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Coping with Chronic Illness: Temporal Patterns of Spiritual Coping and Adjustment among Adolescents with Chronic Illness

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COPING WITH CHRONIC ILLNESS: TEMPORAL PATTERNS OF SPIRITUAL COPING AND ADJUSTMENT AMONG ADOLESCENTS WITH CHRONIC ILLNESS

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MEDICAL/CLINICAL PSYCHOLOGY

ABSTRACT

Issues of spirituality rise to the forefront for youth facing serious health conditions. Positive and negative spiritual coping strategies have been linked with better or worse psychological adjustment, respectively, in pediatric patients. With expansion of research in this area, an empirical synthesis and examination of the prospective relationships between spiritual coping and mental- and physical-health is needed. Accordingly, the first manuscript reports on meta-analytic review of the cross-sectional studies of spiritual coping, health, and psychosocial adjustment. Results revealed that greater use of negative spiritual coping is related to more internalizing problems and poorer quality of life across multiple pediatric illness populations. The second manuscript examined the longitudinal role of spiritual coping in psychological adjustment and found reciprocal relationships over a 2-year period between spiritual coping and depression among adolescents with cystic fibrosis or diabetes. The third manuscript examined the longitudinal role of spiritual coping in physical health outcomes among adolescents with cystic fibrosis, identifying positive spiritual coping as a key predictor of hospitalizations, pulmonary function, and nutritional status over a 5-year period. Addressing spiritual beliefs and adjustment difficulties in pediatric medical care is warranted.

Keywords: *spiritual coping, chronic illness, adjustment, adolescents*

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INTRODUCTION

Pediatric Chronic Illness

Background

Pediatric chronic illness is defined as long-term illness (> 6 months) that interferes with daily functioning and involves extensive medical care or hospitalizations (Elser, 1990). A number of specific conditions are captured under this definition, including asthma, cystic fibrosis, diabetes, and sickle cell disease. Millions of dollars are spent each year on the diagnosis and treatment of pediatric chronic health conditions (Landrigan, Schechter, Lipton, Fahs, & Schwartz, 2002) and dramatic increases in their prevalence have changed the scope of care and demand on health care providers (Perrin, Bloom, & Gortmaker, 2007). Although these increases are primarily a function of improved detection and increased survival (van der Lee, Mokkink, Grootenhuis, Heymans, & Offringa, 2007), most children with chronic illness are not cured and will require ongoing medical care throughout adolescence and adulthood. Estimates suggest that over 30% of US adolescents now experience chronic health conditions that impede their social and emotional development, and often result in disabling sequelae (Newacheck et al., 1991).

As these adolescents mature into adulthood, they are faced with the same developmental challenges as healthy adolescents – developing one's identity, increasing independence from parents, forming intimate relationships with friends and romantic

partners, and establishing employment. Unfortunately, their ongoing medical needs may make these tasks difficult or impossible (Callahan, Winitzer, & Keenan, 2001). In fact, a recent longitudinal study revealed that compared to healthy peers, adolescents with chronic illness were less likely to graduate from high school or attain employment, and were more likely to receive financial assistance (Maslow, Haydon, Ford, & Halpern, 2011). Efforts to negotiate these developmental tasks also often lead to problems with psychological adjustment and medical adherence (LaGreca & Mackey, 2009).

Despite important medical differences among specific illnesses, the psychosocial challenges faced by these adolescents show remarkable similarity (Wallander, Thompson, & Alriksson-Schmidt, 2003). For instance, all these youth need to cope with medical stressors, adhere to treatment regimens, and deal with the impact of their illness on their identity, family, peer relationships, and academic functioning. As such, two of the three studies presented herein focus on two pediatric chronic illness groups, diabetes and cystic fibrosis.

Diabetes (types 1 and 2) affects over 200,000 children and adolescents in the United States (CDC, 2011). Type 1 diabetes develops when the immune system destroys pancreatic cells that make insulin, which regulates blood sugar, while type 2 diabetes develops when the body becomes resistant to insulin and no longer uses it properly (CDC, 2011). The increasing frequency of both types of diabetes has become a major public health concern. Type 1 affects more than 13,000 children each year, and type 2 has rapidly increased over the last 30 years among youth aged 10-19 years (CDC, 2011; Dart, Sellers, & Dean, 2012). Poorly regulated diabetes of any type can lead to significant long-term organ damage and increase the risk of coma or fatality (Mayo Clinic, 2011).

Treatment requires challenging lifestyle and behavior modifications, including dietary restrictions, exercise, and smoking cessation, as well as frequent glucose monitoring and pharmacological management (e.g., insulin injections) for type 1 diabetes and poorly regulated type 2 (Daneman, 2006; Dart et al., 2011).

Cystic fibrosis (CF) is one of the most common inherited, fatal diseases of European American populations (Quittner, Barker, Marciel, & Grimley, 2009), causing nutritional deficiencies and significant lung damage due to thick mucus build up that blocks important passageways, such as in the lungs and pancreas (Mayo Clinic, 2010). In the US, cystic fibrosis is estimated to occur in 1 out of every 3,000 births (Mayo Clinic, 2010), but survival rates have increased due to improved screening and treatment. In fact, data from the CF Foundation Patient Registry (2011) indicated that the median life expectancy has increased to 38.3 years in 2010 compared to 27 years in 1986. With increased survival, new complications arise. For instance, diabetes is a common comorbidity (Selvadurai, 2011) that can complicate an already extensive treatment protocol involving pharmacological management (e.g., antibiotics, nebulizers), airway clearance techniques, nutritional supplements (including enzyme replacement), and demanding dietary regimens (CF Foundation, 2012). Because of susceptibility to infection, patients frequently experience prolonged hospital stays that put them at risk for adjustment difficulties. Hospital stays for this population are particularly challenging because of restricted contact with other patients with cystic fibrosis due to the risk of cross-infection (Tuchman, Schwartz, Sawicki, & Britto, 2010).

Psychological Adjustment

Compared to healthy peers, youth with chronic illness are more likely to experience emotional (anxiety, depression) and behavioral (aggression, conduct) problems (Bauman, Drotar, Leventhal, Perrin, & Pless, 2009); Pinquart & Shen, 2011; Suris, Michaud, & Viner, 2004). For instance, adolescent diabetes patients are at increased risk for anxiety, depression, and eating disorders (Wysocki, Buckloh, & Greco, 2009). Similarly, youth with cystic fibrosis report more internalizing problems than their healthy peers (Berge & Patterson, 2004). Different chronic health conditions increase the risk of these problems to a similar degree (see Pinquart & Shen 2011), perhaps because the psychosocial challenges faced by these adolescents are similar (Wallander et al., 2003). For instance, all these youth need to cope with medical stressors, adhere to treatment regimens, and negotiate the impact of their illness on their identity, relationships, and academic functioning.

Adolescents with chronic illness may be at a greater risk for adjustment difficulties than children because living with a chronic illness disrupts attainment of critical developmental tasks in adolescence, including autonomy from parents, employment, peer-group acceptance, and establishment of romantic relationships (Kyngas, Kroll, & Duffy, 2000; Gortmaker, Walker, Weitzman, & Sobol, 1990; Quittner et al., 2009). In fact, frequent sickness, hospitalizations, and school absences can lead to reliance upon caregivers, social isolation, and academic and employment difficulties (Suris et al., 2004). Complications of puberty can also present challenges. For instance, adolescence is also characterized by an increased awareness of body image, and the effects of illness and its treatment on physical appearance can present challenges to self-

esteem and peer relationships (Reiter-Purtill, Waller, & Noll, 2009; Quittner et al., 2009). Certain conditions (e.g., cystic fibrosis) and treatments (e.g., steroids) can delay or impair pubertal development and growth (Kyngas et al., 2000), further accentuating differences between youth with and without chronic illness and increasing the risk of peer victimization (teasing and bullying) (Pittet, Berchtold, Akré, Michaud, & Suris, 2010; Sentenac, 2012).

The pressure to "fit in" among peers and achieve typical developmental tasks of adolescence despite their medical condition can lead youth with chronic illness to poorly adhere to treatments (LaGreca & Mackey, 2009) and engage in risky health behavior (e.g., substance use; unprotected sex) (Suris & Parera, 2005). Compared to their healthy counterparts, youth with chronic illness are more likely to use cannabis, smoke tobacco daily, and engage in antisocial acts (Suris, Michaud, Akre, & Sawyer, 2008). The risk these behaviors place on their health is further compounded by the low rates of treatment adherence typically observed during adolescence (LaGreca & Mackey, 2009). Less parental supervision, more family conflict, and increased peer pressure may further contribute to poor adherence, including missed treatment appointments, inconsistent regimes, or discontinuation of treatment altogether in an effort to "fit in" around peers (Quittner et al., 2009). Poor adherence is particularly perilous during adolescence because pubertal development alone makes the management of many illnesses more complicated. Diabetes, for instance, can be harder to control because puberty is associated with greater metabolic fluctuations and insulin resistance (Moran et al., 1999). Paired with poor adherence, the risk of health complications or hospitalizations is greatly increased.

Taken together, mental health problems (Pinquart & Shen, 2011), risky behavior (Suris at el., 2008), and poor treatment adherence (LaGreca & Mackey, 2009) during adolescence contribute to worsened health outcomes, compounding the adverse effects of puberty and associated growth and metabolic changes on the course of many chronic diseases (Moran et al., 2002). Cognitive coping strategies can improve health outcomes (Ai et al., 2009; Johnson & Kushner, 2001), and researchers recognize that spiritual beliefs represent a unique set of cognitions that are important to address with individuals with chronic or life-threatening illness. Cross-sectional research suggests that spiritual beliefs play a specific role in adjustment to pediatric illness beyond secular methods of coping (Benore, Pargament, & Pendleton, 2008; Koenig, McCullough, & Larson, 2001), but whether these spiritual coping beliefs indeed impact adjustment over time has yet to be examined.

Spiritual Beliefs and Coping

Spiritual issues rise to the forefront for individuals with chronic illness who have to grapple with the meaning of their health condition and meet the challenges of the illness. Spiritual beliefs can help individuals construct personal meaning out of otherwise incomprehensible illness, and provide a unique source of strength and hope (Pargament, Magyar-Russell, & Murray-Swank, 2005). Research has focused on the connection between spiritual beliefs and psychological adjustment to illness, with particular emphasis on the construct of spirituality. Spirituality is considered the internal, personal expression of belief (e.g., prayers; beliefs of spiritual connectedness) compared to

religiosity, which is considered the outward, institutional expression of belief (e.g., religious service attendance) (Koenig et al., 2001).

Research suggests that there are several pathways through which spirituality helps individuals cope with difficult circumstances (Pargament, Koenig, & Perez, 2000). Spiritual beliefs can help individuals positively reframe or make meaning out of stressful circumstances (e.g., by believing that their illness serves a spiritual purpose), alleviate worry or fear about the future (e.g., course of an illness), and provide alternative means of support during times when family or friends may not be readily available (e.g., praying to a higher-power during a hospitalization) (Cole, Benore, & Pargament, 2004). The use of spiritual beliefs to handle and make sense of difficult life events has been conceptualized as "religious/ spiritual coping[1]" (Pargament et al., 2000).

Specifically, spiritual coping has been defined as "the use of religious beliefs or behaviors to facilitate problem-solving to prevent or alleviate the negative emotional consequences of stressful life circumstances" (Koenig, Pargament, & Nielsen, 1998, p. 513). Initial research with adults indicated that certain beliefs impacted adjustment differently and that not all spiritual beliefs were positive or helpful. For instance, among older, hospitalized adults, belief in a benevolent, collaborative god-figure was associated with less depression compared to beliefs of the god-power as punishing (Koenig et al., 1998). As a result, spiritual coping is conceptualized as being two-dimensional: "positive spiritual coping" involves the use of faith for comfort or strength in response to difficult circumstances, while "negative spiritual coping" reflects spiritual struggle and doubt, or abandonment by a higher power/ god-figure (Pargament, Smith, Koenig, & Perez, 1998).

[1] The terms "religious coping" and "spiritual coping" have been used interchangeably in the literature and refer to the same construct as described in the text. The present study will use the more general term "spiritual coping."

Findings from a meta-analysis of 49 spiritual coping studies support the duality of spiritual coping and demonstrate that positive and negative spiritual coping strategies are related to better and worse psychological adjustment to stress, respectively (Ano & Vasconcelles, 2005; Koenig et al., 2001). In other words, spiritual coping strategies can be either helpful or harmful. Research with adults has also demonstrated that spiritual coping is a stronger predictor of adjustment than global measures of religiousness (e.g., frequency of prayer, worship attendance) and accounts for unique variance in adjustment beyond secular coping (Pargament et al., 1998).

Spiritual Coping in Chronically Ill Adults

Health research has predominantly focused on spiritual coping among adult populations, primarily in relation to psychological outcomes (e.g., anxiety, depression). More recently, this research has been extended to also include physical health outcomes. Key findings are described here in order to provide context for research with pediatric populations.

Psychological Adjustment

Specific spiritual beliefs appear to differentially affect coping with a chronic illness. For instance, adults with HIV/AIDS reported using significantly more positive than negative spiritual coping strategies (e.g., seeking God's love versus feeling abandoned by God), and the use of positive spiritual beliefs was related to better self-esteem and life satisfaction (Cotton et al., 2006). Among hemodialysis patients, negative spiritual coping was correlated with more depression and anxiety, while positive spiritual

coping was related to better quality of life (e.g., mental health, social relations) (Ramirez et al., 2012). Similar results have also emerged among adults with cancer; positive spiritual coping was associated with better quality of life, while negative is associated with poorer quality of life (Tarakeshwar et al., 2006). Research also indicates that spiritual coping predicts psychological outcomes over time. For instance, negative spiritual coping predicted more emotional distress over a two-year period among physically-ill elderly patients (Pargament, Koenig, Tarakeshwar, & Hahn, 2004), and among adult transplant patients, baseline levels of negative spiritual coping predicted more post-transplant depression and anxiety (Sherman, Plante, Simonton, Latif, & Anaissie, 2009).

Physical Health

More recently, research on spiritual coping has begun to focus on physical health outcomes. A seminal study published in 2001 demonstrated higher mortality rates among hospitalized older adults who reported greater religious struggle with their illness, even after controlling for baseline physical and mental health and other covariates (Pargament, Koenig, Tarakeshwar, & Hahn, 2001). Follow-up analyses of specific negative spiritual beliefs revealed that (1) questioning God's love, (2) feeling abandoned by God, and (3) believing in demonic influence were predictive of greater mortality risk. These findings were consistent with previous research with patients undergoing cardiac surgery, in which patients that reported finding more strength and comfort from religion had lower mortality rates 12-months later (Oxman, Clarke, & Stewart, 1995).

Other indices of health have also been examined. For instance, more positive spiritual coping (assessed two weeks prior to cardiac surgery) predicted better postoperative physical functioning (e.g., ambulation; mobility) among adults of 35 years or older (Ai, Peterson, Bolling, & Rodgers, 2006), and spiritual struggle was related to elevations in cytokines associated with heart disease (i.e., plasma interleukin-6) immediately after surgery (Ai et al., 2009). Among adults with HIV, patients who believed in a loving god-figure had lower decline in CD4 cell counts over a four year period, while those who experienced spiritual struggle experienced greater decline (Ironson, Stuetzle, & Fletcher, 2006; Trevino et al., 2010).

Taken together, research among adult chronic illness populations provides strong support for connections between spiritual coping and emotional and physical health. Longitudinal research also supports that these relationships remain over time. A natural extension of this research is to examine the role of spiritual coping in the psychological and physical health of adolescents with chronic illness. Finding similar relationships would warrant interventions to redress maladaptive spiritual cognitions in an effort to improve long-term emotional and physical health.

Spiritual Coping in Chronically Ill Youth

Theoretical Framework

Developmental differences between adults and adolescents are likely to affect the presence, nature, and function of spiritual coping in pediatric versus adult populations. One of the predominant theories of faith development among children and adolescents comes from Fowler (1981), who drew upon Piaget's stage theory of cognitive

development (1964). Fowler proposed that faith development is influenced by cognitive and language development, as well as imagination, emotion, and perception at each developmental stage. The first stages of faith development in early childhood are characterized by simple trust, belief, and love in a higher power, as well as description of a god-figure in magical terms (e.g., miracles). These stages parallel the positive spiritual coping beliefs described by Pargament (1997). Among school-aged children, faith is influenced by concrete-operational thinking (as described by Piaget), with spiritual beliefs becoming less imaginative and more literal. As children enter adolescence, beliefs tend to become more abstract, in line with development of formal-operational thinking. Fowler proposed that adolescents assume more responsibility for their beliefs, explore alternative points of view, and wrestle to reconcile subjective feelings about their faith with objective facts about their world. Negative spiritual beliefs, as described by Pargament, may emerge more prominently during these latter developmental stages of faith.

Fowler's theory has provided a theoretical framework for understanding spiritual coping among pediatric populations. Hospitalized children (8-10 years), for instance, described spiritual themes congruent with Fowler's early stages of faith development, in which the god-figure was characterized as loving, comforting, approving, helping, and protecting (Ebmeier, Lough, Huth, & Autio, 1991). The study also suggested that these beliefs helped the children cope with medically-related fears and anxieties, which reflects the dimension of positive spiritual coping as described by Pargament (1997) and parallels findings in the adult literature (Cotton et al., 2006). Qualitative research also demonstrates that youth with chronic illness have spiritual concerns and that worsening

of health, treatments, and hospitalizations further intensifies these concerns (Roehlkepartain, King, & Wagener, 2005; Silber & Reilly, 1985), making them vulnerable to negative spiritual beliefs.

Pediatric populations endorse the use of spiritual strategies to cope with health-related difficulties described by Pargament (1997). For instance, in a qualitative study with cystic fibrosis patients, children and adolescents verbalized a number of positive spiritual coping strategies (e.g., turning to God for support, praying for God to intervene, collaborating with God), as well as negative spiritual coping strategies (e.g., disease is viewed as punishment from God, anger at God) (Pendleton et al., 2002). Similarly, children with sickle cell disease reported using their spiritual beliefs to feel control over or find meaning in their illness (Cotton, Grossoehme, & McGrady, 2012), and 73% of adolescents with sickle cell disease reported that they sought God's love and care, 35% prayed every day to manage symptoms, 36% questioned God's love for them because of the disease, and 31% felt that the devil made their disease happen (Cotton, Grossoehme, et al., 2009). These studies provide strong support that pediatric populations reflect on their spirituality and utilize spiritual beliefs to cope with their illness.

Psychological Adjustment

In addition to being a salient concern, spiritual coping is an important predictor of emotional health among youth with chronic illness. For instance, positive spiritual coping has been linked with lower emotional distress in youth with asthma or cystic fibrosis (ages 6-16) (Shelton, Linfield, Carter, & Morton, 2005), and negative spiritual coping predicted more depression and anxiety and worse asthma-related quality of life among

pediatric asthma patients (8-17 years) (Benore et al., 2008). In the latter study, negative spiritual coping remained a significant predictor of mental health even after accounting for secular coping and other covariates. Our prior work extends these findings (Reynolds, Mrug, & Guion, 2012). In our sample of 128 adolescents with diabetes or cystic fibrosis, positive spiritual coping was associated with fewer internalizing problems in both disease groups. Additionally, negative spiritual coping was related to more internalizing problems among youth with cystic fibrosis, but not among those with diabetes. We speculated that patients with cystic fibrosis may be more vulnerable to the harmful effects of negative spiritual coping because of the more progressive, life-threatening nature of cystic fibrosis compared to diabetes, and by the isolation these youth experience due to frequent hospitalizations and separation from other patients with cystic fibrosis because of the risk of cross-infection (Tuchman et al., 2010).

Findings related to externalizing problems have been varied. One investigation examining the relationship between spiritual coping and externalizing problems in pediatric populations found no relationship (Zehnder, Prchal, Vollrath, & Landolt, 2006), possibly due to a focus on only positive spiritual coping and its limited measurement (using only two items). Results from our study, however, revealed that negative, but not positive spiritual coping, was related to externalizing problems; specifically, the use of more negative spiritual coping strategies was associated with greater report of externalizing problems (Reynolds, Mrug, et al., 2013).

Reflecting the heightened importance of spiritual beliefs in individuals dealing with health difficulties, spiritual coping was more strongly linked to emotional health in youth with chronic illness compared to their healthy counterparts (Cotton, Kudel, et al.,

2009). Specifically, in a sample of adolescents with inflammatory bowel disease (IBD) and their healthy peers, the relationship between spiritual well-being (i.e., relation to god-figure) and depressive symptoms was moderated by having IBD. Greater spiritual well-being was more strongly related to fewer depressive symptoms among the adolescents with IBD versus those without the condition, suggesting that spiritual beliefs may influence emotional health among adolescents with chronic illness more so than the mental health of their healthy counterparts (Cotton, Kudel, et al., 2009).

Physical Health

There are very few published studies examining the relationship between spiritual coping and physical health among youth with chronic illness. One study among adolescents with cystic fibrosis has linked faster retrospective pulmonary function decline with negative spiritual coping among youth with cystic fibrosis (Grossoehme, Szczesniak, McPhail, & Seid, 2013). However, no studies have evaluated the role of spiritual coping in prospective health outcomes in pediatric populations.. These results highlight the need to further examine the directionality of relationships between spiritual coping and physical functioning among pediatric populations.

In summary, research suggests that similar to adults, children and adolescents utilize spiritual beliefs to cope with their illness, and that both positive and negative dimensions of spiritual coping are related to emotional well-being and adjustment among youth with a variety of chronic health conditions. What is missing is a quantitative synthesis of the research to date to determine how strongly spiritual coping is related to psychological adjustment and physical health among pediatric patients. With the

expansion of pediatric spiritual coping research, a sufficient number of cross-sectional studies are now available to provide meta-analytic review of the role of spiritual coping in health and adjustment to chronic illness. Synthesis of this research will provide a foundation for pursuing longitudinal research assessing the directionality of the effects. For instance, whether spiritual coping affects adjustment and health, or health and adjustment affects spiritual coping, remains unknown. These questions are particularly important to examine in adolescent populations because of the adverse role poor psychological adjustment plays in treatment adherence, future physical health, and successful attainment of important developmental tasks necessary for adulthood (e.g., increased independence). Developmental advances in abstract thinking and faith-based reasoning also make adolescence an important period for studying the role of spiritual coping in functioning. Understanding how spiritual coping and adjustment affect each other over time is essential for effective utilization of spiritual therapies in patient care.

Present Study

To address gaps in the literature identified above, the present study quantitatively reviewed research on the relationships between spiritual coping and psychosocial adjustment and physical health among youth with serious or chronic medical conditions. The study also examined the temporal nature of relationships between spiritual coping, depression, and conduct problems among adolescents with diabetes or cystic fibrosis, as well as the role of spiritual coping in long-term physical health outcomes among adolescents with cystic fibrosis. The following research questions were addressed.

First, a meta-analysis of existing research was conducted to empirically synthesize the roles of positive and negative spiritual coping in psychosocial adjustment and physical functioning among youth with serious medical conditions. Outcomes of psychosocial adjustment included internalizing problems and quality of life, as these have been the focal outcomes of most research in this area. Regarding physical health, both objective and subjective measures of physical functioning were examined. Reflecting the predominant conceptualization of spiritual coping (see Pargament, Feuille, & Burdzy, 2011), positive and negative spiritual coping were examined separately. We hypothesized that higher levels of positive spiritual coping and lower levels of negative spiritual coping would be associated with fewer internalizing problems, higher quality of life, and better physical functioning among pediatric patients.

Second, to clarify prospective relationships between spiritual coping (positive and negative) and psychological adjustment, the present study examined longitudinal data obtained from two adolescent chronic illness groups, cystic fibrosis and diabetes. Consistent with prospective research with adults with chronic illness (Pargament et al., 2004), we hypothesized that positive spiritual coping would be predictive of better psychological adjustment (i.e., less depression; fewer conduct problems) over time, while negative spiritual coping would predict declines in psychological adjustment. Reciprocal effects are also expected – that better emotional and behavioral adjustment will predict the use of more positive and less negative spiritual coping over time. Because cystic fibrosis is generally more severe and progressive than diabetes, we anticipate stronger links from spiritual coping to adjustment for this group.

Finally, to clarify the role of spiritual coping in prospective health outcomes in pediatric populations, we evaluated the relationship between spiritual coping and subsequent changes in pulmonary function, malnutrition, and hospitalizations over a 5-year period in adolescents with cystic fibrosis. It is hypothesized that positive spiritual coping will predict better health functioning over the 5-year period, while negative spiritual coping will be related to faster health decline. Spiritual coping is expected to remain a significant predictor of health outcomes even after accounting for baseline health and secular coping.

SPIRITUAL COPING, PSYCHOSOCIAL ADJUSTMENT, AND PHYSICAL HEALTH IN YOUTH WITH CHRONIC ILLNESS: A META-ANALYTIC REVIEW

by

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Abstract

Objective. The current systematic review and meta-analysis assessed the strength of the relationships between religious/spiritual coping strategies and psychosocial adjustment and physical health in youth with chronic illness. Spiritual coping strategies were operationalized into two dimensions, positive and negative. Psychosocial adjustment included quality of life and internalizing problems, and physical health involved objective medical tests and self- or physician-report of adherence or functional status. **Procedure.** Fourteen studies, published between 1990 and 2013, met inclusion criteria for the meta-analysis and were analyzed using the Comprehensive Meta-Analysis software. **Results.** Findings revealed significant, moderate associations between negative spiritual coping and more internalizing problems (r=.34) and poorer quality of life (r=-.34). Under the fixed but not random effects model, the combined effects showed a small, significant relationship between positive spiritual coping and fewer internalizing problems (r=-.14). **Conclusions.** Spiritual coping is a salient coping strategy for pediatric patients. Consistent with findings among adults with chronic illness, negative spiritual coping puts pediatric patients at risk for psychosocial maladjustment. Intervention research is needed to determine if targeting spiritual coping improves psychosocial adjustment and quality of life.

Keywords: religious; spiritual; coping; children; adolescents; adjustment; health; meta-analysis.

Introduction

With advances in early disease detection and treatment, survival rates among youth with chronic illness continue to rise (van der Lee, Mokkink, Grootenhuis, Heymans, & Offringa, 2007). Recognizing that the adverse effects of chronic illness extend well beyond the domains of physical functioning, impact psychosocial adjustment and persist into adulthood (Curtis & Luby, 2008; Pinquart & Shen, 2011), research on coping and adjustment with pediatric illness has received considerable attention. In particular, a growing body of research has focused on the role of spiritual coping.

Spiritual (or religious) coping involves the use of spiritual beliefs or behaviors to problem-solve or manage stressful life circumstances, such as having a chronic illness (Koenig, Pargament, & Nielsen, 1998). Spiritual beliefs are particularly salient for youth with chronic illness, who frequently face medical stressors and uncertainty about their illness. Spiritual beliefs can help youth positively reframe or make meaning out of their illness, alleviate worry or fear about the future, and provide alternative means of support when family or friends are not available (e.g., during hospitalizations) (Cole, Benore, & Pargament, 2004). Indeed, patients with different types of chronic illness endorse using spiritual beliefs to cope with their illness. Youth with sickle cell disease, for instance, indicate that spiritual beliefs help them feel control over their illness or find meaning in the experience (Cotton, Grossoehme, & McGrady, 2012). Similarly, pediatric patients with cystic fibrosis describe turning to God for support in managing their illness (Pendleton, Cavalli, Pargament, & Nasr, 2002).

Not all spiritual coping strategies, however, are helpful. Initial research among hospitalized adults demonstrated that beliefs reflecting spiritual struggle or punishment were related to higher levels of depression and poorer quality of life (Pargament, Smith, Koenig, & Perez, 1998). Spiritual coping, therefore, was conceptualized as being two-dimensional, with "positive spiritual coping" involving the use of faith for comfort or strength to deal with difficult circumstances and "negative spiritual coping" reflecting spiritual discontentment, doubt, or feelings of abandonment or punishment by God (Pargament et al., 1998). Among adults, meta-analytic review supports this duality of spiritual coping, revealing that positive and negative spiritual coping strategies are related to better and worse psychosocial adjustment, respectively (Ano & Vasconcelles, 2005).

Consistent with research in adults, positive and negative spiritual coping are also important predictors of emotional and behavioral functioning among youth with chronic illness. Cross-sectional and prospective research alike indicate that positive spiritual coping is linked with lower emotional distress and better quality of life in multiple pediatric illness groups (Luberto, Yi, Tsevat, Leonard, & Cotton, 2012; Lyon et al., 2014; Reynolds, Mrug, & Guion, 2013; Reynolds, Mrug, Hensler, Guion & Madan-Swain, 2014; Shelton, Linfield, Carter, & Morton, 2005), while negative spiritual coping has been linked with more internalizing and externalizing problems, and worse quality of life (Benore, Pargament, & Pendleton, 2008; Reynolds et al., 2013). Spiritual coping remains a significant predictor of psychosocial adjustment, even after controlling for secular coping, disease severity, and other covariates (Benore et al., 2008) and is linked more strongly to emotional health in youth with chronic illness compared to their healthy counterparts (Cotton, Kudel, et al., 2009).

Research has also emerged that supports the role of spiritual coping in physical health outcomes among both adult and pediatric patients. Among youth with cystic fibrosis, one study linked negative spiritual coping with worse retrospective pulmonary function decline (Grossoehme, Szczesniak, McPhail, & Seid, 2013), while another linked positive spiritual coping with prospective slower decline in pulmonary functioning and nutritional status and fewer days hospitalized over a 5-year period (Reynolds, Mrug, Britton et al., 2014). These findings are consistent with studies among adults with chronic illness, which have linked positive spiritual coping with better health outcomes, such as improved cardiac functioning over time (Ai, Peterson, Bolling, & Rodgers, 2006), and negative spiritual coping with worse physical health, including higher mortality rates (Pargament, Koenig, Tarakeshwar, & Hahn, 2001), even after controlling for baseline physical and mental health.

Despite these promising findings, results have been varied across studies with pediatric populations. One study, for instance, found significant associations between positive spiritual coping and more anxiety and poorer quality of life (Benore et al., 2008), while others have not evidenced significant associations between spiritual coping and psychosocial or health outcomes (Cotton, Grossoehme, et al., 2009; Landolt, Vollrath, & Ribi, 2002). Given the mixed results and growth of research in this area, a quantitative synthesis of research on spiritual coping and health among youth with chronic illness is warranted. No published studies to date have attempted this task.

Thus, the purpose of the present meta-analysis is to empirically synthesize existing research on the roles of positive and negative spiritual coping in psychosocial adjustment and physical functioning among youth with chronic illness. Outcomes of

psychosocial adjustment will include internalizing problems and quality of life, as these have been the focal outcomes of most research in this area. Regarding physical health, both objective (e.g., glucose levels) and subjective measures of physical functioning (e.g., physician-rated functional status) will be examined. Reflecting the current conceptualization of spiritual coping, positive and negative spiritual coping will be examined separately. We hypothesize that higher levels of positive spiritual coping and lower levels of negative spiritual coping will be associated with fewer internalizing problems, higher quality of life, and better physical functioning among pediatric patients.

Method

Selection of Studies

Eligible articles were identified through PubMed, Web of Knowledge, Academic Search Premier, PsychINFO, and ProQuest (Dissertations and Theses) using a combination of key words related to spiritual coping (*spiritual, spirituality, spiritual/religious coping, religion, religious, religiosity*) and aspects of psychosocial adjustment (*depression, anxiety, quality of life, adjustment, mental/ emotional health*) and physical health. These were combined with the terms *pediatric, children, adolescents, youth,* and *chronic, serious,* and *medical illness*. In addition, established researchers in this area were contacted for copies of articles that focused on spiritual coping and adjustment and the reference lists of relevant empirical papers were hand searched. The abstracts identified through the search procedures, conducted from March 2013 to December 2013, were examined to identify studies that met inclusion criteria.

To be included in the meta-analysis, a study must have (a) been conducted with youth (average age between 6 and 18 years) with a medical illness; (b) measured spiritual

coping; and (c) assessed emotional or physical health. Only studies published in full, in English, and providing the statistics necessary for calculating an effect size were included in the meta-analysis. Unpublished studies (e.g., dissertations) were also included.

The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) flow diagram was used to detail study selection (Figure 1). The initial search resulted in 421 records. After removing duplicates, the abstracts of 226 manuscripts were screened. Screening identified 40 studies appearing to meet inclusion criteria. After review of these studies, 16 met inclusion criteria. In order to avoid statistical dependence between studies, 2 were excluded. One was a dissertation that had since been published (Benore, 2004; Benore et al., 2008) and the other was a longitudinal extension of previously published cross-sectional data that examined only a subset of the adjustment measures used in the cross-sectional article (Reynolds et al., 2013; Reynolds, Mrug, Hensler et al., 2014). Thus, the cross-sectional study was considered more comprehensive and retained for analyses. This left 14 studies suitable for the meta-analysis.

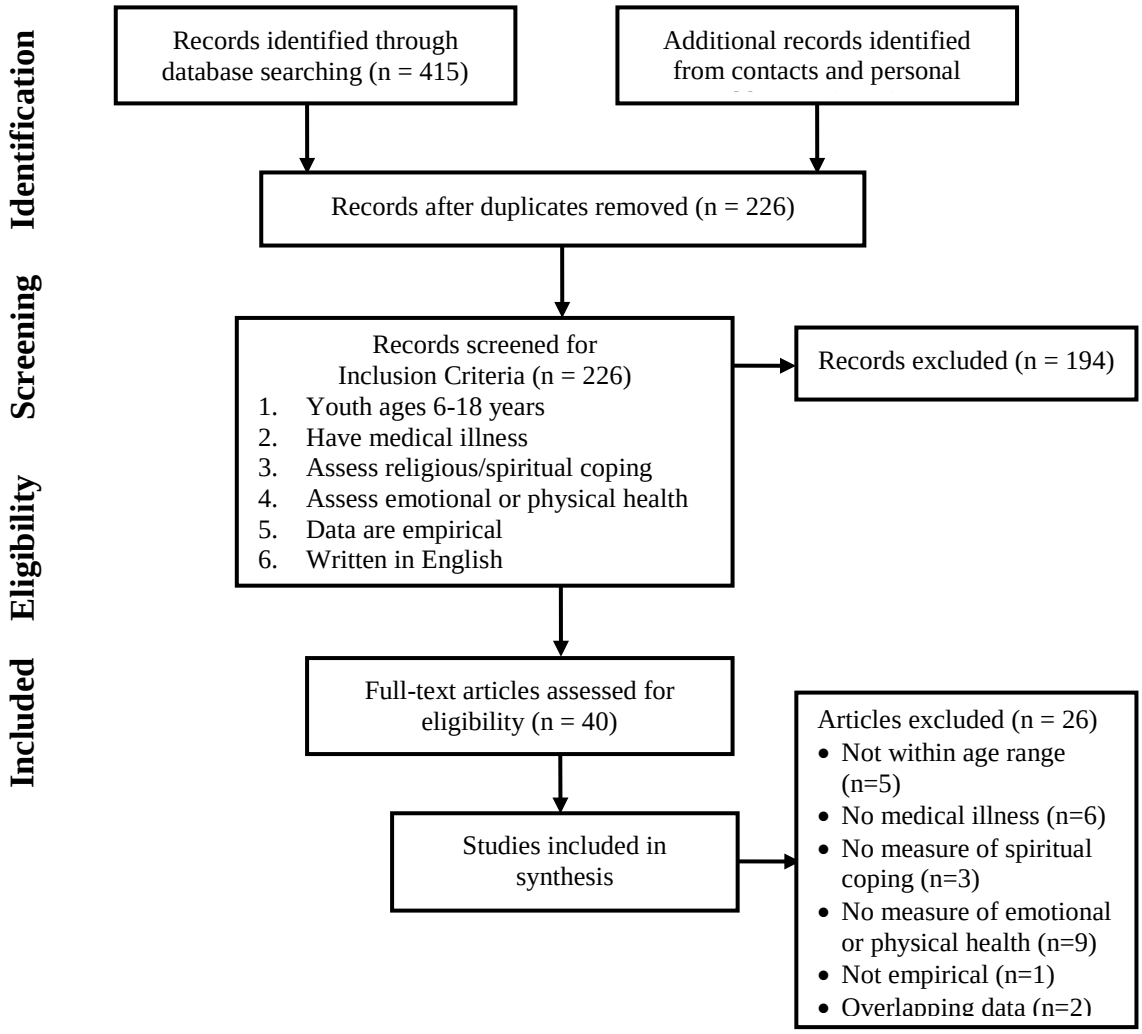

Figure 1. PRISMA diagram demonstrating the literature search and review process.

Data Extraction

Two of the authors coded the primary studies. Data to compute effect sizes were extracted, as well as the following: (a) characteristics of studies (published; unpublished) (b) participant demographics (age; gender; ethnicity; chronic illness); (c) religious affiliations; (d) measures of spiritual coping; (e) measures of emotional or physical health; and (f) reporter (self or caregiver). To assess reliability, 50% of the studies were

independently coded by both authors. Inter-rater agreement across the coded variables was very good (98%). Discrepancies between coders were resolved through review of the original manuscript and discussion.

Operational Definitions

Spiritual coping was defined as the use of spiritual beliefs – either positive or negative – as a coping strategy. Pargament's research served as the operational framework for classifying spiritual coping (see Pargament, Feuille, & Burdzy, 2011). Specifically, positive spiritual coping was defined as thoughts or beliefs related to seeking spiritual connectedness, comfort, and strength with God during difficult circumstances. The use of prayer and measures of spiritual well-being were included in this definition. Negative spiritual coping included reports of spiritual struggle and conflict with God, such as questioning God's power or viewing difficult circumstances in terms of spiritual punishment or abandonment. Measures assessing utilization or frequency of positive and negative spiritual coping were included in the meta-analysis.

Psychosocial adjustment included empirically-validated self-reported measures of quality of life and internalizing problems (i.e., anxiety, depression, emotional distress). Physical functioning was defined as any measure of physical health or physical status for a specific disease (e.g., spirometrics, body mass index). Functional status and adherence were included in this definition. Study characteristics are provided in Table 1.

Table 1

Studies examining the relationship between spiritual coping and mental or physical health in pediatric populations

Author (Year)	Sample size	Pediatric population	Age *M* (SD)	Measure of spiritual coping	Question examples	Scale	Outcome(s)	Measure	Reporter
Benore et al. (2008)	87	Asthma	12 (2.5)	Children's Religious Coping Scale	"When my asthma bothers me, I ask God to help me understand it."	"Never" (0) to "almost always" (4)	Depression Anxiety Quality of life	CDI STAIC PedsQL 3.0, Asthma Module	Self
Boeving et al. (2003) Dissertation	33	Cancer survivors (< 2 years post-diagnosis)	12 (SD not reported)	Child Spiritual Coping Survey	"I ask God to help."	"I never do this"(0) to "I always do this" (4)	Depression Anxiety Quality of life	CDI MASC PedsQL	Self
Cotton, Grossoehme et al., (2009)	37	Sickle cell disease	14 (2)	Brief RCOPE	"I try to see how God might be trying to strengthen me." "I wonder what I did for God to punish/abandon me."	"Not at all" (0) to "a great deal" (3)	Quality of life	PedsQL 4.0	Self

Cotton, Kudel et al. (2009)	154	Inflammatory bowel disease	15 (2)	Spiritual Well-Being Scale	Higher "I believe that a Power loves me and cares about me."	"Strongly disagree" (0) to "strongly agree" (4)	Depression Quality of life	CDI-Short Form PedsQL 4.0-Emotional Functioning scale	Self
Ezop (2002) Dissertation	62	Asthma	12 (2)	Children's Religious Coping Scale	See Benore et al. (2008)		Quality of life	PedsQL 4.0	Self
Grossoehme et al. (2013)	28	Cystic fibrosis	Median = 13.5	Brief RCOPE	See Cotton, Grossoehme et al., (2009)	"Not at all" (0) to "a great deal" (3)	Pulmonary functioning	FEV_1%	Medical record
Landolt et al. (2002)	179	Cancer Diabetes Youth who had been injured	10 (2)	2 items added to the 'How I Coped Under Pressure Scale' (HICUPS)	Not reported.	Never (0) to frequently (3)	Functional status (physical activities of daily living)	3-point Likert severity scale (0 = no functional impairment to 2 = severe functional impairment)	Physician
Luberto et al. (2012)	151	Asthma	16 (2)	1-item on prayer in author-developed, self-reported measure on CAM modalities	"How frequently do you pray to manage your asthma?"	Never (1) to once per day or more (5)	Quality of life	PedsQL 4.0-Psychosocial Functioning scale	Self

Lyon et al. (2012)	38	HIV+	17 (2)	Spiritual Well-Being Scale of the Functional Assessment of Chronic Illness Therapy-Version 4 (FACIT-SP-Ex-4)	"I find strength in my faith or spiritual beliefs."	"Not at all" (0) to "very much" (4)	Depression Anxiety Quality of life	BDI BAI PedsQL 4.0	Self
Park & Nachman (2010)	18	HIV+	18 (SD not reported)	Author-developed, self-reported measure of religious beliefs	"God is punishing me with this infection." "I believe in miracles."	"Strongly disagree" (1) "strongly agree" (5) Average scores $\geq$ 3.5 = "high religious believer"	Adherence to highly active antiretroviral therapy (HAART)	NIAID Pediatric AIDS Clinical Trials Pediatric Adherence Questionnaire, Module 1-III Behavior/ Identification	Self
Reynolds, Mrug, Britton et al. (2014)	46	Cystic fibrosis	15 (2)	Brief RCOPE	See Cotton, Grossoehme et al., (2009)		Pulmonary functioning Nutritional status	Percent predicted FEV1 Body mass index percentiles	Medical record

Reynolds et al. (2013)	128	Diabetes Cystic fibrosis	15 (2)	Brief RCOPE	See Cotton, Grossoehme et al., (2009)		Depression Anxiety	BASC-2, Depression and Anxiety scales	Self
Shelton (2004) Dissertation	100	Asthma Cystic fibrosis	11 (SD not reported)	Children's Spiritual Coping Measure	“If God and I work together, things will get better.”	3-point Likert scale; descriptors not provided. Higher scores indicate more use of spiritual coping.	Emotional symptoms	BASC-2, Emotional Symptoms Index	Self-reported if ≥12 years old Parent-reported if ≤ 11 years old
Zehnder et al. (2006)	161	Cancer Diabetes Epilepsy Youth who had been injured	10 (2)	2 item measure	"Did you ask God for help?" and "did you pray to God for comfort?"	Never (0) to frequently (3)	Internalizing problems	CBCL – Internalizing scale	Parent

Analysis of Effect Sizes

Effect sizes were scored in the form of bivariate correlations (*r*). When correlational data were unavailable, statistics such as means, SDs, p-values, and odds ratios were used to derive *r* (Borenstein, Hedges, Higgins, & Rothstein, 2009). Cohen's guidelines (1988) were utilized to classify the strength of the correlations, with 0.10, 0.30, and 0.50 referring to small, medium/moderate, and large effect sizes, respectively. To ensure the independence of analyzed observations, a single estimate was derived from each sample. For instance, in studies reporting on multiple internalizing problems (e.g., anxiety and depression), estimates were averaged to yield one effect size per study (Borenstein et al., 2009). Hence, each set of participants only contributed one value to each analysis.

Meta-analytic tests were run using both a random effects model (REM) and a fixed effects model (FEM). REM is generally preferable, because it estimates a distribution of population effect sizes (Hedges & Vevea, 1998) and provides greater generalizability due to the assumption that studies differ in ways that may impact results (Borenstein et al., 2009). However, if the number of studies is small, the estimate of variance between studies under REM will have poor precision, which may yield inaccurate results (Borenstein et al., 2009). Thus, FEM is recommended when analyses rely on only a few studies. FEM estimates a single population effect size and does not allow for inferences about a larger population of potential studies represented by those included in this meta-analysis (i.e., unconditional inferences), but it does provide a common effect size among the identified studies and thus inferences about the specific studies can be drawn (i.e., conditional inferences) (Borenstein et al., 2009; Card, 2012;

Hedges & Vevea, 1998). Given the small number of studies available, both models were utilized for all analyses, and significant effects for individual studies will also be reported.

To identify potential heterogeneity in the effect sizes, the *Q* statistic was computed. A significant *Q* indicates that the variability observed among the studies' effect sizes is greater than would be expected from sampling error alone (Borenstein et al., 2009). To capture the amount of variation in effects due to heterogeneity (vs sampling error), the I^2 was calculated (Higgins, Thompson, Deeks, & Altman, 2003). I^2 values of 25%, 50%, and 75% are generally considered to be low, moderate, and high, respectively (Higgins et al., 2003). The possibility of publication bias was also examined using Egger's test and Begg and Mazumdar's rank correlation test (Begg & Mazumdar, 1994). All analyses were performed using Comprehensive Meta-Analysis version 2 (Borenstein et al., 2010).

Results

The total number of participants across all 14 studies included in the meta-analysis was 1,176. Weighted by the total number of participants in each study, the overall sample included 51% females. Across 10 studies reporting demographic information on the race/ ethnicity of 784 participants, the overall sample included 42% Caucasians, 43% African-Americans, 1% Hispanic-Americans, and 14% of "other" racial/ethnic backgrounds. The mean weighted age for the 14 studies was 12.8 years, with a range of 7-22 years. Five studies (*n*=270) reported on religious affiliation, across which 28% of participants defined themselves as Protestant, 6% as Catholic, 51% as "Other Christian," 1% as Jewish, 5% as Other (e.g., Islam), and 9% as having no religious

affiliation. Condition or illnesses included were asthma, cystic fibrosis, sickle cell disease, inflammatory bowel disease, diabetes, epilepsy, cancer, HIV, or serious injury (Table 1).

Associations with Positive Spiritual Coping

Table 2

Effect sizes examining positive spiritual coping

					Random-effects model		Fixed-effects model	
Outcome	No. of Studies	Sample size	Cochran's *Q*	I^2	Cohen's *r*	95% CI	Cohen's *r*	95% CI
Internalizing problems	7	657	37.50***	83.99	-.15	-.34 to .05	-.14***	-.21 to -.06
Quality of life	6	408	23.04***	78.30	-.04	-.26 to .19	-.04	-.14 to .06
Physical health	3	241	14.85***	86.53	.28	-.15 to .62	.12	-.01 to .24

* $p<.05$, *** $p\leq.001$

Internalizing problems. Individual study effect sizes (*r*) for internalizing problems ranged from -.54 to .15. Two of the 7 studies included in this analysis showed significant, medium to large associations between positive spiritual coping and fewer internalizing problems (r=-.44, p<.01, Lyon et al., 2014; r=-.54, p<.001, Shelton, 2004), while the remaining 5 effects were nonsignificant (Benore et al., 2008; Boeving, 2003; Cotton, Kudel et al., 2009; Reynolds et al., 2013; Zehnder et al., 2006). Under the random effects model, the combined effect size was nonsignificant (r=-.15, p = .13) (Table 2). However, under the fixed effects model, the combined effect showed a small, significant relationship between positive spiritual coping and fewer internalizing problems (r=-.14, p=.001). The *Q* statistic was 37.50, p < .001, indicating a significant amount of observed variation across the studies, and the I^2 value of 83.99 indicated a high level of inconsistency in effects across studies. No publication bias was found by Egger's

test (p = .72) or Begg and Mazumdar's rank correlation test (p = .88). A forest plot of the individual and overall effect sizes, as well as their 95% CI, are shown in Figure 2.

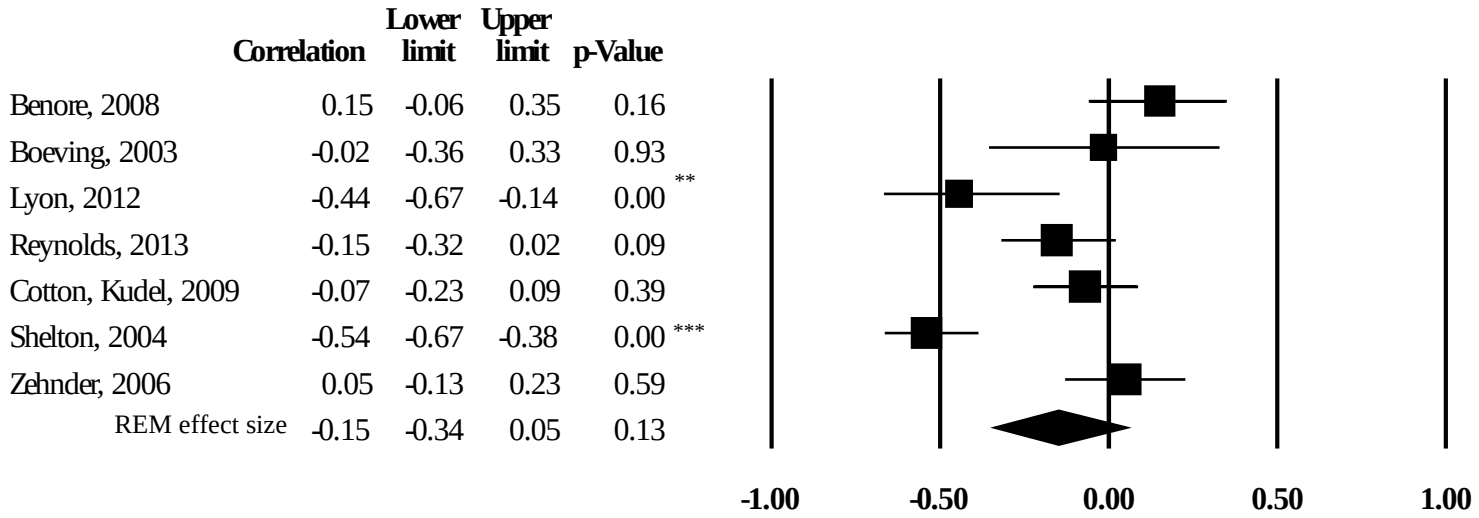

Figure 2. Forest plot of associations between positive spiritual coping and internalizing problems.
REM = random effects model
* $p<.05$. ** $p<.01$. *** $p<.001$

Quality of life. Individual effect sizes for quality of life ranged from r = -.38 to .39 (Figure 3). Two of the 6 studies showed significant, moderate associations between positive spiritual coping and quality of life but the direction of their effects varied. Lyon et al. (2014) showed a positive relationship between positive spiritual coping and better quality of life (r=.39, p<.05), while Benore et al. (2008) demonstrated a negative association (r=-.38, p<.001). The remaining four studies did not reveal significant individual effects (Boeving, 2003; Cotton, Grossoehme et al., 2009; Ezop, 2002; Luberto et al., 2012). Overall, no significant effect between positive spiritual coping and quality of life emerged (REM r=-.04, p=.75; FEM r=-.04, p=.43) (Table 2). There was variability and a high degree of inconsistency across study effects (Q=23.04, p < .001; I^2=78.30). Neither Egger's test (p = .98) nor Begg and Mazumdar's rank correlation test (p = .85) indicated publication bias.

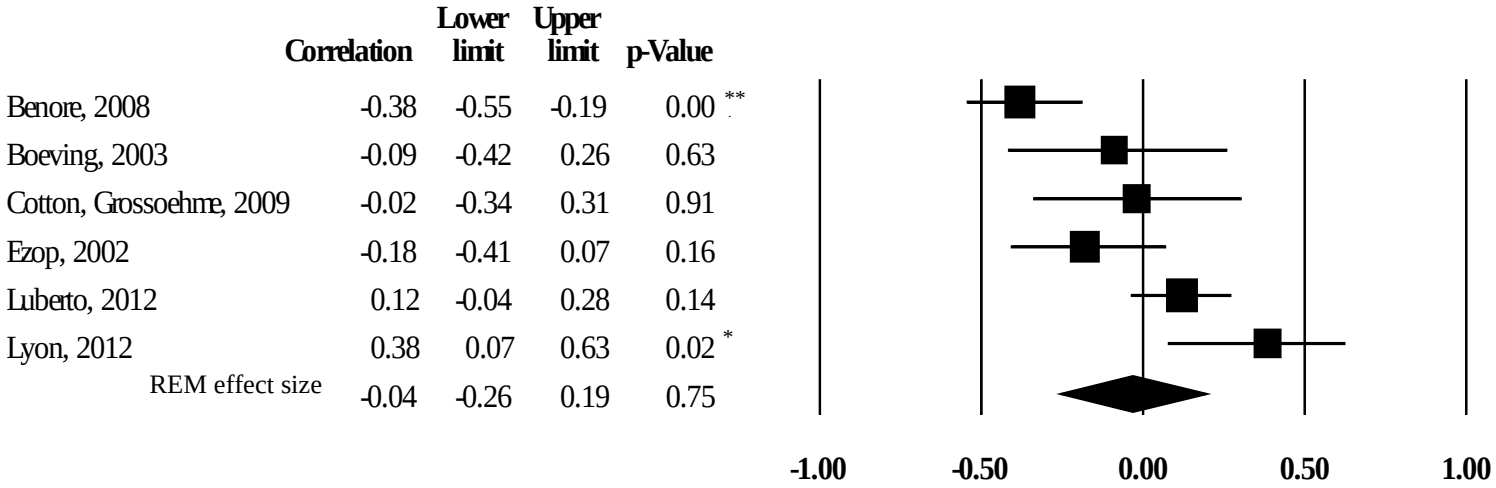

Figure 3. Forest plot of associations between positive spiritual coping and quality of life.
REM = random effects model
* $p<.05$. ** $p<.01$.

Physical health. The individual effect sizes for physical health ranged from .03 to .70 (Figure 4), with 1 of the 3 studies demonstrating a significant, large association between positive spiritual coping and better health functioning, specifically adherence to antiretroviral medications (Park & Nachman, 2010, r=.70, p<.001). The other two studies did not show significant effects (Landolt et al., 2002; Reynolds, Mrug, Britton et al., 2014). Under both analytic models, the cumulative effect size from the studies was nonsignificant (REM r=.28, p=.20; FEM r=.12, p=.07) (Table 2). Significant heterogeneity and inconsistency across the effects was observed (Q = 14.85, p=.001; I^2 = 86.53). No evidence of publication bias emerged (Egger's test p = .43; Begg and Mazumdar's rank correlation test, p = .12).

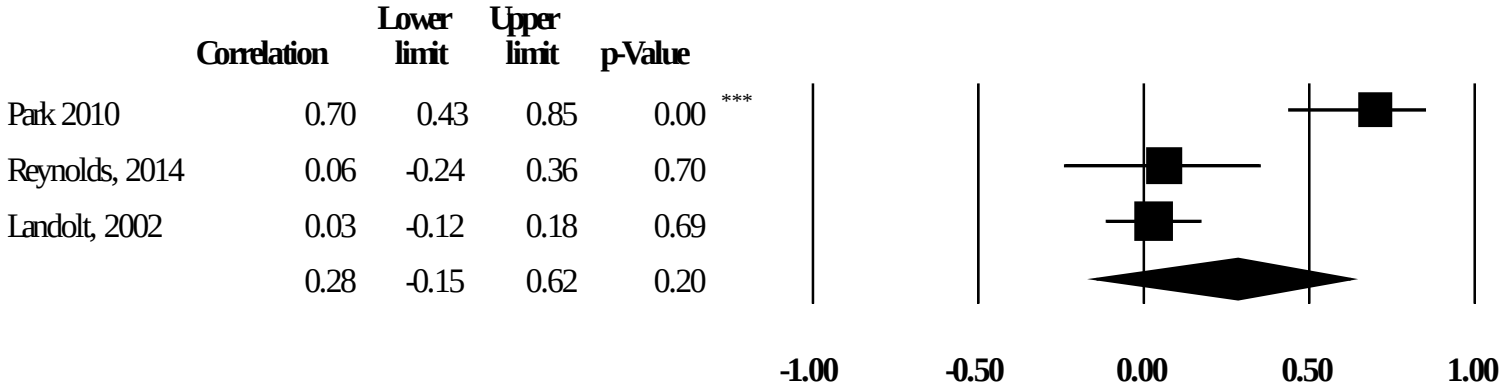

Figure 4. Forest plot of associations between positive spiritual coping and physical functioning.
REM = random effects model
*** $p<.001$

Associations with Negative Spiritual Coping

Table 3

Effect sizes examining negative spiritual coping

Outcome	No. of Studies	Sample size	Cochran's *Q*	I^2	Random-effects model		Fixed-effects model	
					Cohen's *r*	95% CI	Cohen's *r*	95% CI
Internalizing problems	2	213	.01	.00	.34***	.22 to .46	.34***	.22 to .46
Quality of life	3	186	7.97*	74.91	-.34*	-.58 to -.05	-.39***	-.51 to -.26
Physical health	2	71	4.69*	78.68	.07	-.26 to .39	-.06	-.13 to .02

* $p<.05$, *** $p<.001$

Internalizing problems. Both studies reporting the associations between negative spiritual coping and internalizing problems revealed moderate, positive relationships ($r=.35$, $p=.001$, Benore et al., 2008; $r=.34$, $p<.001$, Reynolds et al., 2013, Figure 5). Results under both the fixed effect and random effects models were the same; the combined effect size showed a significant association between negative spiritual coping and more internalizing problems ($r=.34$, $p<.001$) (Table 3). The *Q* statistic was .01 ($p > .05$), which may indicate homogeneity among the studies or reflect low power due to the small number of studies (Borenstein et al., 2009). The I^2 value of .00 suggests consistency of effects across the studies. Due to the small number of studies, publication bias could not be assessed.

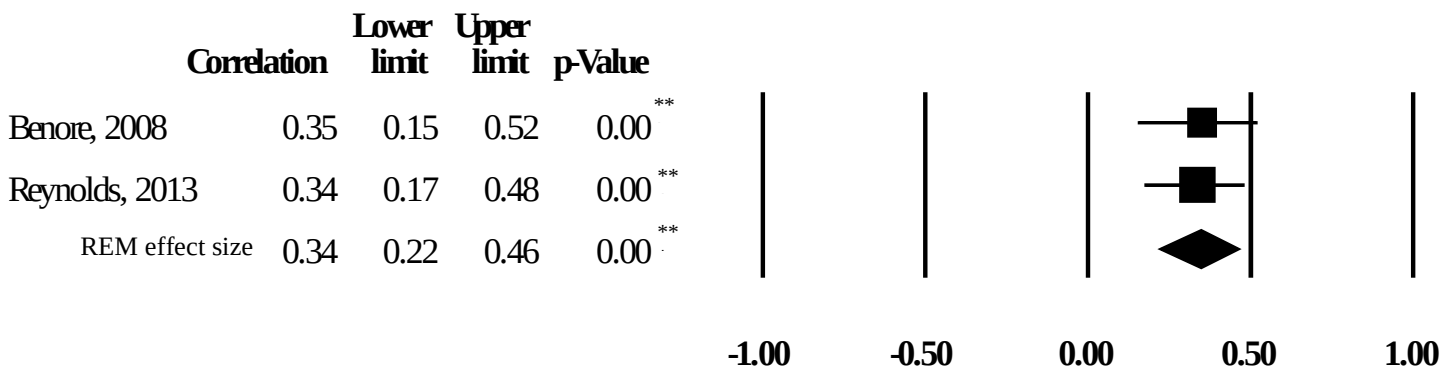

Figure 5. Forest plot of associations between negative spiritual coping and internalizing problems.
REM = random effects model
*** $p \leq .001$

Quality of life. Individual effect sizes for quality of life ranged from -.51 to .01 (Figure 6). Two of the 3 studies showed significant, medium to large associations between negative spiritual coping and worse quality of life (r=-.51, p<.001, Benore et al., 2008; r=-.42, p=.001, Ezop, 2002). The remaining study did not show a significant effect (Cotton, Grossoehme et al., 2009). Under both the random and fixed effects models, the combined effect size was significant (REM r=-.34, p<.05; FEM r=-.39, p<.001) (Table 3), indicating significant, inverse relationships between negative spiritual coping and quality of life. The Q statistic was 7.97 (p<.05) and I^2 value was 74.91, indicating variability and inconsistency across study effects. No publication bias was found by Egger's test (p=.11) or Begg and Mazumdar's rank correlation test (p=.12).

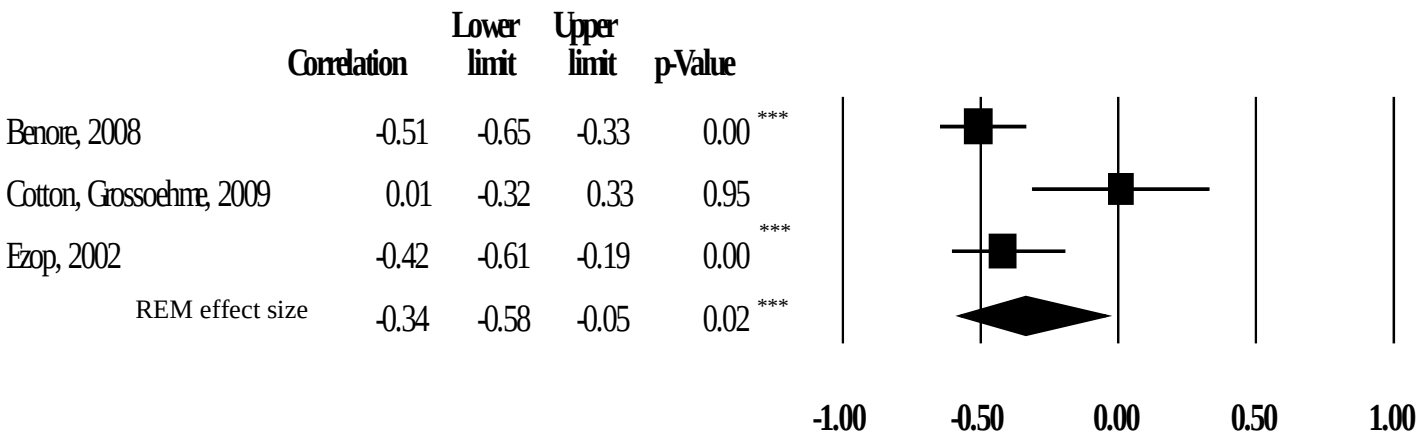

Figure 6. Forest plot of associations between negative spiritual coping and quality of life.
REM = random effects model
*** $p \leq .001$

Physical health. Individual effect sizes for physical health ranged from -.07 to .27 (Figure 7). One study showed a significant, but very small association between negative spiritual coping and worse pulmonary function (r=-.07, p=.05, Grossoehme et al., 2013), while the other study did not reach significance (Reynolds, Mrug, Britton et al., 2014). Under both the random and fixed effects model, the cumulative effect size was nonsignificant (REM r=.07, p=.69; FEM r=-.06, p=.12) (Table 3). Significant heterogeneity and inconsistency across the effects was observed (Q = 4.69, p < .05; I^2 = 78.68). Due to the small number of studies, publication bias could not be assessed.

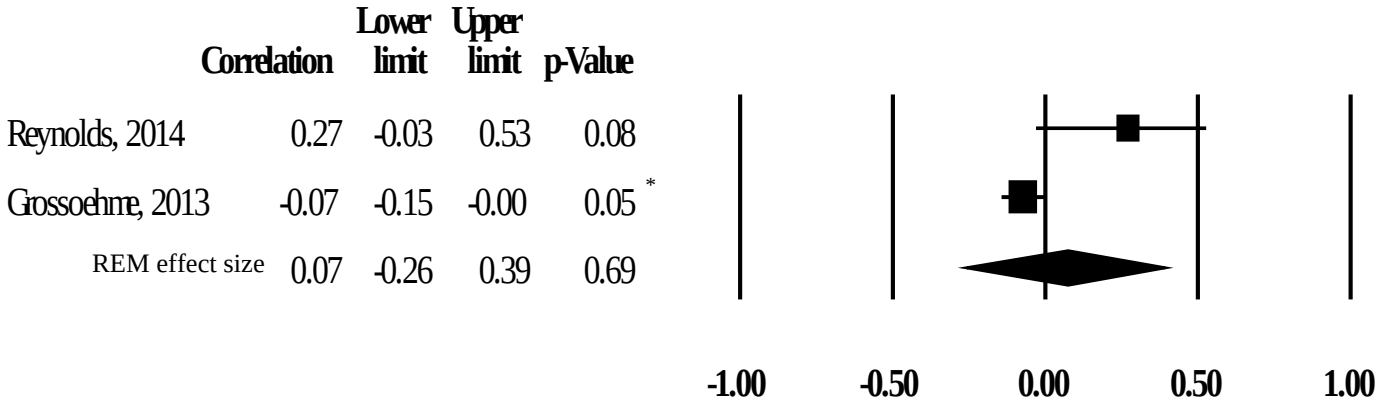

Figure 7. Forest plot of associations between negative spiritual coping and physical functioning.
REM = random effects model
* *p*=.05

Discussion

The purpose of this study was to synthesize the results of studies examining the associations of positive and negative spiritual coping with psychosocial adjustment and physical health among pediatric patients with chronic or serious illness. Following systematic review, a meta-analysis of 14 studies that met inclusion criteria was conducted. The results indicated that negative spiritual coping strategies are related to more internalizing problems and lower quality of life among youth with chronic or serious medical illness. In addition, there was a significant association between positive spiritual coping and fewer internalizing problems under the fixed effects model, but this relationship may not generalize to other studies.

These findings are consistent with longitudinal and meta-analytic studies demonstrating poorer adjustment among adults who use negative spiritual coping strategies for managing difficult events (Ano & Vasconcelles, 2005; Pargament, Koenig, Tarakeshwar, & Hahn, 2004). In the face of a serious or chronic medical illness, particularly during childhood, negative spiritual coping may represent a significant disruption in a child's developing worldview and relationship with God that thereby contributes to sadness, worry for the future, and a sense of poorer quality of life. Although children and adolescents typically report, on average, low frequency of negative spiritual coping, over 30% of pediatric patients endorse feeling spiritually punished or question God's love for them on some occasions (Cotton, Grossoehme et al, 2009; Reynolds, Mrug, Hensler et al., 2014).

Although the present findings provide robust evidence for the association between negative spiritual coping and internalizing problems, they do not clarify the directionality

of this relationship. Among adults with chronic illness, negative spiritual coping consistently predicts poorer adjustment and health over time (Ai, Seymour, Tice, Kronfol, & Bolling, 2009; Ironson, Stuezle, Fletcher, & Ironson, 2006; Pargament, Koenig, Tarakeshwar & Hahn, 2001; Trevino et al., 2010). However, fewer longitudinal studies have been conducted with pediatric patients and the findings have been mixed. Among youth with asthma, Benore et al. (2008) found that negative spiritual coping during baseline hospitalization predicted higher levels of anxiety one month later. In contrast, among youth with diabetes or cystic fibrosis, baseline negative spiritual coping was unrelated to depression assessed two years later (Reynolds, Mrug, Hensler et al., 2014). Instead, higher baseline symptoms of depression predicted more frequent negative spiritual coping at follow-up. These findings suggest that the associations between negative spiritual coping and internalizing problems may be bidirectional and perhaps depend on the time lag between the assessments. Clearly, more longitudinal studies are needed to clarify the directionality of these relationships.

The psychosocial processes through which negative spiritual coping may contribute to internalizing problems are currently not well understood. Among adults, mediating factors, such as optimism and specific cognitions, have been suggested to play a role (Pargament, 2011). Concerns about death, for instance, fully mediated the relationship between spiritual struggle and depression among adults with end-stage congestive heart failure (Edmondson, Park, Chaudoir, & Wortmann, 2008), while optimism partially mediated the relationship between spirituality and improved quality of life among adults with HIV/AIDS (Szaflarski et al, 2006). Although studies among pediatric patients have not explicitly evaluated possible mediators of this link, they have

controlled for other variables that could be conceptualized as potential mediators. For instance, pediatric patients' negative spiritual coping predicted more anxiety at one-month follow-up even after controlling for perceived health and symptom control, as well as secular coping strategies (e.g., distraction) (Benore et al., 2008), suggesting that these factors do not fully mediate the effects of spiritual coping. Additional research, particularly with pediatric populations, is needed to evaluate these mechanisms and clarify the pathways through which negative spiritual coping affects adjustment and quality of life over time.

Contrary to our hypotheses, synthesis of the data under a random effects model revealed that positive spiritual coping was unrelated to adjustment. However, individual studies evidenced moderate to large associations between positive spiritual coping and fewer internalizing problems (Lyon et al., 2014; Shelton, 2004) and a significant cumulative effect emerged under the fixed effects model. However, there was considerable heterogeneity across studies, making it difficult to draw conclusions about these results. Clearly, more studies are needed to study the links between positive spiritual coping and psychosocial adjustment.

Among the included studies, positive spiritual coping was also unrelated to health outcomes. This could be due in part to the cross-sectional design of the studies. For instance, the longitudinal results presented by Reynolds, Mrug, Britton et al. (2014) showed a significant effect between positive spiritual and health outcomes over a 5-year period despite the cross-sectional effect not being significant. In addition, mixed results emerged for quality of life. Specifically, Lyon et al. (2014) reported a moderate association between positive spiritual coping and better quality of life, while results from

Benore et al. (2008) revealed the inverse – positive spiritual coping was moderately associated with poorer quality of life. One possible explanation for these discrepant findings may be a more complex relationship between health problems, positive spiritual coping, and psychosocial adjustment. For instance, positive spiritual coping strategies may be mobilized in response to stress or a difficult situation that worsens psychosocial adjustment and quality of life, including a significant illness-related event such as hospitalization or symptom exacerbation (Pargament et al., 1998). Mobilization theory posits that a normative reaction to distress is to engage (or "mobilize") available coping resources, such as positive spiritual coping strategies, in an effort to promote adjustment. However, improved adjustment may not be immediately apparent, so that early in the coping process positive spiritual beliefs may appear related to poorer adjustment or quality of life as individuals try to cope.

In fact, Benore et al. (2008) suggest that their results may reflect this phenomenon, explaining that data were collected from youth accessing emergency care and undergoing hospitalization for acute asthma treatment. Data from the Lyon et al (2014) study, on the other hand, were obtained from patients during their regular outpatient clinic visits for treatment of HIV. Thus, acute illness-related events may moderate the effects of positive spiritual coping on adjustment. Other disease-related factors, such as severity of the illness, frequency or duration of hospitalizations, and time since diagnosis, may also serve as moderators of these relationships. Indeed, one study with adults with HIV/AIDS found that the positive effects of spirituality on quality of life were moderated by physical functioning. Specifically, spirituality was more strongly related to perceived improvements in quality of life among patients reporting poorer

physical functioning compared to those reporting better functioning (Szarflarski et al., 2006). Although a qualitative review of the individual study effects included in this meta-analysis (significant versus nonsignificant) did not reveal a clear pattern of differences in study characteristics, studies comprised of participants with varying conditions and more diverse illness progression were more likely to evidence nonsignificant effects (Landolt, Vollrath, & Ribi, 2002; Zehnder et al., 2006), suggesting that these factors may explain some of the nonsignificant and heterogeneous findings. Research focused on identifying moderating factors and clarifying the temporal relationships between spiritual coping, adjustment, and health throughout the disease course is needed.

Clinical Implications

The present meta-analysis provides important clinical information about the role of spiritual coping in adjustment and health among youth with chronic or serious medical illness. Specifically, pediatric patients experiencing spiritual struggle may be at risk for internalizing problems and poorer quality of life, highlighting the need for early identification using brief, validated measures (King, Fitchett, & Berry, 2013; Pargament et al., 1998) or following guidelines outlined by the Joint Commission on Accreditation of Healthcare Organizations (JCAHO, 2008). Specifically, JCAHO (2008) suggests that providers ask patients whether "there are any cultural, religious, or spiritual beliefs or practices that may influence his or her care" and if so, to consider having a chaplain complete a more formal spiritual assessment to identify specific religious practices or coping resources. For youth who endorse utilizing negative spiritual coping strategies to cope with their illness, consultation with a hospital chaplain may be especially beneficial. If depression, anxiety, or other psychosocial difficulties are also suspected, a referral to a

pediatric psychologist for a more comprehensive assessment of adjustment and coping would be warranted. More research is needed to determine if interventions addressing spiritual struggle improve adjustment in pediatric patients, as has been demonstrated among adults with serious medical illness (Cole, 2005), or whether existing interventions targeting psychosocial adjustment difficulties lead to the use of more adaptive spiritual coping strategies among youth who identify spirituality as an important coping resource.

Limitations and Future Directions

The present meta-analysis had some limitations. First, generalizability was limited by the small number of studies. Having so few studies also prohibited the examination of moderators and subgroup analysis when heterogeneity was identified. Interpretation and generalizability was also limited by the predominance of participants identifying as Christian (86% across 5 studies). Although research has sought to rectify this limitation, with an emergence of studies focusing on other religious traditions (Pirutinsky, Rosmarin, Pargament, & Midlarsky, 2011; Khan & Watson, 2006), more work is needed in this area, particularly among pediatric patients.

A second limitation was the variability in how individual studies operationalized and measured spiritual coping. Although an effort was made to only examine studies that assessed the use of spiritual beliefs as a coping strategy, differences among the measurement tools call into question how well the underlying construct of spiritual coping was captured in the current meta-analysis. In addition, combining various indices of psychosocial adjustment and physical health may have contributed to the heterogeneity among studies and obscured meaningful relationships. As more research in this area emerges, future meta-analytic studies may benefit from examining positive and negative

spiritual coping with specific indices of adjustment and health (e.g., depression; adherence), or analyzing varying conceptualizations and measures of the constructs as moderators.

Finally, because very few studies have examined prospective relationships between spiritual coping and health among pediatric patients, only cross-sectional data were included in the meta-analysis. Thus, neither the causal relationship nor the temporal order of spiritual coping and health can be inferred from the results. Although a few studies have sought to clarify these longitudinal relationships among pediatric populations (Grossoehme et al., 2013; Reynolds, Mrug, Britton et al., 2014; Reynolds, Mrug, Hensler et al., 2014), replication of these studies across multiple pediatric patient groups and aspects of health is needed.

Despite these limitations, the present meta-analysis summarized extant literature on spiritual coping in youth with chronic or serious illness. The results revealed that these youth are at risk for experiencing spiritual struggle and in turn, these negative spiritual coping strategies are related to internalizing problems and poorer quality of life. In addition, there was some support for a link between positive spiritual coping and fewer internalizing problems. More research is needed to clarify the directionality of the relationships between spiritual coping and mental and physical health, as well as mediators and moderators of these associations. In addition, intervention research with pediatric patients facing serious medical illnesses is needed to determine if spiritual coping is modifiable and whether its targeting improves adjustment.

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SPIRITUAL COPING AND ADJUSTMENT IN ADOLESCENTS WITH CHRONIC ILLNESS: A 2-YEAR PROSPECTIVE STUDY

by

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Abstract

Objective: Examine longitudinal relationships between spiritual coping and psychological adjustment among adolescents with chronic illness. **Methods**: Adolescents (*N*=128; *M*=14.7 years) with cystic fibrosis or diabetes completed measures of spiritual coping and adjustment at two time points approximately two years apart; parents also reported on adolescent adjustment. Prospective relationships between spiritual coping and adjustment were evaluated with an autoregressive cross-lagged path model. **Results**: Positive spiritual coping predicted fewer symptoms of depression and less negative spiritual coping over time, whereas negative spiritual coping predicted more positive spiritual coping. Depressive symptoms predicted higher levels of negative spiritual coping and conduct problems over time. The results did not vary by disease. **Conclusions**: Positive spiritual coping may buffer adolescent patients from developing depression and maladaptive coping strategies. Results also highlight the harmful role of depression in subsequent behavior difficulties and maladaptive coping. Addressing spiritual beliefs and depressive symptoms in pediatric medical care is warranted.

Keywords: pediatric chronic illness, spiritual coping, religious coping, adolescents, psychological adjustment

Introduction

Over 30% of U.S. adolescents experience chronic health conditions that limit their daily activity or result in disability (Newacheck et al., 1998). Illness symptoms and demands of treatment also complicate their achievement of important developmental tasks such as increasing independence, establishing meaningful peer relationships, and transitioning into adult roles (Bauman, Drotar, Leventhal, Perrin, & Pless, 1997). In turn, these adolescents are at greater risk than their healthy counterparts for developing internalizing and externalizing problems that compromise their health over time (e.g., via treatment nonadherence) (Pinquart & Shen, 2011; Quittner et al., 2008). Worsened health outcomes are further compounded by the adverse effects of puberty on the course of some chronic diseases (Moran et al., 2002), highlighting the need to identify effective coping strategies for these adolescents.

A growing body of research has identified religious/ spiritual coping as a salient issue for adolescents experiencing a variety of chronic health conditions (Cotton, Grossoehme, et al., 2009; Shelton, Linfield, Carter, & Morton, 2005). With normative developments in abstract thinking and moral reasoning (Fowler, 1981; Piaget, 1964), issues of spirituality rise to the forefront for most adolescents but become particularly important for those with chronic illness. With an emphasis on the sacred, spiritual beliefs can provide a unique framework for understanding and coping with illness (Pargament, 2011), particularly when other sources of support are not readily available (e.g., decreased social support during hospitalization) (Park, 2007).

Consistent with theory and empirical research on spiritual coping in adults (Pargament, Smith, Koenig, & Perez, 1998), youth with chronic illness utilize spiritual

coping strategies (Cotton, Grossoehme, & McGrady, 2012; Pendleton, Cavalli, Pargament, & Nasr, 2002), and these strategies are strongly related to their behavioral and emotional functioning. Specifically, positive spiritual coping involves cognitive strategies such as seeking comfort and strength from God or believing that God is strengthening the individual in the situation. Positive spiritual coping is associated with lower emotional distress in youth with asthma, cystic fibrosis, and diabetes (Reynolds, Guion, & Mrug, 2013; Shelton et al., 2005). However, not all spiritual cognitions are helpful (Pargament et al., 1998). Some individuals also experience negative spiritual coping, including spiritual doubts or thoughts of being abandoned or punished by God. Negative spiritual coping predicts poorer quality of life and more emotional and behavioral problems in pediatric populations (Benore, Pargament, & Pendleton, 2008; Reynolds et al., 2013). Even after accounting for general coping, attribution style, disease severity, and other covariates, spiritual coping remains a significant predictor of mental health among children (Benore et al., 2008) and adults (Tix & Frazier, 1998; Pargament et al., 1998), and is more strongly linked to emotional well-being of youth with chronic illness compared to healthy peers (Cotton, Kudel, et al., 2009). The use of positive and negative spiritual coping dimensions is either positively correlated (Benore et al., 2008; Pargament et al., 1998) or unrelated (Reynolds et al., 2013), suggesting that patients may utilize both, either, or neither dimension of spiritual coping.

Although existing literature provides strong evidence for the association between spiritual coping and psychological adjustment of pediatric patients, little is known about the dynamic relationships between these variables over time. Most studies on this topic have been cross-sectional and the few prospective investigations have only examined

spiritual coping as a predictor of adjustment outcomes over short periods of time (Benore et al., 2008; Lyon et al., 2011) or been limited in study scope and measurement (Pirutinsky, Rosmarin, Pargament, & Midlarsky, 2011). Yet the relationships between spiritual coping and adjustment are likely to be bidirectional. For instance, more depressive symptoms and conduct problems may promote increased use of negative spiritual coping and lower reliance on positive spiritual coping. Indeed, it has been theorized that spiritual coping strategies may be mobilized in difficult situations (Pargament et al., 1998) and distress may lead to spiritual struggle (Pargament, 2009). It is also unknown whether positive and negative spiritual coping affect each other over time.

Furthermore, disease differences in these relationships have not been explored. For instance, the longitudinal relationship between spiritual coping and mental health may be different for youth facing a progressive, severe disease such as cystic fibrosis compared to youth with a chronic condition such as diabetes, that if controlled well, is typically less disabling. Spiritual coping may be more salient and play a more important role in the adjustment of adolescents with more severe medical conditions, paralleling differences between chronically-ill and healthy youth (Cotton, Kudel, et al., 2009). Better understanding of the temporal relationships between spiritual coping and adjustment across different medical conditions will provide pediatric psychologists and other health care providers better insight into how to intervene to improve coping and adjustment of adolescent patients.

Thus, the present study evaluates the prospective relationships among positive and negative spiritual coping, depressive symptoms, and conduct problems across two

time points and explores whether these relationships vary between cystic fibrosis and diabetes patients. We hypothesize that higher levels of positive spiritual coping will predict less depression and fewer conduct problems over time, whereas more negative spiritual coping will predict poorer emotional and behavioral adjustment. We also expect reciprocal effects – that better emotional and behavioral adjustment will predict the use of more positive and less negative spiritual coping over time. Because cystic fibrosis is generally more severe and progressive than diabetes, we anticipate stronger links from spiritual coping to adjustment for this group.

Method

Participants

Participants included 128 adolescents diagnosed with type 1 diabetes (*n*=82) or cystic fibrosis (*n*=46) and their caregivers. Adolescents (*M*=14.7 years, *SD*=1.8) included 53% males and 83% Caucasians, 13% African Americans, and 4% other ethnicities. Eighty-seven of the original families (68%; diabetes, n=48; cystic fibrosis, n=39) completed the follow-up assessment approximately two years after baseline (*M*=1.78 years since baseline, *SD*=.80). Of these adolescents, 11% identified themselves as having no religious affiliation, 78% identified as Protestant, 8% as Catholic, and 3% as other. A summary of demographic characteristics of the sample is provided in Table 1. Participants lost to follow-up were more likely to have diabetes than cystic fibrosis ($p<.01$), but they did not differ on any other variables used in the study, including gender ($p=.52$), ethnicity ($p=.96$), age ($p=.25$), income ($p=.66$), positive spiritual coping ($p=.27$), negative spiritual coping ($p=.99$), depression ($p=.98$), and conduct problems ($p=.40$).

Procedure

All study procedures were approved by the University's Institutional Review Board. During years 2008-2009, adolescents were recruited during outpatient medical visits at the diabetes and cystic fibrosis clinics at a Children's Hospital in the Southeast U.S. Inclusion criteria included fluency in English and no known diagnosis of a Pervasive Developmental Disorder, Intellectual Disability, or Psychosis. Eligible adolescents ages 12-18 and one primary caregiver were recruited to participate. After providing written parental informed consent and child assent, participants completed a packet of surveys during their visit or mailed it in after completion at home. Both written and verbal instructions for all measures were provided during recruitment. During years 2009-2012, participants were recruited for a follow-up assessment by phone and mail. Families were either mailed the survey with a stamped, addressed return envelope that they returned (80%), or they completed the survey during their regular outpatient clinic visit (20%). The remaining 41 participants who did not complete the assessment could not be located (n=20), declined to participate (n=7), passed away (n=1), or never returned the surveys after multiple reminders (n=13). After each assessment, participants were compensated for their time.

Measures

Demographics and disease characteristics. At baseline, caregivers reported demographic information such as the child's age, gender, and ethnicity. Ethnicity was recoded into two categories, Caucasian and racial/ethnic minority. Caregivers also reported on the family's annual income using a scale that ranged from 1 ($10,000 or less)

to 11 (greater than $100,000). At follow-up, participants were asked about their religious affiliation.

Spiritual coping. At both time points, adolescents completed the Brief RCOPE, a self-report measure of positive and negative religious/spiritual coping strategies that has been validated in both pediatric and adult samples (Cotton, Grossoehme, et al., 2009; Pargament et al., 1998). Positive spiritual coping involves cognitions related to seeking spiritual support (e.g., "seeking God's help in letting go of anger") or reframing a difficult situation from a spiritual perspective (e.g., "trying to see how God might be trying to strengthen me"), while negative spiritual coping involves reframing difficult situations in terms of spiritual punishment or abandonment (e.g., "wondering what I did for God to punish/abandon me") or questioning God's power. The 14 items (7 for positive and 7 negative spiritual coping) are rated on a 4-point scale measuring the frequency or extent to which an individual utilizes each positive or negative spiritual coping strategy (‘‘not at all’’ [0] to ‘‘a great deal’’ [3]). The items were averaged (baseline α=.90 and .73 for positive and negative spiritual coping; follow-up α=.94 and .84). Thus, scores on the positive and negative spiritual coping scales can range from 0 to 3, with higher scores indicating more frequent use of positive or negative spiritual coping. For example, a mean score of 0 would indicate no use of the assessed spiritual coping strategies, whereas a mean score of 3 would indicate frequent use of each coping strategy.

Adolescent depressive symptoms. At both time points, adolescents completed the self-report version of the Behavioral Assessment System for Children-Second Edition (BASC-2) (Reynolds & Kamphaus, 2004). The 12-item depression subscale was used to

measure depression. Raw scores were used instead of standardized scores due to their greater variability, particularly at low levels of psychopathology as was present in this sample (Heflinger, Simpkins, & Combs-Orme, 2000). Because some items on this scale were rated on a 4-point scale ("never" to "always") but others were dichotomous (true/false), all items were converted into z-scores and averaged (baseline α=.84; follow-up α=.81). Higher scores indicate more depressive symptoms.

Adolescent conduct problems. At both time points, caregivers completed the parent version of the Behavioral Assessment System for Children-Second Edition (BASC-2) (Reynolds & Kamphaus, 2004). The 14-item conduct problems scale was used. All items were rated on a 4-point scale (from 1 – "never" to 4 – "always") and averaged (baseline α=.87; follow-up α=.83). Higher scores indicate more adolescent conduct problems.

Statistical Analyses

The data were examined for outliers and violations of normality, linearity, and other assumptions of path modeling. Bivariate relationships among variables were examined with Pearson's correlations for continuous variables, point-biserial correlations for dichotomous variables, and *t* tests.

Prospective, reciprocal relationships among positive and negative spiritual coping, depressive symptoms, and conduct problems were analyzed with an autoregressive cross-lagged path model in Mplus version 7 (Muthén & Muthén, 2013). Missing data (1% of all data points) were handled with Full Information Maximum Likelihood which provides unbiased estimates and standard errors when data are Missing At Random (Enders, 2010). This approach allowed us to use the full sample size of 128 in these analyses. The

model included autoregressive paths linking the same variables over time, as well as cross-lagged paths prospectively linking each variable with all others. Variables measured at the same time point were allowed to covary and all paths were adjusted for demographic variables that were related to any of the variables (gender, ethnicity, diagnosis and annual family income). Baseline variables were also adjusted for age at baseline, and follow-up variables were adjusted for age at follow-up. A good model fit is indicated by CFI values over .90 and RMSEA of .05 or less (Hu & Bentler, 1999). Possible disease differences in model paths were tested with multigroup modeling. The χ^2 difference tests compared the unconstrained model, in which all paths were allowed to vary across the two disease-groups, with the constrained model, where all paths were fixed to be equal for the two disease groups. Significant differences would indicate disease differences in the overall model.

Results

Preliminary Analyses

Descriptive analyses identified 5 outliers on the outcome variables, which were truncated to a raw score corresponding to 3 standard deviations above or below the mean. No significant violations of normality were detected, as indicated by skewness values ranging from -1.13 to 1.90 and kurtosis values ranging from -2.02 to 2.55 (Kline, 2011). Scatterplots confirmed linear relationships among continuous variables.

The means, standard deviations, and correlations of all continuous and dichotomous variables are presented in Table 1. Average levels of positive spiritual coping ranged from 1.86 to 2.06 across the two time points, corresponding to using multiple positive spiritual coping strategies often. Mean levels of negative spiritual

coping ranged from .36 to .49, reflecting relatively infrequent use of these coping strategies. Positive and negative spiritual coping were not significantly related at baseline (r=.14, p=.13) or follow-up (r=.18, p=.10). However, negative spiritual coping at baseline was associated with more frequent use of positive spiritual coping at follow-up (r=.27, p<.01). Baseline negative spiritual coping was also associated with higher baseline levels of depression (r=.37, p<.01) and conduct problems (r=.21, p<.05). Baseline positive spiritual coping was associated with fewer conduct problems (r=-.20, p<.05), as well as less depression at follow-up (r=-.37, p<.01). Adolescent-reported depression and caregiver-reported conduct problems were positively interrelated at both time points (r=.43 and .35, both p<.01). Higher baseline levels of depression were associated with higher follow-up conduct problems (r=.31, p<.01) and greater use of negative spiritual coping strategies (r=.43, p<.01). Depression at follow-up was also related to more negative spiritual coping at follow-up (r=.26, p<.05).

Independent-samples t tests indicated that, compared to Caucasian adolescents, ethnic minority adolescents report higher levels of negative spiritual coping at both baseline (M=.83 vs. .43; t(24)=-2.96, p<.01) and follow-up (M=.65 vs. .31; t(16)=-2.13, p<.05), as well as higher levels of positive spiritual coping at follow-up only (M=2.41 vs. 1.75; t(28)= -3.53, p<.01). No gender or disease differences emerged on any variables. Paired-samples t tests revealed a significant decrease in negative spiritual coping from baseline to follow-up (from M=.49, SD=.47 to M=.36, SD=.44; t(82)=2.71, p<.01). There were no significant changes in positive spiritual coping (p=.12) or conduct problems (p=.35). Because depression scores were standardized within each time point, changes in depression over time could not be analyzed.

Table 1

Descriptive Statistics and Correlations of all Variables

	Variables	M	SD	1	2	3	4	5	6	7	8	9	10	11	12	13
Baseline (N=128)																
	Female	47%	-	1.00												
2	Minority	16%	-	.13	1.00											
3	Cystic fibrosis	36%	-	.05	-.07	1.00										
4	Family income	6.72	2.91	-.03	**-.32****	-.12	1.00									
5	Age	14.71	1.78	.05	.00	-.01	.01	1.00								
6	Positive spiritual coping	2.06	.74	.13	.10	.02	.00	-.16	1.00							
7	Negative spiritual coping	.49	.49	-.06	**.31****	-.04	-.08	.14	.14	1.00						
8	Depression (A)	-.01	.57	-.04	.11	.01	.03	**.20***	-.15	**.37****	1.00					
9	Conduct Problems (P)	1.34	.32	-.04	.01	.00	.02	**.18***	**-.20***	**.21***	**.43****	1.00				
Follow-up (N=87)																
10	Age	16.37	1.82	-.15	-.04	.12	-.01	**.90****	-.14	.09	.18	.20	1.00			
11	Positive spiritual coping	1.86	.88	.19	**.28****	-.06	-.14	-.07	**.47****	**.27****	-.04	-.14	-.05	1.00		
12	Negative spiritual coping	.36	.45	-.07	**.28****	-.01	-.12	**.25***	-.13	**.52****	**.43****	.03	.18	.18	1.00	
13	Depression (A)	.00	.70	-.01	.11	.12	-.07	.07	**-.37****	.04	**.27****	-.06	.06	-.17	**.26***	1.00
14	Conduct Problems (P)	1.34	.28	-.13	.02	.05	-.08	.03	-.05	.12	**.31****	**.40****	-.01	-.12	.20	**.35****

Note. *p<.05, **p<.01 or lower. Significant correlations are in **bold**.
(A): adolescent self-report of behavior on BASC; (P): parent report of behavior on BASC.

Main Analyses

The autoregressive cross-lagged path model (see Figure 1) linking positive and negative spiritual coping, depression, and conduct problems over time had excellent fit to the data [$\chi^2(24)= 24.04$, $p=.46$; Comparative Fit Index (CFI)= 1.00; Tucker Lewis Index (TLI)=.99; Root Mean Square Error of Approximation (RMSEA)=.00]. Spiritual coping, depressive symptoms, and conduct problems had moderate stability over time (β=.31 to .47). Depression and conduct problems were related at each time point (β=.41, $p<.001$). Positive and negative spiritual coping were not related to each other at baseline or follow-up.

Baseline positive spiritual coping predicted lower levels of depression (β=-.38, $p<.001$) and less negative spiritual coping at follow-up (β=-.18, $p<.05$). Baseline negative spiritual coping predicted more positive spiritual coping over time (β=.22, $p<.05$). Baseline depression predicted higher levels of negative spiritual coping (β=.33, $p=.001$) and more conduct problems at follow-up (β=.23, $p<.05$). Conduct problems did not predict any follow-up variable. The percentages of variances explained by the model in the follow up variables were 27% for positive spiritual coping, 42% for negative spiritual coping, 22% for depression and 25% for conduct problems. The multigroup analysis did not indicate the presence of disease differences [$\Delta\chi^2(37)=43.55$, $p=.21$].

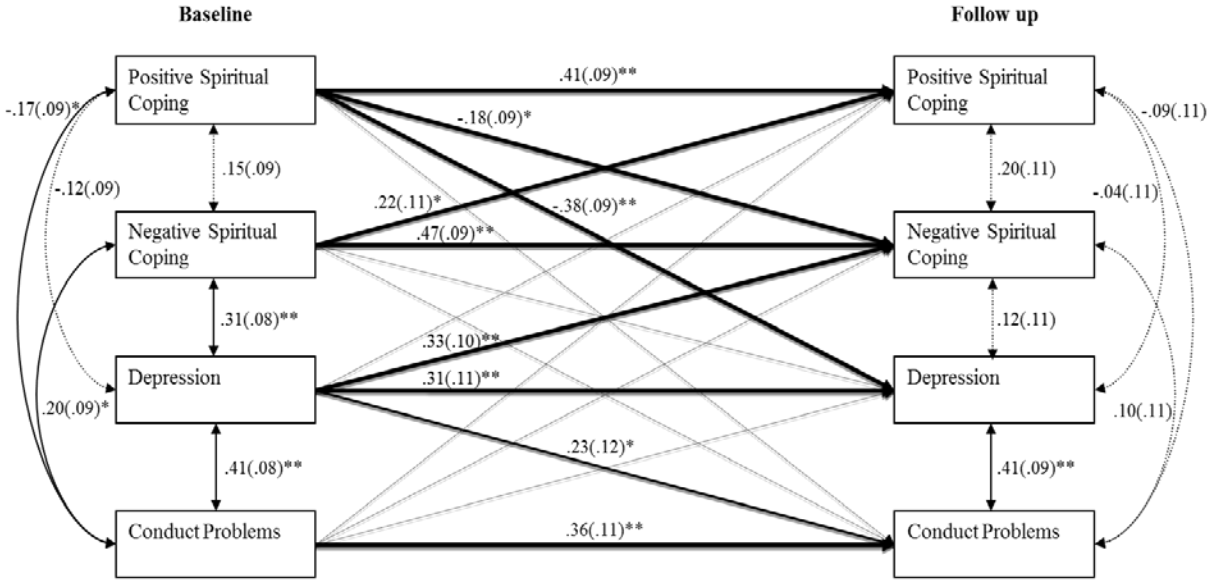

Figure 1. Cross-lagged model of adolescent spiritual coping and psychological adjustment at two-time points. All paths were adjusted for gender, ethnicity, diagnosis and annual family income. Baseline variables were also adjusted for age at baseline, and follow-up variables were adjusted for age at follow-up. The model had excellent fit to the data: $\chi 2(24)=24.04$, $p=.46$; comparative fit index=1.00; Tucker Lewis index=.99; root mean square error of approximation=.00. * $p < .05$. ** $p < .01$. Solid lines represent significant paths. Dashed lines represent non-significant paths.

Discussion

Spiritual coping is related to emotional and behavioral adjustment of youth with chronic illness, but our understanding of the dynamic, longitudinal relationships between these variables has been limited. To address this gap, the present study examined prospective, bidirectional relationships among positive and negative spiritual coping, depressive symptoms, and conduct problems in adolescents with cystic fibrosis or diabetes. The results revealed reciprocal relationships between spiritual coping and depression, suggesting that the use of positive spiritual coping may protect against depression over time, and in turn, low levels of depression may prevent individuals from utilizing negative spiritual coping strategies. Positive and negative spiritual coping were

also reciprocally related, with more positive spiritual coping predicting less negative spiritual coping over time, and, interestingly, more negative spiritual coping predicting more positive spiritual coping. Finally, higher levels of depression predicted more conduct problems over time. These relationships did not vary between adolescents with diabetes versus cystic fibrosis.

Spiritual Coping and Mental Health

This is the first study that evaluated prospective, reciprocal relationships between spiritual coping and psychological adjustment among adolescents with chronic illness. After controlling for the effects of demographic variables, results revealed that positive spiritual coping predicted less depression over time. This finding extends cross-sectional research linking positive spiritual coping with better emotional adjustment in pediatric patients (Reynolds et al., 2013; Shelton et al., 2005). This suggests that more frequent use of positive spiritual coping may buffer pediatric patients from developing depression over time by providing a unique source of support when other sources of support are limited, as is often the case due to hospitalizations or other illness-related disruptions (Pargament et al., 1998; Park, 2007). Positive spiritual coping may also be associated with lower levels of depression by promoting an optimistic attribution style, whereby patients appraise negative events as external, unstable, and specific (Peterson et al., 1982; Reynolds et al., 2013).

Consistent with theory (Pargament, 2009; Pargament et al., 1998), the results also suggest that spiritual coping strategies are influenced by mental health. For adolescents coping with illness, depression may mobilize maladaptive, negative spiritual coping strategies such as reappraising their illness as a spiritual punishment. Indeed, despite

patients indicating, on average, infrequent use of negative spiritual coping strategies, examination of the Brief RCOPE items at both time points revealed that over 30% of the sample endorsed sometimes wondering what they had done for God to punish them (with illness). The prospective relationship between depression and negative spiritual coping is consistent with research linking depression and general pessimistic attributions, whereby individuals view negative events as being due to internal, global, and stable causes (Peterson et al., 1982). In turn, pessimistic attributions exacerbate internalizing problems in pediatric patients (Frank, Blount, & Brown, 1997; Schoenherr, Brown, Baldwin, & Kaslow, 1992), and may also increase the use of negative spiritual coping. Although negative spiritual coping did not predict depression in our adolescent sample, it may lead to depression later in development, as suggested by studies with adult patients (Pargament, Koenig, Tarakeshwar, & Hahn, 2004). Longitudinal research following adolescents with chronic illness into adulthood would help clarify the developmental course and timing of these relationships.

Positive and Negative Spiritual Coping

At both time points, adolescents endorsed using positive spiritual coping more frequently than negative spiritual coping, consistent with theory and empirical research (Pargament & Hahn, 1986; Pargament et al., 1998). Positive and negative spiritual coping were unrelated at either time point. Over time, however, more frequent use of positive spiritual coping predicted less frequent use of negative spiritual coping, while more negative spiritual coping predicted greater utilization of positive spiritual coping. Although this may initially seem contradictory, cross-sectional studies with pediatric and adult patients with chronic illness have found moderate, positive correlations between

positive and negative spiritual coping (Ai, Wink, Tice, Bolling, & Shearer, 2009; Benore et al., 2008; Fitchett et al., 2004; Pargament et al., 1998), suggesting that individuals may use both positive and negative spiritual beliefs to cope.

Our results suggest that more frequent use of positive spiritual coping may diminish the use of maladaptive, negative spiritual coping over time – an important finding because studies with adults with chronic illness have linked negative spiritual coping with declines in mental and physical health over time (Pargament, Koenig, Tarakeshwar, & Hahn, 2001; Trevino et al., 2010). However, our results also suggest that negative spiritual beliefs may bring about spiritual benefit or growth (Fowler, 1981; Pargament, 2011). For instance, pediatric patients who fear that they have been spiritually abandoned may pursue reconnection with a higher power by praying or seeking spiritual collaboration, thereby increasing their use of positive spiritual coping over time. Spiritual growth as a result of illness has been described among adults patients (Cordova, Cunningham, Carlson, & Andrykowski, 2001) and caregivers of childhood cancer survivors (Hensler, Katz, Wiener, Berkow, & Madan-Swain, 2013), but it has not been studied among pediatric patients. Future research should assess spiritual growth in pediatric populations using validated measures, such as the Spiritual Transformation Scale (Cole, Hopkins, Tisak, Steel, & Carr, 2008), and with negative spiritual coping as a predictor.

Depression and Conduct Problems

In our sample of adolescents with chronic illness, depressive symptoms predicted more conduct problems over time. It has been theorized that youth with depression are at risk for developing conduct problems because the irritability and negative affect that is

characteristic of pediatric depression may increase conflict with others and subsequent acting out behaviors (Wolff & Ollendick, 2006). For pediatric patients, depression may exacerbate irritability and disease-related frustrations, including low perceived control over symptoms and treatment, restricted participation in social activities (e.g., due to hospitalization or home treatment demands), or peer rejection/ difficulty making friends, that consequently put them at increased risk for developing externalizing problems (Pinquart & Shen, 2011).

However, the observed link between depression and subsequent conduct problems may reflect reporter bias. In the present study, adolescents reported on their depression, whereas their primary caregiver reported on conduct problems. Since parents caring for children with illness experience distress (Cheshire, Barlow, & Powell, 2010; Sloper, 2000), which can be magnified by their child's depression, they may report biased estimates of their child's behavior (Youngstrom, Loeber, & Stouthamer-Loeber, 2000). Unfortunately, the adolescent-report measure of adjustment used in this study (the BASC-2) does not include the conduct problems scale. Future research should replicate these relationships using the same reporters (e.g., child or parent) of emotional and behavioral functioning.

No Disease Differences

This was the first longitudinal study to examine disease differences in the relationships between spiritual coping and psychological adjustment. Our previous cross-sectional research revealed disease differences such that negative spiritual coping was related to more internalizing problems only among adolescents with cystic fibrosis versus those with diabetes (Reynolds et al., 2013). In the current study, the two disease groups

reported similar levels of spiritual coping, depression, and conduct problems, and no disease differences emerged in the prospective relationships. This suggests that spiritual coping is relevant to and plays an important role in the long-term adjustment of youth with cystic fibrosis and diabetes, and possibly other pediatric illness groups as well. The results also highlight that depression may put patients, in this case diabetes and cystic fibrosis, at risk for using maladaptive coping strategies over time and developing externalizing problems. Future research exploring disease differences should include additional pediatric populations and examine relationships at multiple time points to capture differences due to differential disease course. Including a control group of healthy youth would also be helpful to determine if the studied relationships are unique to youth with chronic illness.

Clinical Implications

In adolescents with cystic fibrosis or diabetes, the use of positive spiritual coping predicted lower levels of depression at follow-up, while depression predicted more use of negative spiritual coping over time. These findings have important implications for clinical practice. As part of an intake or psychosocial assessment, clinicians can use brief, validated measures to screen pediatric patients for depression, spiritual distress, and use of spiritual coping strategies (King, Fitchett, & Berry, 2013; Pargament et al., 1998). Adolescents who report using spirituality to cope may benefit from interventions helping them strengthen their positive spiritual coping beliefs and/or decrease their negative spiritual coping. Such interventions may be particularly relevant if depression or other adjustment difficulties are present. The use of interdisciplinary medical teams that

include pediatric psychologists and pastoral care will be important for providing such integrated clinical care.

Strengths, Limitations, and Future Directions

This study extended existing literature by examining the prospective, reciprocal relationships between spiritual coping and psychological adjustment in adolescents with chronic illness and by exploring disease differences. Methodological strengths include the longitudinal design, inclusion of multiple disease groups, and use of path modeling to simultaneously estimate all relationships. However, this study had several limitations. First, the time between baseline and follow-up may not have been optimal to capture the effects of spiritual coping on adjustment and vice versa. It is possible that studies utilizing shorter intervals between assessments may uncover stronger or additional relationships. The time between baseline and follow up also varied across participants. Results did not change when time was added as a covariate, but the variation in time may have attenuated some of the studied relationships. Second, this study did not measure secular coping strategies or assess religiosity at both time points, and thus, was not able to determine the unique role of spiritual coping in adjustment. Third, the study was limited by the relatively high attrition rate. Although we expended substantial resources tracking and recruiting families for follow-up assessment, many families were too busy to continue their participation. This is not surprising given the stress and time demands associated with disease symptoms and management (Barlow & Ellard, 2006). This limitation is somewhat mitigated by the general lack of differences between those who were vs. were not retained and by using Full Information Maximum Likelihood to utilize all available data. A related limitation is the relatively small sample size, despite

providing sufficient power (>.90) to detect well-fitting models (MacCallum, Browne, & Sugawara, 1996). Finally, the sample was predominately Christian, reflecting the geographic area in which it was recruited (Kosmin, Mayer, & Keysar, 2001), and thus may not generalize to patients residing in locations with different patterns of religious affiliation. In addition, the spiritual coping measure (Brief RCOPE) presumes a monotheistic religious orientation and may not capture spiritual coping among individuals with other theistic belief systems (e.g., Hinduism).

Despite these limitations, this study provides important, clinically-relevant information about the dynamic relationship between spiritual coping and psychological adjustment among adolescents with chronic illness. The results suggest that more frequent use of positive spiritual coping may buffer pediatric patients from depression and utilizing maladaptive, negative spiritual coping strategies, the importance of which is highlighted by our finding that depression predicted conduct problems and negative spiritual coping over time. Thus, for patients who endorse spirituality as an important coping mechanism, not using positive spiritual coping may contribute over time to depression, negative spiritual coping, and conduct problems.

Importantly, these results did not vary by disease, suggesting that pediatric patients dealing with various medical conditions, and for whom spirituality is important, may be at risk for long-term adjustment and coping difficulties if they do not utilize positive spiritual coping. Given the harmful effects of depression and conduct problems on disease self-management, treatment adherence, and long-term adjustment, protective psychosocial factors, such as positive spiritual beliefs, should be considered when providing medical care for adolescents with chronic illness. For patients exhibiting

adjustment difficulties, positive and negative spiritual coping could be assessed using validated measures (King et al., 2013; Pargament et al., 1998) and targeted via interdisciplinary teams and cognitive interventions addressing spirituality (Cole, 2005). Future research should further explore the role of spiritual coping in adjustment through intervention development and longitudinal designs with multiple time points and inclusion of variables related to spiritual coping, such as religious practices and secular coping.

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SPIRITUAL COPING PREDICTS 5-YEAR HEALTH OUTCOMES IN ADOLESCENTS WITH CYSTIC FIBROSIS

by

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Abstract

Background: Positive spiritual coping in adolescent patients with cystic fibrosis (CF) is associated with better emotional functioning, but its role in health outcomes is unknown.

Methods: Adolescents diagnosed with CF (n = 46; *M* = 14.7 years) reported on their use of positive and negative spiritual coping. Measures of nutrition status (BMIp), pulmonary function (%FEV1), and hospitalizations were obtained for a five-year follow up period. Changes in BMIp and %FEV1 scores were estimated with hierarchical linear models; days hospitalized were modeled with negative binomial regression.

Results: Positive spiritual coping was associated with slower decline in pulmonary function, stable vs. declining nutritional status, and fewer days hospitalized over the five-year period. Negative spiritual coping was associated with higher BMI percentile at baseline, but not with health outcomes over time.

Conclusions: These results suggest that positive spiritual coping plays a key role in maintaining long-term health of adolescent patients with CF.

Abbreviations: CF = cystic fibrosis; BMIp = Body Mass Index percentile; %FEV1 = percentage of predicted forced expiratory volume in 1 second.

Introduction

Adolescents with chronic illness, including pulmonary conditions such as CF and asthma, experience more emotional and behavior problems than healthy peers[1]. In turn, these problems are linked with lower quality of life[2], poorer treatment adherence[3], and faster disease progression and mortality[4]. Spiritual beliefs play a unique role as a coping strategy, because they can provide answers to existential questions elicited by the illness (Why me? What comes after death?) and help construct higher meaning out of the illness experience. They can also provide additional social support from a god-figure when other sources are not available[5], such as during hospitalizations.

Youth with different types of chronic illness use spiritual beliefs to cope with their condition[6] (e.g., praying to get better, asking God to give me strength). Such "positive spiritual coping" is associated with better emotional functioning in youth with pulmonary and other disorders[7,8]. Not all spiritual coping beliefs, however, are helpful[9]. Specifically, feeling punished or abandoned by God, termed "negative spiritual coping," predicts more depression and anxiety among youth with CF[7] and asthma[10] and adults with chronic illness[11]. Importantly, spiritual coping remains a strong predictor of emotional problems even after accounting for secular attributions[8] and other coping strategies[10]. Positive and negative spiritual coping are typically measured as dimensional scores ranging from low to high levels. Across studies, these two dimensions are either unrelated to each other[8] or positively correlated[9,10,12], suggesting that some patients utilize both positive and negative spiritual beliefs, while others use neither or only one type of spiritual beliefs.

Among adults with medical illness, positive spiritual coping is also associated with better health outcomes, including improved postoperative cardiac functioning[13], lower rates of mortality[14], and less CD4 cell count decline[15]. Conversely, negative spiritual coping predicts harmful postoperative cytokine elevations[12], higher CD4 cell count decline[16], and higher inpatient mortality[17]. In pediatric patients, only one study linked positive spiritual coping with slower retrospective pulmonary function decline among youth with CF[18]. However, no studies have evaluated the role of spiritual coping in prospective health outcomes in pediatric populations.

To address this gap, this prospective study evaluated the relationship between spiritual coping and subsequent changes in pulmonary function, malnutrition, and hospitalizations over a 5-year period in adolescent patients with CF, a life-threatening progressive genetic disorder with serious pulmonary and pancreatic complications. We hypothesized that positive spiritual coping would be associated with better health functioning over the 5-year period, while negative spiritual coping would be related to faster health decline. We expected that spiritual coping would remain a significant predictor of health outcomes even after accounting for baseline health and secular coping.

Methods

Participants

Participants included 46 adolescents diagnosed with CF and their primary caregivers. Adolescents were between 12 and 18 years old at baseline (*M*=14.7 years, *SD*=1.9) and included 50% males (n=23), 87% Caucasians (n=40), 11% African Americans (n=5), and 2% Hispanics (n=1).

Procedures

The study procedures were approved by the University's Institutional Review Board. Adolescents were recruited during outpatient medical visits at the CF clinic at a Children's Hospital in the southeast U.S. in 2008-2009 (baseline). Inclusion criteria included fluency in English and no known diagnosis of a Pervasive Developmental Disorder, Mental Retardation, or Psychosis. Parental informed consent and adolescent assent was obtained from each family. Participants completed a packet of questionnaires during their clinic visit or at home. Measures of pulmonary function (%FEV1 scores), nutritional status (BMI percentiles), hospitalizations, and medical complications were collected from patients' records in the CF Foundation registry in November 2013 (5-year follow up).

Materials

Spiritual coping. Adolescents completed the Brief RCOPE[9], a self-report measure of positive and negative spiritual coping strategies validated in pediatric samples[6]. Positive spiritual coping strategies include thoughts or beliefs related to seeking spiritual support (e.g., "seeking God's help in letting go of anger") or thinking about a difficult situation from a spiritual perspective (e.g., "trying to see how God might be trying to strengthen me"). Negative spiritual coping strategies, on the other hand, involve reframing the difficult situation in terms of spiritual punishment or abandonment (e.g., "wondering what I did for God to punish/abandon me") or questioning God's power. The 7 positive and 7 negative spiritual coping items were rated on a 4-point scale ("not at all" [0] to "a great deal" [3]) and averaged (α=.90 and .79). Thus, scores on the positive and negative spiritual coping scales can range from 0 to 3, with higher scores reflecting greater use of positive or negative spiritual coping. For instance, individuals

with a mean score 0 do not use any of the positive or negative spiritual coping strategies, whereas those with a mean score 3 often use all the strategies.

Secular coping. Secular cognitive coping was assessed with the Children's Attributional Styles Questionnaire Revised[19]. Adolescents read 24 hypothetical situations, which included 12 negative events (e.g., "A team that you are on loses a game.") and 12 positive events (e.g., "You make your friends happy."). For each event, they had to choose between two explanations for the event, with the explanations varying across locus of control (internal vs. external), stability (always vs. never will be present), or globality (general vs. specific to the situation). Explaining positive events with internal, stable, and general causes represents positive (optimistic) attributions, whereas explaining negative events by these causes is negative (pessimistic). Positive and negative attributions were calculated by summing the number of internal, stable, and general causes chosen across the 12 positive and negative scenarios, respectively (α = .53 and .52). The negative attribution scale was then subtracted from the positive attribution scale, yielding a single dimensional measure of optimistic attribution style.

Pulmonary function. To assess airway obstruction, patients completed the forced expiratory volume in 1 second (FEV1) test at every clinic visit. This test measures the volume exhaled during the first second of a forced expiratory maneuver started from the level of total lung capacity, and is recorded as a percentage of the normal predicted values for height, age, and sex (i.e., percent predicted FEV1, %FEV1)[20]. Higher percentages reflect better pulmonary functioning and are typically classified as normal (>90%), mild obstruction (70-89%), moderate obstruction (40-69%) or severe obstruction

(<39%)[21]. Pulmonary function data were collected for every clinic visit between baseline and the end of the follow up period.

BMI percentile. Body mass index percentiles (BMIp) (adjusted for age and gender) were also obtained at each clinic visit between baseline and end of follow up. Because nutritional status significantly affects disease progression and survival in patients with CF, BMI percentiles are routinely used to screen for malnutrition and nutritional failure[22].

Hospitalizations. The number of days hospitalized was obtained from all available records for two intervals - before baseline and during follow up. The number of days hospitalized was divided by the length of each period to indicate average days hospitalized per year.

Baseline medical complications. At baseline, we summed the number of major CF complications (CF related diabetes, liver disease, allergic bronchopulmonary aspergillosis, and hemoptysis). For one year before baseline, we also summed the percentages of positive tests for bacterial and mycobacterial lung infections associated with health decline in CF patients (*Pseudomonas aeruginosa,* methicillin-resistant *Staphylococcus aureus*, Burkholderias, and nontuberculous mycobacteria)[23].

Demographics. Caregivers reported the family's annual income and the child's ethnicity, gender, and age. Ethnicity was recoded as Caucasian vs. minority.

Data Analysis

Descriptive statistics were examined and bivariate relationships tested with correlations. Hierarchical linear models using SAS PROC MIXED estimated the baseline levels (intercepts) and linear changes per year (slopes) of %FEV1 and BMIp over the

follow up. Following the unconditional model (with no predictors), the unadjusted model included positive and negative spiritual coping as predictors of baseline levels and yearly changes in %FEV1 and BMIp. In adjusted models, baseline secular coping, demographic covariates (age, gender, race, and family income), and baseline health variables (BMIp or %FEV1, days hospitalized, major CF complications, and bacterial infections) were added as predictors of baseline levels and changes in %FEV1 and BMIp. To ease interpretation of coefficients, all continuous predictors were centered at mean 0. Dichotomous predictors were coded 0 for males and Caucasians (vs. 1 for females and minorities). Days hospitalized between baseline and follow up were modeled with negative binomial regression. The unadjusted model included hospitalizations before baseline and positive and negative spiritual coping. The adjusted model included the same covariates as the adjusted %FEV1 and BMIp models.

Results

Patients were followed for up to 5.25 years (*M*=4.52, *SD*=1.23), 71 clinic visits (*M*=28, *SD*=17) and 37 hospitalizations (*M*=9, *SD*=10). Data on hospitalizations before baseline were available for an average of 1.67 years (*SD*=.35) and included up to 25 hospitalizations (*M*=3, *SD*=5). Descriptives and correlations of all variables are presented in Table 1. Positive and negative spiritual coping and attributions were unrelated to one another. Positive spiritual coping was associated with younger age at baseline and better pulmonary function at last follow up. Negative spiritual coping was related to higher BMIp at baseline. Optimistic attributions were associated with fewer days hospitalized before baseline.

Table 1. Summary and Correlations of Demographic, Predictor, and Outcome Variables

	Variable	*M (SD)*	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	Female, %	50%	1													
2	Minority, %	13%	0.13	1												
3	Age	14.7 (1.9)	-0.20	-0.05	1											
4	Family income[a]	7.3 (3.3)	-0.05	**-0.37***	-0.06	1										
5	BMIp, baseline	52.0 (27.2)	0.11	0.21	-0.06	0.19	1									
6	BMIp, last follow up	43.9 (33.4)	0.23	-0.21	-0.07	**0.44***	**0.80***	1								
7	%FEV1, baseline	89.0 (19.7)	**-0.40***	-0.04	-0.02	0.18	**0.37***	**0.53***	1							
8	%FEV1, last follow up	82.4 (21.4)	-0.22	0.14	-0.12	-0.01	**0.35***	**0.60***	**0.77***	1						
9	Days hospitalized per yr, baseline	18.0 (25.3)	0.06	-0.15	0.03	-0.28	**-0.44***	-0.35	**-0.37***	**-0.39***	1					
10	Days hospitalized per yr, follow-up	24.8 (32.1)	0.17	-0.23	0.03	-0.15	**-0.38***	-0.37	**-0.55***	**-0.70***	**0.75***	1				
11	Major complications, baseline	0.4 (0.6)	0.05	-0.12	0.12	-0.09	**-0.39***	-0.20	-0.14	-0.14	0.28	0.12	1			
12	Bacterial infections, baseline	0.3 (0.3)	-0.22	0.07	-0.20	-0.14	-0.27	-0.10	-0.06	-0.28	**0.43***	**0.35***	0.11	1		
13	Positive spiritual coping, baseline	2.1 (0.8)	0.18	0.04	**-0.40***	-0.08	-0.04	0.19	0.16	**0.44***	-0.08	-0.17	-0.25	0.06	1	
14	Negative spiritual coping, baseline	0.5 (0.5)	-0.20	0.28	0.26	-0.10	**0.40***	0.19	0.13	0.09	-0.26	-0.28	-0.07	-0.02	-0.05	1
15	Attributions, baseline	5.7 (3.4)	0.19	-0.20	-0.24	0.26	0.08	0.28	0.13	0.17	**-0.30***	-0.17	0.02	-0.30	0.12	-0.26

* $p < .05$ or lower. [a] family income is on an 11-point scale from 1 ($10,000 or less annually) to 11 (greater than $100,000 annually)

The unconditional model for %FEV1 indicated an average decline of 2.35 points each year ($p<0.001$) (Table 2). In both unadjusted and adjusted models, positive spiritual coping predicted slower decline in %FEV1 scores. Estimated %FEV1 declined from 82% to only 78% for patients reporting the highest level of positive spiritual coping (Figure 1a), compared to estimated decline from 82% to 51% for patients not using positive spiritual coping. Negative spiritual coping and attributions were not related to changes in %FEV1 scores, and neither attributions nor spiritual coping predicted baseline %FEV1. Female sex, lower BMIp, and more bacterial lung infections were associated with lower %FEV1 scores at baseline; bacterial lung infections also predicted faster decline in pulmonary function.

Table 2. Hierarchical linear models predicting change in pulmonary function (%FEV1)*

	Unconditional model		Unadjusted model		Adjusted model	
	B (SE)	p	B (SE)	p	B (SE)	p
Baseline %FEV1						
Intercept	**87.14 (3.02)**	**<0.001**	**85.85 (3.13)**	**<0.001**	**96.14 (3.41)**	**<0.001**
Positive spiritual coping	--		2.26 (4.04)	0.575	4.31 (3.49)	0.217
Negative spiritual coping	--		8.03 (6.08)	0.187	-3.44 (5.62)	0.540
Attributions	--		--		1.18 (0.80)	0.138
Female	--		--		**-25.41 (5.05)**	**<0.001**
Racial/ethnic minority	--		--		7.41 (7.29)	0.310
Age	--		--		0.09 (1.33)	0.947
Family income	--		--		-0.31 (0.78)	0.697
BMIp	--		--		**0.35 (0.11)**	**<0.001**
Days hospitalized per yr	--		--		-0.19 (0.13)	0.129
Major complications	--		--		6.50 (4.07)	0.110
Bacterial infections	--		--		**-13.00 (7.70)**	**<0.001**
Change in %FEV1 per yr						
Intercept	**-2.35 (0.48)**	**<0.001**	**-2.45 (0.46)**	**<0.001**	**-2.72 (0.70)**	**<0.001**
Positive spiritual coping	--		**1.65 (0.62)**	**0.008**	**1.81 (0.72)**	**0.012**
Negative spiritual coping	--		-0.37 (1.00)	0.711	-1.05 (1.18)	0.372
Attributions	--		--		-0.15 (0.18)	0.394
Female	--		--		-0.10 (1.02)	0.925
Racial/ethnic minority	--		--		2.56 (1.45)	0.079
Age	--		--		-0.20 (0.26)	0.455
Family income	--		--		0.09 (0.16)	0.586
BMIp at baseline	--		--		0.00 (0.02)	0.961
Days hospitalized per yr	--		--		0.01 (0.02)	0.629
Major complications	--		--		0.53 (0.80)	0.506
Bacterial infections	--		--		**-3.50 (1.64)**	**0.033**

* All continuous predictors, except for time in follow up, were centered at zero (mean=0). All predictors were measured at or before baseline. Significant results are in **bold**.

Overall, BMIp declined by about 2 percentile points each year (p=0.031) (Table 3). Positive spiritual coping predicted slower decline of BMIp over time in both unadjusted and adjusted models; in the adjusted model it was also associated with lower baseline BMIp. Estimated BMIp for patients using high levels of positive spiritual coping

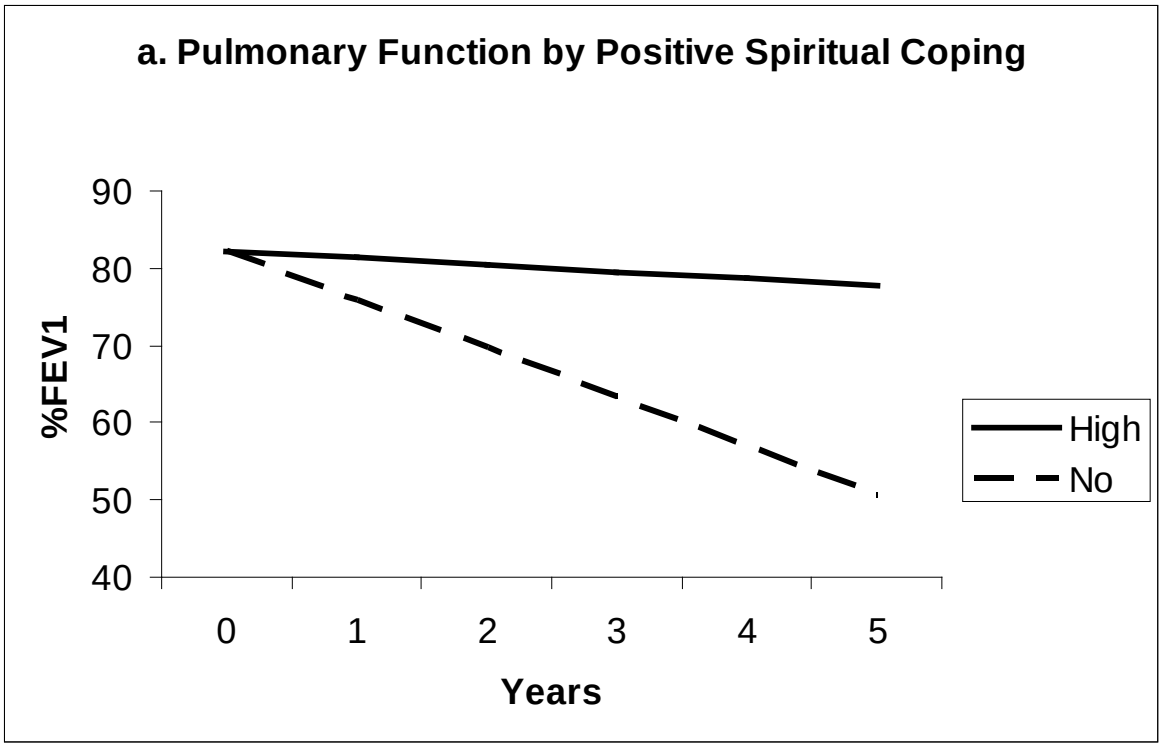
increased slightly from 41st to 44th BMI percentile, compared to decline from 77th to 41st BMI percentile for patients not using positive spiritual coping (Figure 1b). Negative spiritual coping was associated with higher baseline BMIp but unrelated to changes in BMIp over time. Female sex, better pulmonary function, and fewer major complications were related to higher baseline BMIp, and older age predicted faster BMIp decline.

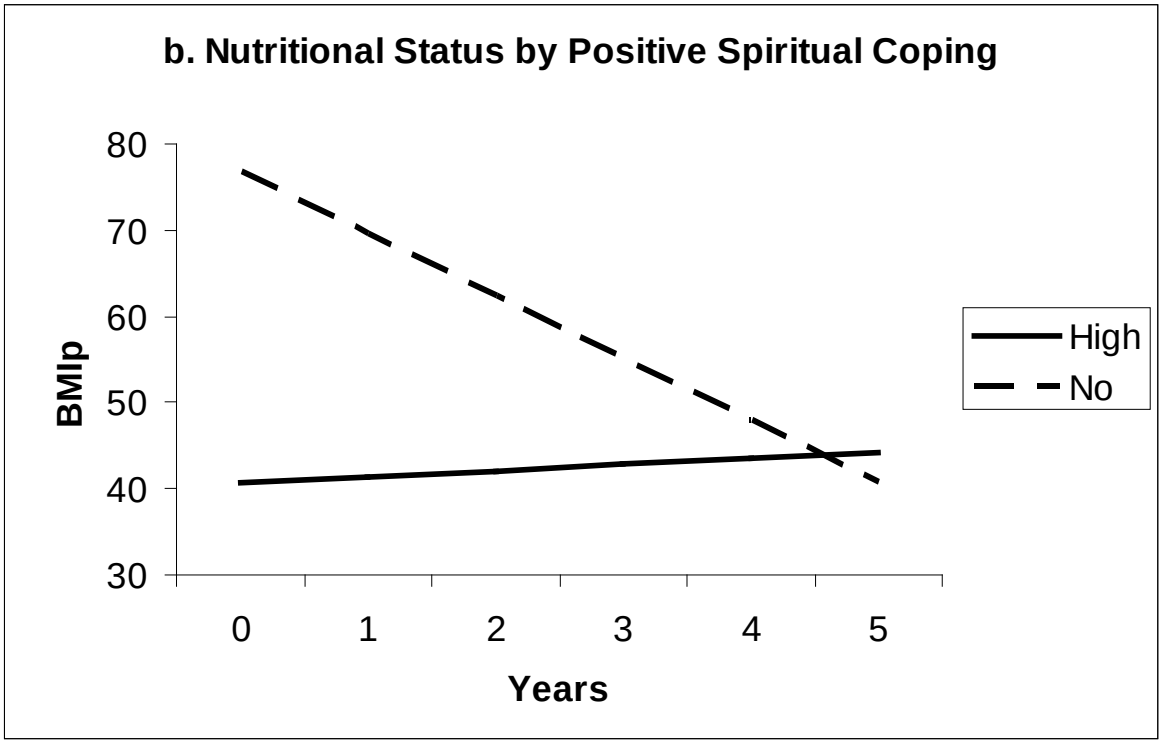
Table 3. Hierarchical linear models predicting change in BMI percentile (BMIp)*

	Unconditional model		**Unadjusted model**		**Adjusted model**	
	B (SE)	p	B (SE)	p	B (SE)	p
Baseline BMIp						
Intercept	**49.46 (3.93)**	**<0.001**	**47.19 (3.80)**	**<0.001**	**36.59 (4.74)**	**<0.001**
Positive spiritual coping	--		-3.60 (4.85)	0.462	**-12.03 (4.87)**	**0.014**
Negative spiritual coping	--		**21.84 (7.33)**	**0.003**	**18.72 (7.15)**	**0.009**
Attributions	--		--		-0.35 (1.09)	0.751
Female	--		--		**19.10 (7.37)**	**0.010**
Racial/ethnic minority	--		--		8.02 (9.84)	0.415
Age	--		--		-2.30 (1.79)	0.197
Family income	--		--		1.27 (1.04)	0.221
%FEV1 at baseline	--		--		**0.45 (0.17)**	**0.008**
Days hospitalized per yr	--		--		-0.11 (0.17)	0.537
Major complications	--		--		**-13.97 (5.11)**	**0.006**
Bacterial infections	--		--		-11.00 (11.59)	0.339
Change in BMIp per yr						
Intercept	**-1.98 (0.88)**	**0.031**	**-2.14 (0.80)**	**0.011**	-1.99 (1.13)	0.089
Positive spiritual coping	--		**3.93 (1.11)**	**<0.001**	**2.63 (1.19)**	**0.027**
Negative spiritual coping	--		-1.61 (1.78)	0.366	0.12 (1.86)	0.948
Attributions	--		--		0.32 (0.29)	0.272
Female	--		--		-1.07 (1.70)	0.528
Racial/ethnic minority	--		--		2.70 (2.32)	0.245
Age	--		--		**-0.94 (0.43)**	**0.029**
Family income	--		--		0.17 (0.25)	0.499
%FEV1 at baseline	--		--		0.01 (0.04)	0.829
Days hospitalized per yr	--		--		0.02 (0.04)	0.965
Major complications	--		--		1.64 (1.19)	0.167
Bacterial infections	--		--		1.08 (2.76)	0.697

* All continuous predictors, except for time in follow up, were centered at zero (mean=0). All predictors were measured at or before baseline. Significant results are in **bold**.

Figure 1.
In pediatric patients with CF, positive spiritual coping (High) is associated with slower decline in pulmonary function (a) and stable nutritional status (b) over a 5-year period. Not using positive spiritual coping (No) predicts steeper decline from mild to moderate pulmonary obstruction (a) and initially higher but declining nutritional status (b).





To explore the associations between negative and positive spiritual coping and baseline BMIp, we used ANOVAs to compare spiritual coping across underweight (<15th BMIp), normal (16th-84th BMIp), and overweight (>85th BMIp) groups of patients[31]. Significant differences in negative spiritual coping emerged between overweight vs. non-overweight patients (M=1.31 for overweight vs. 0.24 for underweight and 0.39 for normal BMIp; F (2, 41)=11.80, p<0.001). The three groups did not differ on positive spiritual coping, even after adjusting for all covariates (p=0.297).

Negative binomial regressions revealed that positive spiritual coping predicted fewer days hospitalized in both unadjusted and adjusted models (Table 4). The incidence rate ratios indicated that one unit increase in positive spiritual coping was associated with 46% (unadjusted) to 70% (adjusted) reduction in the number of days hospitalized during the 5-year follow up. Estimates from the adjusted model indicated that, at average levels of all other covariates, patients who did not use positive spiritual coping spent 125 days hospitalized each year during follow up, compared to only 3 days a year among patients using the highest level of positive spiritual coping. Fewer hospitalizations were also predicted by male sex, racial/ethnic minority status, and higher baseline BMIp.

Table 4. Negative binomial regressions predicting days hospitalized per year during the 5-year follow up period*

	Unadjusted model			Adjusted model		
	IRR	95% CI	p	IRR	95% CI	p
Days hospitalized before baseline	**1.03**	**1.01 - 1.05**	**<0.001**	**1.03**	**1.01 – 1.05**	**0.046**
Positive spiritual coping	**0.54**	**0.32 – 0.92**	**0.022**	**0.30**	**0.15 – 0.60**	**<0.001**
Negative spiritual coping	0.52	0.23 – 1.19	0.122	1.25	0.49 – 3.17	0.642
Attributions	--			1.09	0.92 – 1.28	0.315
Female	--			**3.25**	**1.01 – 10.53**	**0.049**
Racial/ethnic minority	--			**0.28**	**0.09 – 0.92**	**0.037**
Age	--			0.85	0.68 – 1.07	0.170
Family income	--			0.99	0.88 – 1.11	0.886
%FEV1	--			0.99	0.97 – 1.01	0.374
BMIp				**0.98**	**0.96 – 0.99**	**0.041**
Major complications	--			0.70	0.35 – 1.41	0.316
Bacterial infections	--			0.64	0.18 – 2.33	0.498

* All continuous predictors were centered at zero (mean=0). All predictors were measured at or before baseline. IRR – incidence rate ratio. CI – confidence interval. Significant results are in **bold**.

Discussion

This study identified positive spiritual coping as a key predictor of five-year health outcomes in adolescents with CF. Positive spiritual coping was protective against declines in pulmonary function and nutritional status, and predicted fewer hospitalizations over time. Specifically, patients who did not use positive spiritual coping experienced decline from mild to moderate pulmonary obstruction (from 82% to 51% of predicted FEV1) compared to a slower decline within the mild range (from 82% to 78%) among those using the highest level of positive spiritual coping. Patients who did not use positive spiritual coping also spent estimated 122 more days hospitalized each year than those using high levels of positive spiritual coping. High use of positive spiritual coping

was also associated with stable nutritional status (from 41st to 44th BMI percentile) compared to a decline from initially higher BMI (from 77th to 41st percentile) among those not using positive spiritual coping. These effects of positive spiritual coping were present even after adjusting for a number of demographic variables, secular coping, and baseline health indicators, including major CF complications, bacterial infections, and hospitalizations.

The health outcomes assessed in this study, pulmonary function, nutritional status, and hospitalizations, are key predictors of mortality in patients with CF[20,24,25]. Based on estimates from those studies, the health declines observed in our patients who did not use positive spiritual coping vs. those who used high levels of such coping translate into a 2 – 3 fold increase in mortality risk. These estimates are comparable to the effects of spiritual coping on mortality in older adults[14,17] and are consistent with the role of spiritual coping in health outcomes of multiple adult patient groups[11-13,15,16]. This study represents an important extension of this work to a pediatric population, demonstrating the importance of spiritual coping for long-term health outcomes in adolescents with CF.

Consistent with pediatric studies examining mental health outcomes[10], our results showed that spiritual coping predicts physical health even after controlling for secular coping[19]. This suggests that positive *spiritual* coping provides a unique cognitive framework and resources to deal with the challenges of having a progressive chronic illness, than secular cognitions, such as optimistic attributions. However, the mechanisms through which spiritual coping affects health are not yet well understood. It may be that positive spiritual coping helps maintain pulmonary function and stable weight and prevent hospitalizations in youth with CF through spiritually-related positive emotions

(e.g., hopefulness, sense of peace) that facilitate treatment adherence[3] and healthy immunological response[26]. Positive spiritual coping also is associated with less depression and anxiety in youth with CF and other pulmonary disorders[7,8], which are linked with higher treatment adherence among youth with CF[3]. Treatment adherence is one of the most important factors in slowing disease progression[27] but declines considerably during adolescence[28]. Thus, positive spiritual coping may be an important factor in maintaining emotional well-being and treatment adherence during the critical adolescent period, helping to preserve health and extend longevity in patients with CF. Positive spiritual coping may also reduce stress and ensuing physiological responses to stress (e.g., higher cortisol levels[15]; lower antibody levels[26]) that could compromise patients' health and accelerate disease progression (e.g., via pulmonary infections and exacerbations). Another factor that may help explain the link between positive spiritual coping and physical health is social support[5]. For instance, positive spiritual coping may lead to greater involvement in religious social activities (e.g., prayer meetings, church youth groups) that serve as important sources of support and protection against depression and stress that may affect treatment adherence and health. More research is needed to identify the psychological, social, and physiological pathways linking spiritual coping with physical health.

Interestingly, negative spiritual coping and low positive spiritual coping were related to higher baseline BMIp; these results were primarily due to overweight patients reporting higher levels of negative spiritual coping. Since having a chronic illness and being overweight put youth at risk for peer victimization and depression[29], adolescents with CF who are overweight may feel doubly burdened and experience more spiritual

distress, as well as less positive spiritual beliefs.

Poorer baseline pulmonary function and more hospitalizations in female patients are consistent with prior research[25] and may be related to hormonal differences. Specifically, estrogen has been linked to a form of bacterium that is difficult to clear from the lungs and treat with antibiotics[30], thereby exacerbating lung damage. More bacterial infections also predicted worsening pulmonary function over time, and more CF complications were associated with poorer baseline nutritional status. Results also indicated that older youth had faster nutritional decline, which is consistent with age as a predictor of disease progression and mortality[24]. Finally, racial/ethnic minority patients had fewer hospitalizations per year, perhaps a function of genetic differences in disease expression.

Clinical Implications

The results highlight the importance of positive spiritual coping for long-term health outcomes in adolescents with CF. Supporting the use of positive spiritual coping in this population may translate into better emotional and health functioning over time. Health professionals can screen for the use of spiritual coping using brief, valid measures[9]. Multidisciplinary teams involving chaplains and pediatric psychologists are well positioned to promote patients' positive spiritual coping and reduce spiritual distress. Psychosocial interventions focusing on spiritual coping have been successful in improving well-being, depression, and pain in adults with cancer and terminal illness and may prove effective for adolescents with CF.

Limitations and Future Directions

This study extends existing literature by linking spiritual coping with long-term

health outcomes in pediatric patients with CF. However, inferences are limited by a relatively small number of patients, warranting replication with larger samples. Additionally, the study was conducted in a predominately Christian, southeastern region of the United States; future studies should include greater geographic and religious diversity.

Conclusions

This study highlights the importance of spiritual coping in health outcomes of adolescents with CF. Specifically, failure to utilize positive spiritual coping was associated with pulmonary and nutritional decline and more hospitalizations over a five-year period. Positive spiritual coping may promote stable health through psychological and social factors that facilitate treatment adherence and healthy physiological functioning. Additional research is needed to evaluate these mechanisms and replicate the present results in larger and more diverse samples. Interventions targeting spiritual coping may improve health outcomes in adolescents with CF.

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DISCUSSION

A growing body of research has focused on the role of spiritual coping in psychosocial adjustment and physical health among youth with serious or chronic illness. However, until now, a synthesis of this research had not been conducted. The present study endeavored to aggregate and summarize effects across 14 cross-sectional studies of spiritual coping and quality of life, emotional health, or physical functioning among pediatric patients. Consistent with research among adults (Pargament, 2011), the meta-analysis revealed that greater use of negative spiritual coping is related to more internalizing problems and poorer quality of life across multiple pediatric illness populations. For youth dealing with serious medical issues, negative spiritual coping may reflect a crisis in their worldview and relationship with a higher power that contributes to feelings of hopelessness, sadness, worry about their future, and poorer quality of life.

Given the harmful effects of unresolved depression on long-term health and adjustment of youth with medical illness (Frank, Blount, & Brown, 1997; Stewart, Rao, Emslie, Klein, & White, 2005), the need to intervene with pediatric patients demonstrating internalizing problems is critical. The results of the meta-analysis suggest that spiritual beliefs may play a role in internalizing problems, warranting assessment of spiritual coping strategies and if identified as a coping resource, a referral for consultation with pastoral care. For youth who identify spirituality as important and who are suspected of significant adjustment difficulties, a referral to a pediatric psychologist for intervention

that includes a focus on spiritual coping beliefs may improve adjustment. Indeed, spiritually-modified cognitive-behavioral therapy for adults with chronic illness has demonstrated improvements in overall adjustment (Cole, 2005). Because the studies in the meta-analysis were cross-sectional, the directionality of the relationships between negative spiritual coping and internalizing problems and quality of life remains unclear. It may be that internalizing problems and poorer quality of life lead to greater use of negative spiritual coping strategies (Reynolds, Mrug, Hensler et al., 2014) that thereby reinforce or maintain poorer adjustment. Thus, targeting internalizing problems and adjustment difficulties may lead to a reduction in use of maladaptive, negative spiritual coping strategies. Longitudinal, intervention research is need to clarify the directionality of these relationships and determine if spiritual coping strategies are modifiable and if their targeting results in improvements in long-term adjustment of youth facing serious medical conditions. Meta-analytic results did not reveal a relationship between negative spiritual coping and physical functioning. This is likely due in large part to the small number of studies examined and significant heterogeneity across the study effects. Given, however, the role of negative spiritual coping in mortality and physical decline observed among adults with chronic illness (Pargament et al., 2001), the pursuit of more research examining this relationship among pediatric patients remains warranted.

Meta-analyses did not reveal significant associations between positive spiritual coping and quality of life or physical functioning. A small, trivial effect emerged between positive spiritual coping and internalizing problems but the generalizability of the finding is limited to the studies examined. Significant heterogeneity across studies examining positive spiritual coping was also observed. The individual studies evidenced significant

associations between positive spiritual coping and fewer internalizing problems and better quality of life but inverse relationships were also observed. Specifically, one study linked positive spiritual coping to poorer quality of life (Benore et al., 2008). This contradictory finding has been observed among adult patients with chronic illness (Pargament et al. 1998) and may be related to the timing of assessment (e.g., at hospitalization versus at a routine outpatient medical visit). Specifically, if assessment takes place at the time of an acutely difficult medical situation, positive spiritual coping may appear linked with poorer adjustment because youth may be mobilizing the use of positive spiritual coping strategies to combat the distress they are experiencing (Benore et al., 2008; Pargament et al. 1998). Longitudinal studies examining these variables, as well as moderating and/or mediating factors such as disease severity, length or frequency of hospitalization and general cognitive coping strategies, are needed to clarify these relationships and identify contributing factors.

Extending meta-analytic study of the cross-sectional research on spiritual coping, psychosocial adjustment, and health in pediatric patients, longitudinal examination of these relationships was pursued. With respect to psychosocial adjustment, results revealed reciprocal relationships between spiritual coping and depression among adolescents with cystic fibrosis or diabetes (Reynolds, Mrug, Hensler et al., 2014). Specifically, positive spiritual coping predicted less depression over a 2-year period, while depressive symptoms predicted higher levels of negative spiritual coping over time. The results did not vary by disease and remained after controlling for the effects of demographic variables (gender, ethnicity, diagnosis and annual family income).

The findings suggest that the use of positive spiritual coping may protect against depression over time, while low levels of depression may prevent youth from utilizing maladaptive, negative spiritual coping strategies. Frequent use of positive spiritual coping may buffer pediatric patients from developing depression over time by providing a unique source of support when other sources are limited, such as access to friends during hospitalizations or other illness-related disruptions (Pargament et al., 1998; Park, 2007). Positive spiritual coping may also be associated with lower levels of depression by promoting an optimistic attribution style, whereby patients appraise negative disease-related events as external, unstable, and specific (Peterson et al., 1982; Reynolds et al., 2013). Similarly, the prospective relationship between depression and negative spiritual coping is consistent with research linking depression and pessimistic attributions, whereby individuals view negative events as being due to internal, global, and stable causes (Peterson et al., 1982). In turn, pessimistic attributions exacerbate internalizing problems in pediatric patients (Frank et al., 1997; Schoenherr, Brown, Baldwin, & Kaslow, 1992) and may also amplify the use of negative spiritual coping.

Interestingly, negative spiritual coping did not predict adjustment over time, contrary to research with adults (Pargament et al., 2004) and hypotheses generated from the meta-analysis. Although this relationship did not emerge in our adolescent sample, negative spiritual coping may lead to depression later in development, as suggested by studies with adult patients (Pargament et al., 2004). Thus, additional longitudinal research following youth with medical illness into adulthood would help clarify the developmental course and timing of these relationships.

With respect to physical health, positive spiritual coping was identified as a key predictor of 5-year health outcomes in adolescents with cystic fibrosis (Reynolds, Mrug, Britton et al., 2014). Specifically, positive spiritual coping was protective against declines in pulmonary function and nutritional status and predicted fewer hospitalizations over time. These effects were present even after adjusting for secular coping (i.e., attribution style), demographic variables, and baseline health indicators such as major disease-related complications and bacterial infections. However, the mechanisms through which spiritual coping affects health are not yet well understood. Positive spiritual coping may prevent hospitalizations and help maintain pulmonary function and stable weight in youth with cystic fibrosis through spiritually-related positive emotions (e.g., hopefulness, sense of peace) that facilitate treatment adherence (Quittner et al., 2008) and healthy immunological response (Stone, Marco, Cruise, Cox, & Neale, 1996). Positive spiritual coping may also reduce stress and ensuing physiological responses to stress, including higher cortisol (Ironson et al., 2002) and lower antibody levels (Stone et al., 1996) that may compromise patients' health and accelerate disease progression (e.g., via pulmonary infections and exacerbations). Since this study only evaluated adolescents with cystic fibrosis, replication of the present results in larger, more diverse samples is needed.

Taken together, these studies extend existing literature by providing a synthesis of the cross-sectional research to date, linking spiritual coping with mental and physical health outcomes over time, and identifying the reciprocal relationships between spiritual coping and psychosocial adjustment among youth with serious medical conditions. Despite these findings, there are limitations to the studies presented herein. The meta-analysis was limited by the small number of studies that met inclusion criteria, thus

reducing analytic power and preventing subgroup analyses when heterogeneity was present. In addition, operationalized and measured constructs of spiritual coping varied across studies, and different indices of psychosocial adjustment (e.g., anxiety; depression) and health (e.g., functional status; adherence) were combined due to the limited number of studies. Although generalizability is sometimes improved by examining different conceptualizations of the same construct (Rosenthal & DiMatteo, 2001), this variability across studies likely contributed to the significant heterogeneity and may have obscured meaningful differences. Finally, the data were cross-sectional, prohibiting inferences about causal relationships and the temporal order of spiritual coping, adjustment, and health. As more research in this area emerges, future meta-analytic studies should examine longitudinal studies of positive and negative spiritual coping with specific indices of adjustment and health (e.g., depression; adherence) and consider analyzing varying conceptualizations and measures of the constructs as moderators.

With respect to the longitudinal studies, inferences were limited by the small sample sizes and participants identifying predominantly as Christian. In addition, only one disease group, youth with cystic fibrosis, was examined in the longitudinal study of spiritual coping and physical health, thereby reducing the generalizability of the results to other pediatric populations. The longitudinal examination of spiritual coping and psychosocial adjustment was limited by the relatively high attrition rate, variable length of time between the initial assessment and follow-up, and exclusion of mediating variables, such as secular coping strategies, that would provide insight into the unique role of spiritual coping in adjustment over time.

Despite these limitations, these studies provide important, clinically-relevant information about the dynamic relationships between spiritual coping, psychosocial adjustment, and physical health among youth with chronic or serious medical illness. The findings highlight that spiritual coping is not only a salient coping strategy for pediatric patients but it is related to their emotional and physical health over time. The cross-sectional meta-analytic data suggest that negative spiritual coping is related to adjustment difficulties and poorer quality of life and the longitudinal examination of spiritual coping and mental health revealed that depression puts pediatric patients at risk for utilizing maladaptive, negative spiritual coping strategies. Positive spiritual coping emerged as a predictor of fewer depressive symptoms and better physical health over time, highlighting its role as a protective coping strategy for youth facing difficult medical conditions who identify spirituality as an important coping resource. For patients exhibiting adjustment difficulties and health decline who identify spirituality as important, positive and negative spiritual coping could be assessed using validated measures (King, Fitchett, & Berry, 2013; Pargament et al., 1998) and targeted via interdisciplinary teams and cognitive interventions addressing spirituality (Cole, 2005). Future research should further explore the role of spiritual coping in adjustment and health through intervention development and longitudinal designs with multiple time points and inclusion of variables related to spiritual coping, such as religious practices, secular coping, and illness-related factors.

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APPENDIX A

INSTITUTIONAL REVIEW BOARD APPROVAL

THE UNIVERSITY OF ALABAMA AT BIRMINGHAM

Institutional Review Board for Human Use

Form 4: IRB Approval Form
Identification and Certification of Research
Projects Involving Human Subjects

UAB's Institutional Review Boards for Human Use (IRBs) have an approved Federalwide Assurance with the Office for Human Research Protections (OHRP). The Assurance number is FWA00005960 and it expires on January 24, 2017. The UAB IRBs are also in compliance with 21 CFR Parts 50 and 56.

Principal Investigator:	REYNOLDS, NINA
Co-Investigator(s):	MRUG, SYLVIE SCHWEBEL, DAVID C
Protocol Number:	**X080624002**
Protocol Title:	*Coping with Chronic Illness*

The IRB reviewed and approved the above named project on 6/13/14. The review was conducted in accordance with UAB's Assurance of Compliance approved by the Department of Health and Human Services. This Project will be subject to Annual continuing review as provided in that Assurance.

This project received EXPEDITED review.

IRB Approval Date: 6-13-14

Date IRB Approval Issued: 6-13-14

IRB Approval No Longer Valid On: 6-13-15

Julius Linn, M.D.
Acting Chair of the Institutional
Review Board for Human Use (IRB)

Investigators please note:

The IRB approved consent form used in the study must contain the IRB approval date and expiration date.

IRB approval is given for one year unless otherwise noted. For projects subject to annual review research activities may not continue past the one year anniversary of the IRB approval date.

Any modifications in the study methodology, protocol and/or consent form must be submitted for review and approval to the IRB prior to implementation.

Adverse Events and/or unanticipated risks to subjects or others at UAB or other participating institutions must be reported promptly to the IRB.

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APPENDIX B

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Title:	Spiritual Coping and Adjustment in Adolescents With Chronic Illness: A 2-Year Prospective Study:
Author:	Nina Reynolds, Sylvie Mrug, Molly Hensler, Kimberly Guion, Avi Madan-Swain
Publication:	Journal of Pediatric Psychology
Publisher:	Oxford University Press
Date:	03/19/2014

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