

_____ I have fun in some things

_____ Nothing is fun at all

5. _____ I am bad all the time

_____ I am bad many times

_____ I am bad once in a while

6. _____ I think about bad things happening to me once in a while

_____ I worry that bad things will happen to me

_____ I am sure that terrible things will happen to me

7. _____ I hate myself

_____ I do not like myself

_____ I like myself

8. _____ All bad things are my fault

_____ Many bad things are my fault

_____ Bad things are not usually my fault

9. _____ I do not think about killing myself

_____ I think about killing myself but I would not do it

_____ I want to kill myself

10. _____ I feel like crying every day

_____ I feel like crying many days

_____ I feel like crying once in a while

11. _____ Things bother me all the time

_____ Things bother me many times

_____ Things bother me once in a while

12. _____ I like being with people

_____ I do not like being with people many times

_____ I do not want to be with people at all

13. _____ I cannot make up my mind about things

_____ It is hard to make up my mind about things

_____ I make up my mind about things easily

14. _____ I look O.K.

_____ There are some bad things about my looks

_____ I look ugly

15. _____ I have to push myself all the time to do my school work

_____ I have to push myself many times to do my school work

_____ Doing school work in not a big problem

16. _____ I have trouble sleeping every night

_____ I have trouble sleeping may nights

_____ I sleep pretty well

17. _____ I am tired once in a while

_____ I am tired many days

_____ I am tired all the time

18. _____ Most days I do not feel like eating

_____ Many days I do not feel like eating

_____ I eat pretty well

19. _____ I do not worry about aches and pains

_____ I worry about aches and pains many times

_____ I worry about aches and pains all the time

20. _____ I do not feel alone

_____ I feel alone many times

_____ I feel alone all the time

21. _____ I never have fun at school

_____ I have fun at school only once in a while

_____ I have fun at school many times

22. _____ I have plenty of friends

_____ I have some friends but I wish I had more

_____ I do not have any friends

23. _____ My school work is all right

_____ My school work is not as good as before

_____ I do very badly in subjects I used to be good in

24. _____ I can never be as good as other kids

_____ I can be as good as other kids if I want to

_____ I am just as good as other kids

25. _____ Nobody really loves me

_____ I am not sure if anybody loves me

_____ I am sure that somebody loves me

26. _____ I usually do what I am told

_____ I do not do what I am told most times

_____ I never do what I am told

27. _____ I get along with people

_____ I get into fights many times

_____ I get into fights all the time

THE END

THANK YOU FOR FILLING OUT THIS FORM

APPENDIX B

Children's Attributional Style Questionnaire-Revised (CASQ-R)

INSTRUCTIONS

Here are some situations. I want you to try really hard to imagine that these situations just happened to you. After each situation is presented, two possible reasons for why the situation might have happened are given. I want you to choose the most likely reason to explain why the situation happened to you.

Sometimes both of the reasons may sound true, and sometimes both may sound false, and, you may never have been in some of these situations. But even so, I want you to pick the reason that seems to explain why the situation happened to you.

There are no right answers and no wrong answers, so always pick the reason that seems the most likely to you.

Circle either "A" or "B" for each question.

1. You get an "A" on a test.

   A. I am smart.
   B. I am good in the subject that the test was in.

2. Some kids that you know say that they do not like you.

   A. Once in a while people are mean to me.
   B. Once in a while I am mean to other people.

3. A good friend tells you that he or she hates you.

   A. My friend was in a bad mood that day.
   B. I wasn't nice to my friend that day.

4. A person steals money from you.

   A. That person is not honest.
   B. Many people are not honest.

5. Your parents tell you something that you make is very good.

   A. I am good at making some things.
   B. My parents like some things I make.

6. You break a glass.

   A. I am not careful enough.
   B. Sometimes I am not careful enough.

7. You do a project with a group of kids and it turns out badly.

   A. I don't work well with people in that particular group.
   B. I never work well with groups.

8. You make a new friend.

   A. I am a nice person.
   B. The people that I meet are nice.

9. You have been getting along well with your family.

   A. I am usually easy to get along with when I am with my family.
   B. Once in awhile I am easy to get along with when I am with my family.

10. You get a bad grade in school.

    A. I am not a good student
    B. Teachers give hard tests.

11. You walk into a door and you get a bloody nose.

    A. I wasn't looking where I was going.
    B. I have been careless lately.

12. You have a messy room.

    A. I did not clean my room that day.
    B. I usually do not clean my room.

13. Your mother makes you your favorite dinner.

    A. There are a few things that my mother will do to please me.
    B. My mother usually likes to please me.

14. A team that you are on loses a game.

    A. The team members don't help each other when they play together.
    B. That day the team members didn't help each other.

15. You do not get your chores done at home.

A. I was lazy that day.
B. Many days I am lazy.

16. You go to an amusement park and you have a good time.

A. I usually enjoy myself at amusement parks.
B. I usually enjoy myself in many activities.

17. You go to a friend's party and you have fun.

A. Your friend usually gives good parties.
B. Your friend gave a good party that day.

18. You have a substitute teacher and she likes you.

A. I was well behaved during class that day
B. I am almost always well behaved during class.

19. You make your friends happy.

A. I am usually a fun person to be with.
B. Sometimes I am a fun person to be with.

20. You put a hard puzzle together.

A. I am good at putting puzzles together.
B. I am good at doing many things.

21. You try out for a sports team and do not make it.

A. I am not good at sports.
B. The other kids who tried out were very good at sports.

22. You fail a test.

A. All tests are hard.
B. Only some tests are hard.

23. You hit a home run in a ball game.

A. I swung the bat just right.
B. The pitcher threw an easy pitch.

24. You do the best in your class on a paper.

A. The other kids in my class did not work hard on their papers.
B. I worked hard on the paper.

APPENDIX C

Perceived Control (embedded within general information)

How much control do you think **you** have over the **daily symptoms** of your JRD?

1	2	3	4	5	6	7
No Control		A Little Control		A Great Deal Of Control		Complete Control

How much control do you think **you** have over the **long-term course** of your JRD?

1	2	3	4	5	6	7
No Control		A Little Control		A Great Deal Of Control		Complete Control

APPENDIX D

Juvenile Arthritis Functional Assessment Report- Child Form (JAFAR-C)

Below are some questions about some things that have to be done to eat, get dressed, and go to school. Please tell us how well you've been able to do these things during the past week by placing a check mark under the column that describes your ability. For example, if you were asked, "Over the past week, have you been able to brush your hair by yourself: All of the time, Just some of the time, of Almost never?" you would place a check mark under the column labeled "All of the time" if you were able to do this everyday. For the following questions, please tell us how often you have been able to perform each of the following activities:

	All the time	Sometimes	Almost Never
1. Take shirt off hanger	_____	_____	_____
2. Button shirt	_____	_____	_____
3. Pull on sweater over head	_____	_____	_____
4. Turn on water faucet	_____	_____	_____
5. Climb into bathtub	_____	_____	_____
6. Dry back with towel	_____	_____	_____
7. Wash face with washcloth	_____	_____	_____
8. Tie shoelaces	_____	_____	_____
9. Pull on socks	_____	_____	_____
10. Brush teeth	_____	_____	_____
11. Stand up from chair without using arms	_____	_____	_____
12. Get into bed	_____	_____	_____
13. Cut food with knife and fork	_____	_____	_____
14. Lift empty glass to mouth	_____	_____	_____
15. Reopen previously opened food jar	_____	_____	_____

16. Walk 50 feet without help _____ _____ _____

17. Walk up 5 steps _____ _____ _____

18. Stand up on tiptoes _____ _____ _____

19. Reach above head _____ _____ _____

20. Get out of bed _____ _____ _____

21. Pick up something from floor from standing position _____ _____ _____

22. Push open door after turning knob _____ _____ _____

23. Turn head and look over shoulder _____ _____ _____

APPENDIX E

Brief Symptom Inventory (BSI)

INSTRUCTIONS:
On the next page is a list of problems people sometimes have. Please read each one carefully, and blacken the circle that best describes HOW MUCH THAT PROBLEM HAS DISTRESSED OR BOTHERED YOU DURING THE PAST 7 DAYS INCLUDING TODAY. Blacken the circle for only one number for each problem and do not skip any items. If you change your mind, erase your first mark carefully. Read the example before beginning, and if you have any questions please ask them now.

EXAMPLE

Not at All	A little Bit	Moderately	Quite a Bit	Extremely	HOW MUCH WERE YOU DISTRESSED BY:
0	1	2	3	4	Bodyaches

		0	1	2	3	4	HOW MUCH WERE YOU DISTRESSED BY:
1		0	1	2	3	4	Nervousness or shakiness inside
2		0	1	2	3	4	Faintness or dizziness
3		0	1	2	3	4	The idea that someone else can control your thoughts
4		0	1	2	3	4	Feeling others are to blame for most of your troubles
5		0	1	2	3	4	Trouble remembering things
6		0	1	2	3	4	Feeling easily annoyed or irritated
7		0	1	2	3	4	Pains in heart or chest
8		0	1	2	3	4	Feeling afraid in open spaces or on the streets
9		0	1	2	3	4	Thoughts of ending your life
10		0	1	2	3	4	Feeling that most people cannot be trusted
11		0	1	2	3	4	Poor appetite
12		0	1	2	3	4	Suddenly scared for no reason
13		0	1	2	3	4	Temper outbursts that you could not control
14		0	1	2	3	4	Feeling lonely even when you are with people
15		0	1	2	3	4	Feeling blocked in getting things done
16		0	1	2	3	4	Feeling lonely
17		0	1	2	3	4	Feeling blue
18		0	1	2	3	4	Feeling no interest in things
19		0	1	2	3	4	Feeling fearful
20		0	1	2	3	4	Your feelings being easily hurt
21		0	1	2	3	4	Feeling that people are unfriendly or dislike you
22		0	1	2	3	4	Feeling inferior to others
23		0	1	2	3	4	Nausea or upset stomach
24		0	1	2	3	4	Feeling that you were watched or talked about by others
25		0	1	2	3	4	Trouble falling asleep
26		0	1	2	3	4	Having to check and double-check what you do
27		0	1	2	3	4	Difficulty making decisions
28		0	1	2	3	4	Feeling afraid to travel on buses, subways, or trains
29		0	1	2	3	4	Trouble getting your breath
30		0	1	2	3	4	Hot or cold spells
31		0	1	2	3	4	Having to avoid certain things, places, or activities because they frighten you
32		0	1	2	3	4	Your mind going blank
33		0	1	2	3	4	Numbness or tingling in parts of your body
34		0	1	2	3	4	The idea that you should be punished for your sins
35		0	1	2	3	4	Feeling hopeless about the future
36		0	1	2	3	4	Trouble concentrating
37		0	1	2	3	4	Feeling weak in parts of your body
38		0	1	2	3	4	Feeling tense or keyed up
39		0	1	2	3	4	Thoughts of death or dying
40		0	1	2	3	4	Having urges to beat, injure, or harm someone
41		0	1	2	3	4	Having urges to break or smash things
42		0	1	2	3	4	Feeling very self-conscious with others
43		0	1	2	3	4	Feeling uneasy in crowds, such as shopping or at a movie
44		0	1	2	3	4	Never feeling close to another person
45		0	1	2	3	4	Spells of terror or panic
46		0	1	2	3	4	Getting into frequent arguments
47		0	1	2	3	4	Feeling nervous when you are left alone
48		0	1	2	3	4	Others not giving you proper credit for your achievements
49		0	1	2	3	4	Feeling so restless you couldn't sit still
50		0	1	2	3	4	Feelings of worthlessness
51		0	1	2	3	4	Feeling that people will take advantage of you if you let them
52		0	1	2	3	4	Feelings of guilt
53		0	1	2	3	4	The idea that something is wrong with your mind

APPENDIX F

Provider Questionnaire

1. Patient's name: _____

2. Patient's Diagnosis (if multiple diagnoses, please list rheumatic illness first; please indicate if patient is seropositive or ANA-positive):

   _____

   _____

   _____

3. When was the patient diagnosed with the above rheumatic illness?

   Date of diagnosis: _____

4. What is the patient's current medication regimen?

   _____ _____
   _____ _____
   _____ _____
   _____ _____

5. Based on the patient's physical exam, please classify him/her into one of the following four classes.

Class I	Class II	Class III	Class IV
Completely able to perform usual activities of daily living (self care, vocational, & avocational)	Able to perform usual self-care and vocational activities, but limited in avocational activities	Able to perform usual self-care and vocational activities, but limited in avocational activities	Limited ability to perform usual self-care, vocational, and avocational activities

APPENDIX G

IRB Approval Form

Oklahoma State University
Institutional Review Board

Protocol Expires: 2/10/2005

Date: Thursday, February 12, 2004 IRB Application No AS00104

Proposal Title: PSYCHOLOGICAL COMORBIDITY IN JUVENILE RHEUMATOID DISEASES: A COMPARISON OF AMERICAN INDIANS AND CAUCASIANS

Principal Investigator(s):

Nicole Andrews
215 North Murray
Stillwater, OK 74078

Janelle Wagner
215 N. Murray
Stillwater, OK 74078

James Jarvis
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Oklahoma City, OK 73104

Molly White
407 N. Murray
Stillwater, OK 74078

John M. Chaney
215 N. Murray
Stillwater, OK 74078

Reviewed and Processed as: Expedited (Spec Pop)

Approval Status Recommended by Reviewer(s): Approved

Dear PI :

Your IRB application referenced above has been approved for one calendar year. Please make note of the expiration date indicated above. It is the judgment of the reviewers that the rights and welfare of individuals who may be asked to participate in this study will be respected, and that the research will be conducted in a manner consistent with the IRB requirements as outlined in section 45 CFR 46.

As Principal Investigator, it is your responsibility to do the following:

1. Conduct this study exactly as it has been approved. Any modifications to the research protocol must be submitted with the appropriate signatures for IRB approval.
2. Submit a request for continuation if the study extends beyond the approval period of one calendar year. This continuation must receive IRB review and approval before the research can continue.
3. Report any adverse events to the IRB Chair promptly. Adverse events are those which are unanticipated and impact the subjects during the course of this research; and
4. Notify the IRB office in writing when your research project is complete.

Please note that approved projects are subject to monitoring by the IRB. If you have questions about the IRB procedures or need any assistance from the Board, please contact me in 415 Whitehurst (phone: 405-744-5700, colson@okstate.edu).

Sincerely,

Carol Olson

Carol Olson, Chair
Institutional Review Board

APPENDIX H

Informed Consent and Assent Forms

Consent Form

I, _____(name of participant's parent/legal guardian), voluntarily consent to allow my child to participate in the investigation of psychological factors and juvenile rheumatic diseases (JRD).

PURPOSE OF STUDY The purpose of the study is to examine psychological factors associated with JRD disease processes.

DESCIUPTION OF RESEARCH PROCEDURES: The research requires the completion of several paper-and-pencil measures in the Pediatric Rheumatology Clinic at the Children's Hospital of Oklahoma that address psychological factors and perceptions of life events, both in general and with respect to JRA. Some items on the questionnaires contain sensitive issues (e.g., depression, relationships, etc.).

COSTS: There are no costs to your child for participation in this study.

POSSIBLE RISKS: There is virtually no risk associated with completing questionnaires. It is possible that your child may experience some negative emotions during the completion of the questionnaires, but these will be short-lived and have no long-term effects.

RIGHT TO REFUESE OR WITHDRAWAL: My child's participation is voluntary; there is no penalty for refusal to participate, and my child is free to withdraw his/her consent and participation in this project at any time without penalty, after notifying the project director.

BENEFITS: Although my child's participation may not necessarily be personally beneficial to my child, the information derived from this project may have important implications for others who have JRD. The information gained may contribute to a better understanding of the cognitive/emotional functioning and overall treatment of individuals with JRD.

COMPENSATION AND INJURY: I understand that my child and I will receive $10.00 compensation in the form of gift certificates for approximately one hour of participation, and there is no risk of injury as a result of this study.

SUBJECT ASSURANCES: Any data collected as part of my child's participation in this experiment will he treated as confidential and will receive a code number so that they will remain confidential. In no case will any use be made of these data other than as research results. If data from my child's participation are ever displayed, my child's identity w'ill remain confidential.

I may contact Dr. John Chaney, Oklahoma State University, Psychology Department, 215 North Murray Hall, Stillwater, Oklahoma 74078, at (405) 744-5703 should I wish further information about the research. I may also contact the Institutional Review Board (IRB) executive assistant, Sharon Bacher, Oklahoma State University, 203 Whilehurst, Stillwater, Oklahoma 74078, (405) 744-5700. Should any problems arise during the course of the study, I may take them to Dr. Maureen Sullivan, Psychology Department Head, Oklahoma State University, Department of Psychology, 215 North Murray Hall, Stillwater, OK 74078, at (405) 744-027.

I have read and fully understand the consent form, and the option to receive a copy of this consent form has been given to me. I sign it freely and voluntarily.

Date: _____ Time: _____ (A.M./P.M.)

Signed: _____

(Signature of participant's parent/legal guardian)

Witness(es) if required: _____

I certify that I have personally explained all elements of this form to the subject before requesting the subject to sign it

Signed: _____

(Project director or his/her authorized representative)

Assent Form

By signing this form, you are saying that you volunteer to participate in the following study on feelings and juvenile rheumatoid disease (JRD). For this study you will complete several questionnaires. No harm will come to you as a result of participating in this study, however, you are free to stop at any time during your participation in the study. Although the information that you provide will not benefit you directly, other individuals with RA and related medical conditions will likely benefit through better overall treatment of their disease. Your name will not be used after you complete these questionnaires. This means that the information you provide will not be made public in any way, and only you and the experimenter will know what answers you provide on the questionnaires.

Signed:_____
(Signature of participant)

Date: _____ Time:_____ (A.M./P.M.)

Witness(es) if required: _____

I certify that I have explained all elements of this form to the participant before requesting them to sign it.

Signed: _____

VITA

Janelle L. Wagner

Candidate for the Degree of

Doctor of Philosophy

Thesis: A COGNITIVE DIATHESIS-STRESS MODEL OF DEPRESSION IN CHILDREN AND ADOLESCENTS WITH JUVENILE RHEUMATIC DISEASE

Major Field: Psychology

Biographical

Education: Graduated from Stillwater High School, Stillwater, OK, May, 1994; Received Bachelor of Arts degree in Psychology and graduated Summa Cum Laude with a minor in Religion and Honors in Psychology from Wake Forest University, Winston-Salem, NC, May, 1998; Received Master of Science in Psychology from Oklahoma State University, Stillwater, OK, May, 2002; Completed the requirements for the Doctor of Philosophy degree with a major in Psychology at Oklahoma State University (OSU), July, 2004.

Experience: Ad hoc reviewer for the *Journal of Pediatric Psychology*, September 2003-present; Clinical psychology intern at the Medical University of South Carolina in Charleston, SC, August 2003-July 2004; Student editor for the 2003 *Handbook of Pediatric Psychology*, 2002; Clinical practica experience through OSU Psychological Services Center, August 1999-June 2003; Clinical practica experience through the Center for Child Abuse and Neglect and Consultation Liaison Services at the University of Oklahoma Health Sciences Center, June 2001- July 2002; Instructor of Introductory Psychology, August 2000 - June 2001; Teaching Assistant, August 1999- August 2002; Research Associate in Dr. John Chaney's Health Psychology Research Lab at OSU, August 1999-July 2004; Research Assistant at the Attention Deficit Program in the Department of Psychiatry at Duke University Medical Center, September 1998 - June 1999; Research Tutor in the Fast Track Program in the Department of Psychology at Duke University, September 1998 - February 1999; Undergraduate honors psychology research at Wake Forest University, January 1997-May 1998

Professional Affiliations: American Psychological Association (APA), APA Division 54-Society of Pediatric Psychology, APA Division 53-Society of Clinical Child and Adolescent Psychology, APA Division 38-Health Psychology, APA Division 12-Society of Clinical Psychology, APA Graduate Student Association, Association for the Advancement of Behavior Therapy, OSU Psychology Graduate Student Association