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Hunger for Grace: The Association between Eating Disorders and Religiousness

A thesis submitted in partial fulfillment of the requirements for the degree of Master of Science at Virginia Commonwealth University.

by

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## Table of Contents

	Page
List of Tables .....	v
Abstract .....	vi
Introduction.....	1
Overview.....	1
Description of Literature Search .....	2
Definitions and Measurement of Religiousness.....	4
Theoretical Dimensions of Religion.....	7
Definitions and Measurement of Eating Disorders .....	9
Religiousness and Health.....	11
A Cognitive Behavioral Theoretical Perspective .....	13
Similarity of Core Beliefs and Values .....	16
Effect of Religion on Eating Pathology.....	24
Effect of Eating Pathology on Religion.....	33
Incorporating Religious Values into Treatment.....	35
Summary and Theoretical Model.....	39
Hypotheses .....	43
Method .....	46
Participants.....	46
Measures .....	46
Procedure .....	54
Statistical Analyses.....	54
Results .....	61
Data Cleaning.....	61

Subsample 1: Exploratory Factor Analysis.....	61
Subsample 2: Confirmatory Factor Analysis .....	62
Subsample 3: Confirmatory Factor Analysis Replication .....	65
Factor Interpretation and Internal Consistency .....	66
Evidence of Scale Validity.....	67
Demographics .....	71
Diagnostic Status and Religiousness .....	73
Associations between Eating Disorder Symptomatology and Religiousness.....	76
Associations among Individuals Meeting Eating Disorder Diagnostic Criteria .....	77
Discussion.....	83
Religious Attendance and Belief Scale.....	83
Connecting the Religious Attendance and Belief Scale with Other Constructs .....	86
Applications for the Religious Attendance and Belief Scale.....	88
Eating Disorders and Religiousness .....	89
Contributions to the Literature .....	92
Limitations .....	93
Strengths .....	96
Future Directions for Research .....	97
References.....	100
Appendices.....	117
Appendix A.....	118
Appendix B .....	119
Appendix C .....	121
Appendix D .....	126
Appendix E .....	127
Vita .....	130

## List of Tables

Table 1. Measures Included in the Current Study.....	47
Table 2. Factor Loadings for Final Items .....	63
Table 3. Correlations among Religiousness Variables and Validity Scales .....	68
Table 4. Descriptive Statistics.....	72
Table 5. Frequencies of Diagnoses .....	74
Table 6. Summary of Regressions Results within Diagnoses .....	78
Table 7. Means and Standard Deviations for Religiousness and Measures of Disordered Eating by Diagnosis for Eating Disorders Broadly and Narrowly Defined.....	79

## **Abstract**

### **HUNGER FOR GRACE: THE ASSOCIATION BETWEEN EATING DISORDERS AND RELIGIOUSNESS**

By: Janet A. Lydecker, B.A.

A thesis submitted in partial fulfillment of the requirements for the degree of Master of Science at Virginia Commonwealth University.

Virginia Commonwealth University, 2010

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Religiousness is one potential, understudied psychosocial correlate of eating disorders. To assess associations between religiousness and eating disorders, this study developed the Religious Attendance and Belief Scale (Rel-AB), and examined its psychometric properties. Women from a large population-based sample ( $N = 1510$ ;  $M_{age} 42.5$ ) completed subscales measuring (1) belief in a personal and loving God, and (2) attendance at religion-related activities, as well as eating disorder measures. Belief was negatively associated with eating disorder symptomatology among women meeting broadly defined criteria for bulimia nervosa. Eating disorders and religiousness were not associated in the overall sample, and associations were largely nonsignificant among participants meeting criteria for other eating disorders. Overall, results indicated that the Rel-AB Scale has good psychometric properties and is useful for the assessment of religiousness in both research and treatment settings. The



utility of including religiousness in the conceptualization of an individual and potential treatment options is discussed.

## Hunger for Grace: The Association between Eating Disorders and Religiousness

### **Overview**

Eating disorders are serious mental health problems with severe consequences (Becker, Grinspoon, Klibanski, & Herzog, 1999); however, their cause remains relatively unknown (Polivy & Herman, 2002). Eating disorders have the highest mortality rate of any psychiatric disorder (Fairburn, Cooper, Doll, Norman, & O'Connor, 2000), and the highest rates of suicide attempts and hospitalizations of all psychiatric disorders among adolescents (Newman et al., 1996). Individuals with eating disorders also experience high levels of emotional and physical distress. Although questions remain about the etiology of eating disorders, most researchers agree that both environmental and biological factors influence these conditions (Morris & Twaddle, 2007). Eating disorders can be understood in terms of a biopsychosocial model of psychopathology. Examples of biological factors might include genetic predisposition (e.g., Kaye et al., 2008), birth circumstances including neonatal immaturity (Favaro, Tenconi, & Santonastaso, 2008), high reactivity to stress (Leon et al., 1993), and time of puberty onset relative to peers (Brooks-Gunn, 1987). Examples of psychosocial factors might include a history of trauma (e.g., Wonderlich et al., 2001), sociocultural factors promoting the thin ideal such as perceived pressure to be thin (Stice & Whitendon, 2002; Taylor et al., 1998) and feeling discrepant from that ideal (Sanderson, Darley & Messinger, 2002), and inability to label emotional arousal (Leon et al., 1993).

Religiousness is one potential, psychosocial correlate that is currently understudied in eating disorder literature (Benson, Roehlkepartain, & Rude, 2003; Hill & Pargament, 2003).

Literature describing historical reports of eating disorders, recorded before the establishment of formal diagnoses, as well as contemporary case studies and case series, suggest that there is a strong link between the body—physical experiences and experiences of physicality—and religion (e.g., Baxter, 2001; Dell & Josephson, 2000; Garrett, 1996; Garrett, 1997; Guisado Macías & Vaz Leal, 2003; Keel & Klump, 2003; Miles, 1995; Polinska, 2000). Interest in studying the effects of religiousness on individuals has increased in recent years, although it is still not nearly as widely studied as other social variables (Oxman, Freeman, & Manheimer, 1996). Evidence of increased interest can be seen in the founding of several scientific journals with a theme of religiousness (e.g., *Mental Health, Religion and Culture*; *Journal of Media and Religion*), including a journal published by the American Psychological Association dedicated to religion and spirituality (*Psychology of Religion and Spirituality*, McMinn, Hathaway, Woods, & Snow, 2009). This increased interest in religiousness is appropriate given that reports typically indicate that 90% of Americans are associated with formal religion in some way, and 96% of Americans believe in God or a universal spirit (McCullough, Hoyt, Larson, Koenig, & Thoresen, 2000). Despite increased interest, empirical research examining these constructs within the field of eating disorders remains sparse.

### **Description of Literature Search**

The current study examined existing literature to develop hypotheses about the association between eating disorders and religiousness. A literature search was conducted using the PsycInfo and Medline databases to find articles related to both eating disorders and religion. From there, relevant sources cited by those articles were investigated for their application to the current theme. The results of the literature search yielded articles in four

domains: similarity in the core beliefs and values, potential effect of religion on eating disorders, potential effect of eating disorders on religion, and incorporation of religion into eating disorder treatment. Methodologically, historical accounts and case studies/series can aid in formulating hypotheses for quantitative research. These works, however, cannot directly lead to clinical and research applications because their small sample sizes and resultant lack of demographic and other diversity restricts generalizability to the larger population. Overall, there are large gaps in the empirical research available examining the association between religiousness and eating disorders.

Perhaps because of methodological limitations such as small sample sizes, results of studies on religiousness and eating disorders, both qualitative and quantitative, are contradictory. Some authors suggest that religion has an inverse effect on eating disordered attitudes and behaviors (e.g., Hawley & DeHaan, 1996; Joughin et al., 1992), and some suggest that religion has a direct, positive effect on eating disorders (e.g., Arthur & Rosser, 1999; Baxter, 2001; Marsden, Karagianni, & Morgan 2007; Pinhas, Heinmaa, Bryden, Bradley & Toner, 2008). Others suggest that eating disorders have an effect on religiousness (Berrett, Hardman, O'Grady, & Richards, 2007; Graham, Spencer, & Anderson, 1991). Still others report no association between religion and eating disorders (Cwikel, Zilber, Feinson, & Lerner 2008; Perkins, 1991). These inconsistent findings are likely due in part to the range of operational definitions for religiousness (Park & Folkman, 1997) and variability in the methods used to observe and describe the association between religiousness and eating disorders. Given these inconsistencies, further research is needed to clarify the potential link between these variables. The following sections will review findings of previous research that inform the current study and place them in a larger theoretical context. In addition,

subsequent sections will discuss limitations of this research and implications for the design of the current study and for future investigations.

### **Definitions and Measurement of Religiousness**

Religion, broadly defined, is the pursuit of meaning utilizing strategies related to the sacred (Abeles et al., 1999). Religion is both complex and putatively multi-dimensional (Benson et al., 2003; Kendler et al., 2003; Vance, 2008). Before discussing how religiousness is measured and how it might relate to eating disorders, it is important to clarify commonly accepted definitions of religiousness. As early as 1902, William James distinguished firsthand religion, which is personal and related to direct experience, from secondhand religion, which is inherited and rooted in tradition (Hill & Pargament, 2003). In addition to the complexities of religion, spirituality can be construed as a separate but overlapping construct. Similar to William James' distinctions within the construct of religion, contemporary researchers generally define spirituality as personal and subjective experience, but define religion as a fixed set of ideas and ideology (Hill & Pargament, 2003). Despite the differences articulated, it is important to note that these constructs might overlap. Nearly all expressions of spirituality happen within a social context, especially as private actions enter the public domain through discussion. Additionally, nearly all religious institutions are concerned with the personal experiences of their members, and many people do not consciously categorize their experiences as one or the other, but as both or neither (Hill & Pargament, 2003; Barrett, Pearson, Muller, & Frank, 2007). Nonetheless, especially in the past thirty or forty years during which Western Civilization has gone through a period of secularization, some people have emphasized the distinctions between the concepts and choose to define themselves as "spiritual, but not religious" (Zinnbauer et al., 1997, p.551).

The current study will focus on religiousness, with the understanding that there may be components of theistic spirituality—personal experiences and interactions with God (e.g., Richards, Hardman, & Berrett, 2007)—involved in that definition, because the constructs overlap. This study defines religiousness as the beliefs and related cognitions individuals hold concerning the sacred, which they express as behaviors, affect, and cognition within a context centered on God or a universal spirit.

There remains a lack of consensus regarding how best to measure religiousness. Some psychologists have argued that science should not measure or study religiousness, or that science cannot properly study religiousness because of their fundamental differences (e.g., Bergin, 1980; Ellis, 1980; Walls, 1980, see also reviews by McMinn et al., 2009; Miller & Thoresen, 2003; Miller & Thoresen, 2004). However, most contemporary researchers do not believe that psychology and religion are incompatible, but might not study religion as ubiquitously as other constructs. Most studies have assessed religiousness simplistically by including one or two items as part of a demographic questionnaire (e.g., Barrett et al., 1997; Boyatzis, Kline, & Backof, 2007; Cwikel et al., 2008; Guisado Macías & Vaz Leal, 2003; Jacobs-Pilipski, Winzelberg, Wilfley & Taylor, 2005; Latzer, Vander, & Gilat, 2008; Perkins, 1991; Perkins & Luster, 1999; Pinhas et al., 2008, see also reviews by Vance, 2008; Weaver et al., 1998), or by using a scale that evaluates only select aspects of an individual's religious experience (Boyatzis & McConnell, 2006; Graham et al., 1991; Joughin et al., 1992; Marino, Lunt, & Negy, 2008; Oliver, Reed, Katz, & Haugh, 1999; Sancho, Arija, & Canals, 2008).

Many assessments of religiousness include face valid items evaluating easily measurable external demonstrations of Judeo-Christian religions, such as church attendance

(Weaver et al., 1998). One limitation of this approach to measurement is that it does not allow responses to capture the potential multi-dimensionality of religiousness (Benson et al., 2003; Kendler, Gardner, & Prescott, 1997; Kendler et al., 2003; Richards et al., 2007; Vance, 2008; Vance, Maes, & Kendler, n.d.). The way in which researchers measure religiousness needs expansion and clarification, so that future efforts can confidently compare and build upon findings, and so that psychology can move towards a more complete understanding of religiousness.

One larger conceptual framework for religiousness is that of global meaning (Park & Folkman, 1997). Global meaning is comprised of an individual's beliefs and goals that consistently influence many situations. These beliefs and goals are both enduring and valued, of personal significance and utmost importance to the individual. Global meaning influences situational meaning as individuals apply their global meaning schemas to specific situations. Religion is one form of global meaning, an overarching meta-schema that influences many aspects of an individual's life. Religion offers, among other things, explanations for interpreting events and coping strategies. Some of the literature on religion and eating disorders suggests that eating disorders might also be a type of global meaning, a worldview that influences how individuals interpret every aspect of their lives, albeit a less adaptive form of global meaning than religion. The following sections will review literature describing how eating disorders are maintained by core beliefs (Wilson & Fairburn, 2000) and values including asceticism, self-denial (e.g., Baxter, 2001; Grenfell, 2006; Miles, 1995; Norris, Boydell, Pinhas, & Katzman, 2006; Vandereycken, 2006) and control, and common psychological themes such as unworthiness, guilt and shame (Dell & Josephson, 2000). Because of these similarities and the possibility that both religion and eating disorders have

an influence on the global meaning individuals construct for themselves, it is hypothesized that there will be an association between eating disorders and religion. More research is necessary to investigate this potential association, and to determine the influence of eating disorders on how individuals make meaning out of the world.

### **Theoretical Dimensions of Religion**

Although most prior research has assessed religiousness in a limited fashion, using one or two items as part of a demographic questionnaire, recent research has shown greater interest in the potential multi-dimensionality of religiousness (e.g., Abeles et al., 1999; Benson et al., 2003; Ellison, 1991; Kendler et al., 2003; Vance, 2008). Intrinsic and extrinsic religiousness are the most widely studied religious orientations, locating individuals' motivation to be religious as internal or external. However, some researchers have suggested that a limitation of measures assessing intrinsic and extrinsic religiousness is that these constructs might be prejudiced towards conservative or traditional religiousness and not include some facets of liberal or less conservative religiousness (D'Onofrio et al., 1999). The field needs further research to explore the breadth of possible domains within religiousness and their application across religious orientations, as it has minimally addressed them to date. Examples of possible dimensions include: religious belief, private practices, values, social support, coping, meaning, daily behaviors, values, and commitment (e.g., Abeles et al., 1999; D'Onofrio et al., 1999; Flannelly et al., 2006; Kendler et al., 2003; Park & Folkman, 1997).

Kendler and colleagues (2003) used an item pooling approach when they explored potential dimensions of religiousness. Specifically, in a preliminary exploration of many items putatively related to the latent construct of religiousness, Kendler and colleagues



(2003) explored participants' patterns of responses to religiousness items to conceptualize the dimensions of religiousness. From that analysis, which they intended for presentation of information on empirical dimensions of religiousness rather than production of a replicable measure, seven dimensions emerged. These included: general religiousness, social religiousness, belief in an involved and benevolent God, forgiveness, belief in God as a judge, unvengefulness, and thankfulness. General religiousness is similar to variables used in previous research assessing broadly-defined religiousness. The general religiousness dimension assessed an individual's concern and involvement with religious issues, including sensing her place within the universe and her active involvement with God on a day-to-day basis and at times of crisis. Social religiousness addresses the aspects of religion that involve other religious individuals, including the degree of interaction with others and frequency of church attendance. In addition, attitudes about substance use were included in this dimension, suggesting that the dimension might also include religious peer influences on an individual. The forgiveness dimension included items related to interpersonal forgiveness, although it does not consistently correlate with religiousness (McCullough & Worthington, 1999). The God-as-judge dimension measured a belief that the primary role of God is to judge, and included items addressing the judgmental and punitive nature of God. The unvengefulness factor included items that were negatively loaded attitudes toward the world emphasizing personal retaliation rather than forgiveness. The final dimension, thankfulness, included items reflecting a thankful attitude toward life and God, as opposed to an angry attitude.

Religion, conceptually, has multiple dimensions that vary by individual and by institution. Although most studies focus on self-reported religiousness (e.g., "How important

is religion to you,” Perkins, 1991) instead of the contents of religious belief, individuals who are religious could, if they put their faith in different religions or aspects within a religion, have dissimilar perspectives of the world. This might account for some of the inconsistent results found in correlational studies of eating disorder diagnoses and symptoms, and religiousness. For example, Joughin and colleagues (1992) found a significant correlation between religiousness and eating disorder symptoms, whereas Perkins (1991) found no relation between any dysfunctional eating and strength of religious faith. Joughin and colleagues (1992) measured religiousness as the importance of participants’ religion to them, whereas Perkins (1991) categorized participants as having high or low religiousness based on their response to a question about the strength of their religious commitment.

### **Definitions and Measurement of Eating Disorders**

The American Psychiatric Association (2000) defines eating disorders as clinical mental disorders, but they are also prevalent in subthreshold forms (e.g., Mintz & Betz, 1988; Striegel-Moore, Silberstein, & Rodin, 1986). Body image dissatisfaction is so pervasive among women in contemporary Western culture that some have described it as a *normative* discontent (Striegel-Moore et al., 1986; see also Kuchler & Variyam, 2003; Mintz & Betz, 1988). Prevalence estimates for eating disorders are high; between one and ten percent of women have an eating disorder by clinical standards (Taylor et al., 1998), and an additional 61% engage in at least some disturbed eating behavior (Mintz & Betz, 1988). For the purpose of this research, the term “disordered eating” includes attitudes and behaviors characteristic of eating disorders that do not meet severity or frequency standards required for a clinical diagnosis.

The text revision of the fourth edition of the *Diagnostic and Statistical Manual of*

*Mental Disorders (DSM-IV-TR*; American Psychiatric Association, 2000) defines two specific eating disorders: anorexia nervosa and bulimia nervosa. An individual with anorexia nervosa refuses to maintain a minimally normal body weight, has an intense fear of gaining weight, and has a disturbed perception of her body shape and size (*DSM-IV-TR*, 2000). An individual with bulimia nervosa binge-eats, compensates inappropriately to prevent weight gain (i.e., purges), and excessively evaluates herself according to her weight and shape. To binge means to eat more than a normal amount in a discrete period; compensation can involve vomiting, misuse of laxatives or diuretics, fasting, or excessive exercise (*DSM-IV-TR*, 2000). In addition to anorexia nervosa and bulimia nervosa, researchers are currently developing formal diagnostic definitions of distinct variations of eating disorders to be included as clinical eating disorders, namely binge eating disorder and purging disorder. Binge eating disorder is characterized by periods of consumption of objectively large quantities of food without compensatory behavior (Goldfein, Walsh, LaChaussée, Kissileff, & Devlin, 1993), and purging disorder is characterized by recurrent purging without corresponding binges (Keel, Haedt, & Edler, 2005).

Eating disorders are both similar and dissimilar to other psychological and medical disorders. They are similar with respect to their severity and the negative impact they have on the lives of affected individuals and those close to them. However, they are dissimilar with respect to the pervasiveness of their subthreshold forms (Mintz & Betz, 1988). Therefore, it is important to distinguish between characteristics of disorders meeting clinical severity standards, and those that are more normative. If there were a normative discontent surrounding body image and weight (Striegel-Moore et al., 1986), future efforts should use caution when generalizing information obtained from case studies and interventions

conducted within a clinical context to individuals with disordered eating who do not participate in or seek treatment.

This study included variables representing diagnoses for anorexia nervosa, bulimia nervosa, and binge eating disorder. Broadly defined diagnoses for the same disorders were also included. These broad diagnoses include characteristics of the full clinical disorders that do not meet the severity or frequency required by full diagnostic criteria (Mazzeo et al., 2006). A continuous or ordinal scale can also measure levels of disordered eating. Examples of frequently used scales include the Eating Disorder Inventory (Garner, Olmsted, & Polivy, 1983), the Three-factor Eating Questionnaire (Stunkard & Messick, 1985), the Eating Disorder Diagnostic Scale (Stice, Telch, & Rizvi, 2000), and the Eating Disorder Examination Questionnaire (Fairburn & Beglin, 1994; Mond, Hay, Rodgers, & Owen, 2006). This study, as described in more detail in the Methods section, uses subscales from the Eating Disorder Inventory and the Three-Factor Eating Questionnaire.

### **Religiousness and Health**

The lack of empirical research on religiousness is problematic within the field of health psychology generally, and particularly in the area of eating disorders, because having more information on the association between disordered eating and religiousness might be beneficial to individuals with maladaptive eating behaviors. In particular, there is an increasing literature indicating that religiousness is associated with health benefits (Fosarelli, 2008; Institute for the Future, 2000; Miller & Thoresen, 2003; see also review by McMinn, Hathaway, Woods, & Snow, 2009). This includes both religious involvement and the social support that comes from being part of a community organization (Institute for the Future, 2000). Religiousness might be protective because it counters the effects of stress on both

physical and mental health (Kendler et al., 1997), particularly during times of high psychological stress (Kendler, Gardner, & Prescott, 1999; Schnittker, 2001) and major life changes (Schnittker, 2001; Smith, McCullough, & Poll, 2003). Numerous studies have suggested that religiousness can serve as a buffer against physical and mental health problems (e.g., Forthun, Pidcock, & Fischer, 2003; George, Larson, Koenig, & McCullough, 2000; Hawley & DeHaan, 1996; Institute for the Future, 2000; Joughin et al., 1992; Kendler et al., 1997; Kendler et al., 1999; Perkins & Luster, 1999; Schnittker, 2001; Smith et al., 2003). Religiousness seems to be protective against several forms of poor health, including: cardiac risk factors (Ai, Seymour, Tice, Kronfol, & Bolling, 2009), high blood pressure (Masters, Hill, Kircher, Benson, & Fallon, 2004), and glycemic control in type 2 diabetes (Newlin, Melkus, Tapper, Chyun, & Koenig, 2008). Furthermore, religiousness seems to aid in the recovery of certain mental health problems, including: post-traumatic stress disorder (Exline, Smyth, Gregory, Hockemeyer, & Tulloch, 1995; Park & Folkman, 1997), grief (Park & Folkman, 1997), and depression (Kendler et al., 1999; Murphy & Fitchett, 2009; Schnittker, 2001; Smith et al., 2003).

Furthermore, it has been argued that excluding religion and spirituality from the conceptualization of an individual's psychology, health, and well-being leads to an incomplete understanding of the individual (Graham et al., 1991; Hill & Pargament, 2003), and that human behavior more generally cannot be understood without incorporating religion (Pargament, 2002b). In the eating disorder field, which does not have an omnibus treatment protocol, it is essential to have the most complete picture possible of an individual's psychopathology and personality to provide ethical and effective treatment. In the practice guidelines published by the American Psychiatric Association (2006) for the treatment of

eating disorders, the only recommendation related to religion is that: “Legitimate food allergies and patients’ religious and cultural practices must be considered and discussed to limit patient rationalizations for restricted eating.” (p.42).

Research has not established why religion appears to buffer against poor mental and physical health, for health psychology in general or for eating disorders more specifically. The association between eating disorders and religiousness is an area that needs further research, as evidence exists for inverse associations between religiousness and various mental and physical health disorders within the broader field of health psychology. Despite this, there is a range of hypotheses about the relation between religiousness and health. For example, past research has suggested that psychosocial factors such as family functioning could be a common factor influencing both religiousness and health (Smith et al., 2003). It has also been hypothesized that religiousness might reduce pathology; some evidence for this hypothesis is provided by research in the area of substance abuse (D’Onofrio et al., 1999; Kendler et al., 1997). Furthermore, there is a literature on religious coping that suggests religiousness can be used to cope with mental health problems, particularly among individuals who were religious before the onset of their problem (e.g., Pargament, Smith, Koenig, & Perez, 1999; Park & Folkman, 1997).

### **A Cognitive Behavioral Theoretical Perspective**

According to cognitive theory, how an individual thinks about and interprets events influences her emotions and behaviors (Beck, 1995). Core beliefs are the fundamental, global, and often rigid beliefs that an individual has about herself, the world, and herself in the world. These core beliefs lead to intermediate beliefs, which are rules and attitudes an individual sets up for herself, and which then lead to automatic thoughts. Automatic

thoughts are brief and rapid and thus individuals often uncritically accept them as true.

When an individual is presented with a situation, these automatic thoughts can be triggered and lead to a reaction that is emotional, behavioral, and physiological.

Cognitive theory conceptualizes the etiology of eating disorders as rooted in inaccurate or distorted cognitions. Cognitive-behavior therapy is one of the most prevalent forms of treatment for eating disorders, particularly bulimia nervosa (Mitchell, Agras, & Wonderlich, 2007). CBT addresses maladaptive cognitions and related behaviors of an individual through psychoeducation, correction of cognitive distortions, development of coping behaviors, self-monitoring, and behavioral changes. Cognitive theory has proposed that individuals with bulimia nervosa excessively evaluate themselves based on their weight and/or shape, and place extreme importance on these appearance concerns (*DSM-IV-TR*, 2000). Individuals with anorexia nervosa have an intense fear of gaining weight, and have a disturbed experience of their shape, both of which are cognitive distortions. Cognitive psychologists have also proposed that the importance these individuals place on weight- and shape-related cognitions plays a major role in the maintenance of their eating disorders (Fairburn et al., 2000). Studies on the treatment of bulimia nervosa have shown that compared to cognitive-behavior therapy, behavior therapy alone is less effective (Wilson & Fairburn, 1993), providing some support for the important role of cognitions in eating disorders. A theoretical model presents the cognitive conceptualization of eating disorders and the potential association between religion and the core beliefs involved in the eating disorder for women with some disordered eating characteristics (Appendix A).

Religion also influences the way an individual sees the world, from lessons learned in childhood, to personal convictions held as an adult. By contributing to and filtering

individuals' core and intermediate beliefs, religion helps individuals to make sense of the world in which they live, and their role in it. Religiousness is the extent to which individuals participate in a religion, namely behaviors associated with practice and acceptance of central beliefs. Because of its theoretical role as a meta-schema, religion can be understood as a complex and potentially multifaceted construct (Kendler et al., 1997; Kendler et al., 2003). In addition to assessing denomination or frequency of attendance, it is also valuable to evaluate factors that would indicate core or intermediate beliefs. These might include: the extent to which an individual endorses the beliefs of her particular religion, the importance of religion to her, and her perspective regarding the value of different components of her religion (for example, whether an individual sees God as more loving, more judgmental, or equally loving and judgmental, could alter thoughts, behaviors, or emotions).

Eating disorders include behaviors perpetuated by faulty cognitions; religious belief influences how people think about the self, the world, and the self in the world (Park & Folkman, 1997). Moreover, qualitative research and theoretical works have suggested a link between the two constructs. For example, Baxter commented, "Religious themes and symbolism seem to arise more frequently in patients with eating disorders than in others." (Baxter, 2001, p. 137). This overlap might be due to a similarity in the affective components addressed by religions across the spectrum and by eating disorders, namely: guilt, shame, and atonement for wrongdoing. If an individual experienced this similarity, these affective components might reinforce related core beliefs. Several authors have examined values shared by individuals with eating disorders and individuals with strong religious beliefs. They have also hypothesized a causal direction, or at least a theoretical temporal sequence (e.g., Joughin et al., 1992), of the effect of faith on eating disorder pathology, the effect of the



endorsement of eating disorder attitudes on faith, the effect of eating disorders on religion, and the value of having a religious component to eating disorder treatment. Subsequent sections will review these themes, which have their foundations in cognitive theory.

It is important to investigate religiousness and eating disorders more rigorously and comprehensively because of the thematic overlap among the constructs, and in the overlap individuals have reported in their experiences with eating disorders. It is also imperative to have well-designed and generalizable empirical research in this area given the demand for clinical treatment and psychosocial education and prevention techniques with religious components and themes. Neither clinician nor researcher can fully understand an individual, or the disorder with which she struggles, without addressing the religious dimensions of her thought processes (Graham et al., 1991; Hill & Pargament, 2003).

### **Similarity of Core Beliefs and Values**

An explanation psychologists and historians have proposed for the association between eating disorders and religion is that eating disorder symptomatology and the beliefs of many world religions reflect similar core beliefs and values (Dell & Josephson, 2000; Latzer et al., 2008; Marsden et al., 2007). Examples of these core beliefs include: feelings of unworthiness, anguish, shame and guilt (Dell & Josephson, 2000). Historians and scientists refer to Saint Catherine of Siena as the first example, albeit diagnosed across cultures and eras, of a woman whose underlying religious beliefs led to the development of eating disordered behavior. Saint Catherine was a fourteenth century saint best known for fasting rigorously from adolescence until death to achieve greater spirituality and closeness to God (Baxter, 2001). She reportedly held as a core belief that fasting was fundamental to female holiness (Dell & Josephson, 2000; Garrett, 1996; Garrett, 1997; Keel & Klump, 2003).

Building on this case, despite its anecdotal nature, authors today acknowledge a similarity between the core beliefs and values of religiously devoted individuals and those with eating disorders (Baxter, 2001; Dell & Josephson, 2000; Guisado Macías & Vaz Leal, 2003; Garrett, 1996; Garrett, 1997). This similarity, however, does not mean that the saint's acts of holiness in self-starvation were the manifestations of anorexia nervosa. In particular, there was no evidence that body image dissatisfaction or fear of gaining weight motivated her fasting (Keel & Klump, 2003; Polinska, 2000). Nonetheless, like many women who practice a wide range of world religions (Cwikel et al., 2008; Dell & Josephson, 2000; Ford, 1992; Latzer et al., 2008; Miles, 1995; Pinhas et al., 2008) hold similar core beliefs and values to those of many women with eating disorders. Examples include: asceticism, self-denial, abstinence, purification and penance through fasting (Baxter, 2001; Grenfell, 2006; Miles, 1995; Norris et al., 2006; Vandereycken, 2006). Women with eating disorders also perceive an opposition between the body and the spirit, a tension that theorists have noted in some religious individuals and doctrines (e.g., Guisado Macías & Vaz Leal, 2003). Although it is possible that global meaning systems individuals use related to religion are similar to those related to eating disorders, it is also possible that religion is the filter individuals use to understand themselves and the world, including their eating disorder.

In case reports, women in treatment for their eating disorder have described attitudes and beliefs influencing their eating disordered behavior using religious terms, indicating that a religious meta-schema (Park & Folkman, 1997) might be influencing their interpretation of their experience with the disorder and treatment. Baxter (2001) observed this type of description: restriction is “holy, pure and good, whereas bingeing and purging is weak and evil” (p.137). Similar religious interpretations of eating disorder pathology emerged from a

qualitative study in which researchers conducted semi-structured interviews with ten individuals who met *DSM-IV* criteria for either anorexia or bulimia nervosa (Marsden et al., 2007). These women, who ascribed to various Christian denominations, all indicated that their religious faith was highly important to them. Marsden and colleagues noted that overall, the women conceptualized eating disorder pathology as sin. For example, one claimed, “food and weight became my god” (p.10), which equates pathology with sin because having a “god” breaks one of the Ten Commandments from Judeo-Christian religions. Another individual in the series of interviews described seeing everything she did wrong as contributing to her “sinful nature.” The authors believed this line of thought led her to see everything she did or felt as wrong: “sometimes I wonder if it is wrong to feel hungry. If I am hungry before I think I should be, then that seems like a sign of weakness and that means I am greedy,” (Marsden et al., 2007, p. 9). Although these results provide an in-depth, rich perspective on the potential associations between religiousness and eating disorders, one of the limitations of this work is that these findings might not be applicable to the broader population of women with eating disorders, as this sample was not randomly selected. Study staff did not interview women until after the women had sought and possibly received treatment for their eating disorders. Treatment would likely influence, to some degree, the way they thought and spoke about their eating problem. The women were also all highly religious, confining the generalizability of these results to other individuals with high levels of religiousness. Furthermore, the sample is too small to represent the diversity of people with eating problems adequately.

In addition to interviewees’ descriptions of their pathology using religious terms, Marsden and colleagues (2007) also observed three dimensions of overlap in the

interviewees' descriptions of the etiology of their eating disorders. These etiological dimensions included craving control, having a negative self-image, and needing to give penitence for wrongdoing. Most prevalent in their series of case studies was the belief that the self-denial intrinsic to restrictive eating disorders would make up for real or imagined wrongdoing (e.g., "I think that one of the ways that I try and make amends is to punish myself through food... eating as little as possible, or it's the other extreme of punishing my body and exerting myself" p. 9-10). In another example, one woman described craving control by the church and by God. The authors surmised that this led to her conceptualization of God as a disciplinarian. Although this might be the causal direction of the relationship, this conclusion is premature. Determining causation requires that the cause and effect have a significant relationship, that there is a clear temporal relationship with the cause preceding the effect, and that the design controls for all other possible explanations for the causal relationship (Heppner, Wampold, & Kivlighan, 2008). Regarding the conclusion Marsden and colleagues (2007) reached about craving being controlled, it is just as likely that the participant's conceptualization of God as a disciplinarian was the originating core belief, and provided the context to crave being controlled by God and the church as a way to maintain her belief system.

Women with eating disorders have also described treatment in religious terms. Women in Marsden and colleagues' qualitative study (2007) reported viewing medical treatment as salvation offered by God ("I think I'd be dead otherwise, I think I would have done myself in", p.10), and treatment failure threatened their religious faith and indicated a return to a state of sin. These descriptors provide important qualitative data that contribute to our understanding of how eating disorders and religion might be associated, and provide

further evidence that this relationship merits further study. These qualitative statements might be indicative of a causal relationship that religion influences eating disordered attitudes and behavior, or that eating disorders influence religiousness, or that religiousness might be a form of global meaning through which individuals interpret events without having any direct influence.

Although one individual described the core belief that she needed to be controlled by God and the church (Marsden et al., 2007), it is more common for individuals with eating disorders to maintain the core belief that they have no control over their circumstances and can only exert control over their eating behavior (e.g., Dell & Josephson, 2000; Joughin et al., 1992). From a psychodynamic perspective, both religion and eating disorders provide a strategy for adolescents to try to control their environment, which presents distress related to developing sexuality, by providing a method for postponing adult sexuality (Joughin et al., 1992).

From a feminist and Judeo-Christian theoretical perspective, Grenfell (2006) noted that eating disordered behaviors could be a way that women control their involvement in religious institutions within the guidelines their religion has set. That is, religions exclude women because they are patriarchal, and “women who diet are compensating for that exclusion in their attempt to emulate the changeless perfection of the holy,” (p.368) becoming holy through a means allowed to them, when other means are prohibited. Overall, Grenfell suggested that dietary restriction is part of the religious culture for women. However, Grenfell elaborated that the identity-formation process in religious communities becomes related to the body in women who are already susceptible to anxiety about their bodies, suggesting an interaction between a predisposition to endorse eating disorder

attitudes and behaviors, and the use of those behaviors for a spiritual end. Nonetheless, it seems unlikely that dietary restriction would be part of the religious culture for women because, as other studies have noted (e.g., Graham et al., 1991), food and eating are central in Judeo-Christian theology and in social aspects of many contemporary religions. It should also be noted that psychodynamic and feminist theories of the association between religion and disordered eating are hypotheses and have not been empirically evaluated, but contribute to theoretical justification for an association between religiousness and eating disorders that needs to be evaluated in future research.

Women have also used religious themes and values to promote eating disordered attitudes and behaviors. For example, Norris and colleagues (2006) qualitatively reviewed twenty frequently visited pro-anorexia (“pro-ana”) websites, which promote the thin ideal and other eating disordered attitudes and behaviors, and even promote eating disorders (Grunwald, Wesemann, & Rall, 2008; Lipczynska, 2007; Norris et al., 2006). Results of their review found that more than seventy-five percent of the sites used religious metaphor, especially in terms of religious language and imagery, and some had a cult-like appearance. In particular, many sites had an “Ana Psalm” or “Creed” expressing positive attitudes toward anorexic behavior. The websites encouraged sacrifice, claiming that giving up school and relationships is necessary for success with the eating disorder. Norris and colleagues also noted overarching themes of self-control, perfectionism, transformation, and coping, among others. Unlike the observed similarities in descriptions of eating disorders, origins, and treatment, it seems less likely that the language used on pro-ana websites would be the result of using religion to give meaning to all aspects of life including eating disorders. Rather, it seems as though these websites used religion and religious values more intentionally, to

justify and encourage eating disordered attitudes and behaviors.

Another potential common feature to religion and disordered eating is the motivation to present oneself as meeting societal norms. As an attempt to control the impressions others form about them, individuals present a public version of themselves that is not always consistent with their personal attitudes or their private behaviors. Extrinsic religiousness occurs when an individual is motivated to present herself as religious to gain social status, social support, or general acceptance in a community (Forthun et al., 2003), rather than being motivated by an internal feeling of religiousness. Ellison and Skerkat (1995) found that in communities where religion was highly valued, such as the American South, greater social pressures existed to be involved in religious activities and organizations. For the middle and upper classes, groups who likely had more status to gain or lose, church attendance increased with the salience of those norms. Similarly, when settings highly valued attractiveness, women presented a favorable impression of themselves by controlling how much they ate: “light eaters” were perceived as more feminine (Bock & Kanarek, 1995; Chaiken & Pliner, 1987; Mori, Chaiken & Pliner, 1987; Pliner & Chaiken, 1990), and as more attractive (Bock & Kanarek, 1995; Chaiken & Pliner, 1987; Connor-Greene, Striegel-Moore, & Cronan, 1994; Mori et al., 1987). Furthermore, having the same food preferences and eating the same amount as others eat created an impression of greater popularity (Crandall, 1988; Pliner & Mann, 2004). The quantity of food individuals eat might interact with extrinsic religiousness when individuals are motivated to have social support through their religion, and can use the amount of food they eat to present themselves favorably. This would have consequences for eating disordered behaviors if restriction was drastic enough to be characteristic of eating disorders or disordered eating. However, if an individual’s motivation were positive self-

presentation for social gain, neither eating disorder pathology nor religion would be the cause of the association, rather, social gain would be the base cause.

Despite the similarities between eating disordered and religious worldviews, it is also imperative to highlight that many religions hold positive attitudes toward food and women with eating disorders do not. Particularly in Abrahamic religions, eating has an important role: food is a sign of God's provision, seals covenants and appears in celebrations (Dell & Josephson, 2000; Miles, 1995). Because of the symbolic importance of food and eating, contemporary religions also place high value on sharing meals together (Grenfell, 2006). This emphasis on food, and the potential for individuals with anxiety about food and eating to avoid religious events surrounding food, indicates that there cannot be a simple association between sharing values and developing an eating disorder, or a simple association between religious teaching and the development of symptoms of an eating disorder.

Eating disorders and religiousness have similar themes pervading underlying core beliefs; however, this is evidence that there might be an association between these constructs, not evidence that these constructs are equivalent or that one causes the other. In 2002, the American Psychological Association designated religion a form of diversity (American Psychological Association, 2002; McMinn et al., 2009). Eating disorders, in contrast, remain categorized as a form of psychopathology. Despite this, and because eating disordered attitudes seem to be a form of global meaning, Vandereycken (2006) suggested that in this era of multicultural awareness, we should reconsider whether eating disorders are psychopathology, or whether that classification is the judgment of psychology on culture. Specifically, he argued that the link between eating disorder symptomatology and religion could indicate that eating disorder pathology is part of religion. This idea might indicate that



eating disorders should be classified as “Religious or Spiritual Problems” (*DSM-IV-TR*, 2000), or not viewed as clinical problems at all. Similarly, scholarly reviews of pro-anorexia websites have reported that these sites frequently include content describing anorexia nervosa as a lifestyle, not a disease (Grunwald et al., 2008; Lipczynska, 2007; Norris et al., 2006). However, because eating disorder diagnoses and symptoms are not confined to denominations or to religious persons (Cwikel et al., 2008), it is unlikely that eating disorders are solely cultural or sociocultural constructs. Furthermore, because eating disorders have high mortality, functional impairment and suffering associated with them, it seems appropriate that clinicians and researchers would consider them a form of pathology, and not simply a manifestation of diversity.

### **Effect of Religion on Eating Pathology**

Some authors have moved beyond describing similar aspects of religious and eating disordered worldviews and proposed hypotheses regarding the effect of religion on eating pathology. Specifically, some suggest that religion might protect against the development of an eating disorder (e.g., Forthun et al., 2003; Hawley & DeHaan, 1996; Hill & Pargament, 2003; Joughin et al., 1992; Latzer et al., 2008; Matthews et al., 1998; Perkins & Luster, 1999). In contrast, others suggest that religious values and ideology might trigger an eating disorder (e.g., Arthur & Rosser, 1999; Baxter, 2001; Dell & Josephson, 2000; Ford, 1992; Grenfell, 2006; Guisado Macías & Vaz Leal, 2003; Marx & Griffith, 2001; Pinhas et al., 2008; Vandereycken, 2006) or justify and perpetuate it (e.g., Baxter, 2001; Heise & Steitz, 1991; Marsden et al., 2007; Morgan, Marsden, & Lacey, 2000; Norris et al., 2006; Sorotzkin, 1998). Still others suggest that there is no association between religion and eating disorders (Cwikel et al., 2008; Perkins, 1991).

Intrinsic religiousness, or an individual's personal experience with matters of faith, has been associated with reduced risk for eating disorders. In one study on family risk factors for developing eating disorders and intrinsic and extrinsic religiousness, researchers measured family dysfunction and eating disorder symptomatology in 876 college women (Forthun et al., 2003). Intrinsic religiousness was negatively associated with eating disorder symptomatology, from which the authors concluded that it buffered participants' risk of developing severe pathology. When individuals had a high level of extrinsic religiousness—a self-serving desire to gain social status, support, or security—they were also more vulnerable to risk factors and negative outcomes. Further, the authors concluded that this result might indicate that religion had its strongest influence on eating disorder pathology before the disorder developed; specifically, that religion moderated the relationship between biological and environmental risk factors and eating disorder outcomes. Methodologically, it is important to note that the study design and the authors' conclusions both had limitations. One limitation of this study was that all measures were self-report; therefore, family dysfunction, as assessed in this study, reflects perceived rather than actual dysfunction. Similarly, items were face valid, and were therefore subject to participants' willingness to answer them accurately, which might have been a challenge given that many individuals are hesitant to portray their families in a negative light. The study did not include a measure of social desirability to account for whether participants were intentionally presenting themselves and their families in an overly positive light. Another limitation is that other variables, such as family cohesion, could have influenced the results, but neither the design nor the analyses controlled for those variables. This limitation, as well as the cross-sectional design of the study, means that these results are correlational. Thus, any conclusions

regarding the causal influence of intrinsic and extrinsic religiousness on eating disorder risk are premature. It is equally plausible that eating disorder symptomatology might influence family cohesion or an individual's religiousness, rather than assuming causality in another direction. Nonetheless, this study shows that there might be a causal link between religiousness and eating disorders moderated by family dysfunction, and that future research should address this relation.

Another study focused on religious conversion as a potential protective factor against disordered eating. Joughin and colleagues (1992) mailed questionnaires to members of a national self-help organization for eating disorders. Responses ( $n = 851$  of 2,300 mailed) indicated that individuals who reported an experience of religious conversion (at any time over their lifespan) manifested less severe eating disorder symptomatology than individuals who did not report changing religious orientations. They proposed that this finding might have occurred because participants used their religion as an external way of controlling perceived chaos, rather than using disordered eating behaviors to achieve this end. However, they also found that the degree of weight loss and the lowest body mass index during adulthood reported by participants (i.e., based on self-reported height and weight history) were positively associated with individuals' ratings of the importance of religion, especially for members of Protestant denominations with more formal structure, such as Anglicans. This suggests that individuals who convert to a different religion have a qualitatively different experience with religion in some way that is protective, and which individuals who are religious but who do not change religions do not have. Methodologically, there are several problems with this study. First, participants self-selected into both the self-help organization used for recruitment and the study sample; therefore, they might differ in

important ways from the general population of individuals with eating disorders. Protection against eating disordered symptomatology severity might develop because the individual with an eating disorder was more engaged in existential questions, as the authors suggested. Alternatively, the protective factor might have coincided by chance with the illness, or might have been a result of increased social support in response to having a severe eating disorder, as has been shown with other illnesses. Further, the authors attempted to limit the sample to participants with an active or past eating disorder by excluding males, and excluding women who reported the onset of problems after age 30. They were not able to report, however, whether only individuals with eating disorders participated. The authors commented that they would not expect concerned friends or family members, who could have been part of the organization and thus received an invitation to participate, to respond to the survey. The sample was also limited to Christians, divided categorically by denomination. Second, the study was cross-sectional with face valid self-report items, which means that results can only be interpreted as correlations, not as causation with any assumption about the direction of the effect.

Other studies have suggested that religiousness might protect against the development of an eating disorder among individuals who had been sexually abused in the past (Hawley & DeHaan, 1996; Perkins & Luster, 1999). These results are consistent with conclusions drawn by Forthun and colleagues (2003), although they do not differentiate between intrinsic and extrinsic religion. Furthermore, in Perkins and Luster's study (1999), religiousness was negatively related to purging; among women who reported high religiousness, purging rates were 22% lower than women who reported low religiousness. Methodologically, Perkins and Luster (1999) used a cross-sectional design in which 7,903 adolescent girls reported

bulimic symptomatology and whether they had a history of sexual abuse, as well as other individual, familial, and extra-familial factors including, among others, religiousness. However, the study had the same design concerns as those in the study by Forthun and colleagues (2003): all items were self-report and face valid, which is potentially problematic because of the sensitive nature of many of the questions, and the design was cross-sectional, precluding any conclusions regarding causality.

Previous research on college-age women at high risk for developing eating disorders has evaluated the effectiveness of spirituality and religiousness as coping mechanisms. Jacobs-Pilipski and colleagues (2005) measured body dissatisfaction, religious affiliation, importance of spirituality/religiousness, and perceived effectiveness of spirituality/religiousness. Participants with strong spiritual and religious beliefs reported using related behaviors, such as praying or reading religious texts, as coping mechanisms to alleviate their body dissatisfaction. Participants without strong spiritual and religious beliefs reported using distraction as a coping mechanism. Overall, this suggested that some individuals might be more open than others to using spiritual and religious strategies to cope with body dissatisfaction.

The findings that religiousness might buffer against the development of eating disorders are especially noteworthy when considered in light of Berrett and colleagues' (2007) observations that trauma can undermine spirituality or, alternatively, lead to spiritual growth. Berrett and colleagues (2007) conducted a qualitative study of women in treatment for eating disorders, and found that some women believe trauma, spirituality, and eating disorders are causally connected. However, it is important to note that participants' reports differed regarding the perceived direction of the association between religion and eating

disorders (e.g., Berrett et al., 2007; Grenfell, 2006; Joughin et al., 1992). Given this difference, it is possible that participants' beliefs in the causal relationship between these constructs is more indicative of their attempt to attribute meaning to trauma and eating disorders, rather than evidence of a true causal influence. As Park and Folkman (1997) discuss, individuals will try to attribute purpose through the cognitive processes of assimilation and accommodation when situations that contradict their worldview, or system of global meaning, confront them. This seems to be a more appropriate interpretation given that the direction of causality participants perceived was not uniform. That is, it is possible that instead of religion affecting eating disordered attitudes and behavior positively or negatively, individuals are seeing eating disordered attitudes and behavior as well as trauma through a religious lens.

Religiousness might also affect or trigger eating disordered behaviors through its potential to influence cognitive processes. Specifically, some individuals' experiences with religion is black and white; they are taught to see the world in terms of good and bad, right and wrong, much like individuals with eating disorders see food and eating behaviors (Safer, Telch, & Chen, 2009). Examples of dichotomous thinking related to food and eating include: "I've had one bite too much, I might as well binge eat," and "I ate more than what's on my meal plan; I'm a failure," (Mitchell, 1990, p. 133). Heatherton and Baumeister (1991) have argued that this type of type of dichotomous thinking is especially likely to occur during eating binges, although these authors do not comment directly on any link between religiousness and disordered eating. Part of the explanation these authors propose for the etiology of eating disorders is that individuals need to escape from life stress, and find an outlet in their eating behavior. They described the binge as a mechanism to escape self-

awareness that functions by allowing the individual to focus on short-term, low-level actions, rather than long-term, high-level consequences. Typically, individuals who binge eat are highly self-aware and self-critical when they are not binge eating. During the binge, affected individuals report more black and white thinking and willingness to believe irrational thoughts compared to typical thinking. Again, more research is needed to determine the kind of religious belief that could be at play in this type of situation, and whether there is any causal relation or an apparent but unrelated theme.

Many religions encourage self-discipline and self-denial, including fasting and abstinence from certain foods. Most individuals who participate in those religious practices do not develop eating disorders; however, for individuals predisposed to developing these disorders, engaging in such behaviors could trigger their emergence (Muir, Wertheim & Paxton, 1999). Research has not established causality for religion as a trigger. Alternatively, it is possible that having a predisposition to develop an eating disorder could lead an individual to seek out a religious context in which her desired eating behaviors were encouraged and viewed as appropriate. For example, in the Catholic faith, one of the seven deadly sins is gluttony (Baxter, 2001). According to this religious perspective, gluttony is sinful not because consumption is sin, but because self-indulgence beyond the necessities takes attention away from spiritual concerns (Baxter, 2001). Nonetheless, women who are struggling with body image issues, or who have a predisposition to develop an eating disorder, might seek out this kind of religious context that seems to validate their pre-existing tendencies toward eating disordered behaviors. For these women, excessive compliance to religiousness through denial of food might trigger an eating disorder.

Some studies that use denomination as a measure of religiousness have found no effect of religiousness on eating pathology. In samples of participants with eating disorders, distribution of membership in different denominations and religions is similar to that of the general population (Morgan et al., 2000; Forthun et al., 2003), and in a clinical sample, religious orientation and level of observance were not significantly related to diagnosis (Cwikel et al., 2008). If there were a causal effect of a specific religious doctrine on eating disorder pathology, then one would expect to find a disproportionate representation of that specific religion among individuals with eating disorders. However, even with disproportionate distribution, it would not be possible to determine whether religious affiliation caused eating pathology, whether eating pathology led to religious affiliation, or whether other factors led to both religious affiliation and eating pathology. One study did find a significant difference in the prevalence of eating disorders in a Jewish sample compared with a non-Jewish sample (Pinhas et al., 2008); Jewish women were more likely to have an eating disorder than women who were not Jewish. When these researchers investigated differences within the Jewish group to determine if levels of religiousness influenced eating disorder symptomatology, they did not find any significant differences, indicating that the initial disparity might have been due to the social context tied to religious affiliation rather than beliefs. This potential explanation also points to a methodological flaw in this study, which drew participants from small local communities, limiting generalizability beyond those communities. It is also possible that other factors confounded Pinhas and colleagues' finding, such as different familial socioeconomic status levels among various religious groups, a variable that they did not measure in the study.



The possible effects of religion on disordered eating attitudes and behaviors reviewed thus far are rooted in doctrine and are subtle influences. Some religious organizations have also taken overt stances regarding eating behavior. The official stance of many world religions is against obesity, ostensibly for health reasons (Mann, 2008). In the United States, some evangelical and fundamentalist Christian denominations in particular have adapted weight loss initiatives that have a strong emphasis on the spiritual components of dieting. The motivation for these programs, as Marx and Griffith (2001) describe, was that “sloppy fat, hanging all over the place (or even well girdled) is not a good Christian witness” (unattributed quote, p.186). According to these programs, thinness is a matter of religious obedience, and any extra pounds of fat are a sign of sin (Marx & Griffith, 2001). Books such as *Slim for Him, Pray Your Weight Away*, and *More of Jesus, Less of Me* add a religious connotation to the thin ideal, by including spiritual discipline components to established Weight Watchers or Overeaters Anonymous models. Although Marx and Griffith (2001) suggest this might be a cultural mentality of institutionally conservative Christians, the existence of titles like these and the targeted programs in some churches does not mean this mentality or culture can be generalized to other settings, even within the same denomination. However, it is important to note that there are also books published that address maladaptive eating behaviors within religious contexts (e.g., *Religion of Thinness: Satisfying the Spiritual Hungers behind Women's Obsession with Food and Weight*, Lelwica, 2010; *Perfecting Ourselves to Death*, Winter, 2005).

Previous research on social norms surrounding disordered eating and similar behaviors has established that not all members of a group equally influence how others perceive group norms. In particular, well-liked members have stronger effects on norms that

others perceive (Prentice & Miller, 2002). In a study on alcohol use, a similar social norm to disordered eating in college settings (Sanderson et al., 2002), researchers found that the effect of religion on alcohol consumption was mediated by participants' reference groups (Chawla, Neighbors, Lewis, Lee, & Larimer 2007). Based on this research, it seems plausible that disordered eating and religiousness could be linked by a complex web of factors including the importance of religion to an individual, the importance of religious peers, and the eating behavior of well-liked individuals within these religious reference groups.

### **Effect of Eating Pathology on Religion**

An eating disorder can influence an individual's religious behaviors, as conflicts can arise between eating behavior and religious practice. Graham and colleagues (1991) published a case series of women hospitalized for eating disorder treatment ( $N = 20$ ). They asked participants retrospectively about their religious practices both before the onset of the disorder and during the time they manifested eating disorder symptoms. In this sample of women, the majority of whom met criteria for anorexia nervosa, they found that eating disorders altered religious practice, and that the fear of becoming fat pervaded individuals' existential and spiritual lives by cutting off potential support, comfort, and structure. Most notably, two-thirds of women with eating disorders who had previously participated in the Eucharist reported stopping that practice because they feared consuming the calories in the bread and wine, or because the desire to purge the elements overwhelmed them with guilt. Most women in these case studies also reported decreasing their participation in social church activities related to food, and increasing fasting after the onset of their illness. In this way, eating disordered attitudes altered these women's worldviews, and they viewed religion through that filter.

Women with eating disorders have also expressed that their preoccupation with eating and weight distracted them from their spirituality. Berrett and colleagues (2007) gave an open-ended survey to female inpatients in an eating disorder treatment center and analyzed responses qualitatively, finding themes of eating pathology distancing women from their religious beliefs and practices. For example, one participant responded: “My eating disorder replaced God as my higher power. I did my eating disorder’s bidding. It also shut off the small connections I had with God,” (p.375). Similarly, other women tied their feelings of unworthiness to self-blame: “My eating disorder has made me ashamed to confront my higher power for what I have done. It has made me feel not worthy and too depressed and hopeless to ask my higher power for help,” (p.375). “I believed that it would be unfair of me to ask for help and comfort from my higher power because I did this to myself,” (p.375). In this way, eating disordered behaviors were associated with feeling of guilt, shame and unworthiness that blocked women from their own religiousness.

Wilbur and Colligan (1981) compared patients hospitalized for anorexia nervosa to matched healthy controls who had previously been hospitalized for a psychiatric disorder, but did not meet criteria for any psychiatric disorder at the time of the study. They gave all participants a battery of questionnaires including the Minnesota Multiphasic Personality Inventory-2, the Devereux Adolescent Behavior Rating Scale, and demographic measures. Women with anorexia nervosa scored higher on the Wiggins content scale for religious fundamentalism compared to their matched controls. The scale included items such as: “I read the Bible several times each week” and “I pray several times each day.” The control group appears well-matched for potentially confounding variables such as psychotropic medication use and prolonged hospitalization; however, because the comparison group had

been previously hospitalized, it is unclear from these data how women with eating disorders might differ from the general population with respect to general religiousness and religious practice. In general, individuals with health problems severe enough to require hospitalization might use religious coping to address feelings of anxiety, particularly if they were highly religious individuals before hospitalization (Park & Folkman, 1997). Because the group of interest was currently hospitalized and the control group was not hospitalized at the time of the study, it is likely that religious coping strategies were more accessible to the hospitalized individuals. Further research is necessary regarding the extent to which having an eating disorder severe enough to require hospitalization might lead to more religiousness than another disorder also requiring hospitalization.

### **Incorporating Religious Values into Treatment**

It is also important to consider how treatment can incorporate religion effectively. Although the direction of the association between religion and eating disorders, or even the existence of a significant association, is not established or fully understood, there are clearly individuals who value religion and have eating disorders. The presence of both ways of making meaning out of the self in the world—interpreting the world through cognitions typical of eating disorders and interpreting the world through cognitions related to religiousness—suggests that considering these worldviews together might be able to decrease disordered eating because there are two potentially co-occurring routes for addressing maintaining maladaptive cognitions. Such patients could potentially benefit from religious components to treatment, and in fact often seek the help of clergy (Mitchell, Erlander, Pyle, & Fletcher, 1990; Oliver et al., 1999). Many women also report having requested religious counseling (Dale & Hunt, 2008; Richards et al., 2005; Worthington, Mazzeo & Kliever,

2002), and several described religious factors in their recovery (Baxter, 2001). In a pilot study, researchers sought to understand the current role of clergy in the treatment of eating disorders (Mitchell et al., 1990). Of the clergy who responded to a mailed survey request (84 of 200 initially approached), nearly half reported counseling at least one parishioner with an eating disorder within the past year. In the same study, researchers also surveyed 50 patients with a diagnosis of bulimia nervosa, most of whom reported strong religious beliefs and frequent practice. Sixty-six percent of clergy reported referring their parishioner to an outside clinician at some point during their counseling; however, none of the patients with bulimia reported a professional referral. This discrepancy points to a methodological limitation regarding this study. Specifically, researchers recruited clergy by offering them a workshop on eating disorders as an incentive. This incentive might have led the clergy to self-select for their participation. Desiring an eating disorder workshop could have selectively encouraged clergy who were more aware of the severity of eating disorders, and who therefore might be more likely to refer parishioners to professionals, to participate, although they might not be representative of all clergy whom the participants with bulimia nervosa could have encountered. Nonetheless, the figures the authors presented point to a need to understand how religion and eating disorders interconnect.

Adding religious components to therapy could enhance the effectiveness of treatments, particularly for highly religious individuals who are open to and potentially eager for religious themes in therapy. In a meta-analysis of 31 studies including therapies with a religious component or base, the overall effect size was .56, compared to the typical .48 effect size reported by Lambert and Bergin (1994) for psychotherapy in general (as cited by Smith, Bartz, & Richards, 2007). The authors concluded from this comparison that spiritual

elements augmented a therapy's effectiveness; however, this conclusion should be viewed with caution because 32% of the studies reviewed did not measure baseline religiousness, and only 58% of studies included random assignment to a religious or control group. Of the studies that did not include random assignment, it is possible that participants self-selected into the therapy because of their desire to have a religious component to their treatment. This would likely increase motivation to participate in the therapy, and might increase the effectiveness of the treatment for such individuals. Manley and Leichner (2003) noted that religious content in treatment might be particularly helpful when addressing suicidality of adolescent females with eating disorders, because of the intrinsic existential and ethical issues of suicide.

Richards and colleagues (2005) designed a treatment with roots in cognitive-behavior therapy and added a spiritual component, based on the premise and observation that religious individuals can be hesitant to seek psychotherapy because of a fear that it will undermine their faith. In an inpatient treatment facility for eating disorders, research staff randomized 122 participants to weekly treatment during the first eight weeks of their hospitalization, in addition to the intensive inpatient program. A non-blinded comprehensive team provided treatment; therefore, even though the group sessions were one-hour long, care throughout the week was consistent with the assigned condition. In one condition, participants received a self-help workbook and participated in a spiritual growth group; in a second, they received a self-help workbook and participated in a CBT group; in a third, they participated in an emotional support group. All participants agreed to randomization, but not all described themselves as religious individuals. The focus of treatment was individuals' personal experiences with a higher power. Investigators found that the religiousness treatment group

had significantly lower psychological disturbance, including anxiety, depression, and relationship distress, and significantly fewer behaviors and attitudes of eating disorders at the conclusion of the study, compared to the cognitive and emotional groups. Not surprisingly, they also showed higher spiritual well-being. Participants in the religiousness condition also improved more quickly than the other groups during the first four weeks of the intervention.

In a similar study, Boyatzis and colleagues (2007) examined differences among religiousness, non-theistic spirituality, and control conditions in a brief intervention. These researchers measured body esteem in 135 college women before and after a randomly assigned treatment condition, which involved reading material that was either religious, spiritual or control (i.e., random campus news). The research design involved matching participants in each condition on how important they considered religion to be in their lives, and on body esteem. The religiousness condition involved body affirmations that were theistic with a Christian tone, emphasizing God's love and acceptance of participants' bodies. The non-theistic spirituality condition involved body affirmations with a positive secular tone and no mention of a higher power. After the treatment, all participants viewed images of models embodying the thin ideal to activate body image concerns, and then completed body esteem measurements. Individuals in the religiousness group improved significantly compared to the control group, who declined from their baseline levels. Individuals in the non-theistic spirituality group improved marginally compared to the control group. Notably, these results occurred despite low levels of baseline religiousness among participants in the group that received the religious intervention. Thus, it is possible that adding a religiousness component to therapy would be beneficial to many individuals who are open to a religious theme, even if they do not consider themselves personally religious.

Qualitative studies also provide support for the incorporation of religious values into psychological treatment for eating disorders. In the open-ended survey conducted by Berrett and colleagues (2007), completed by the treatment-seeking sample described previously, women reported drawing strength from their spirituality in the recovery process. For example, one woman stated, “Being able to be hopeful about having a relationship with God gives me so much more to be hopeful for and knowing that He can forgive me helps me forgive myself,” (p.375). Another woman focused on the social support aspect of spirituality: “I know that no matter what, my spirituality will always be there, and through it there will always be people who love and care about me. I know I will never be completely abandoned again,” (p.376). These statements suggest that there are individuals who would benefit from therapy utilizing a religion-based global meaning, especially if that is a meaning system they are trying to maintain, as might have been the case with these highly religious participants. Others have commented that religious belief is an important aspect of recovery because it provides hope, belonging and security (Forthun et al., 2003).

### **Summary and Theoretical Model**

Previous research has established a link between religion and eating disorders. This link is salient to individuals with eating disorders, as well as to the clinicians who treat them. Perhaps due to these methodological limitations, the literature presents contradictory information regarding the nature of the associations between these constructs. Some studies find positive links between eating disorders and religiousness, some find negative links, and some find that the concepts are unrelated. However, there is a trend in the literature suggesting that a protective component of positive religious beliefs and coping emerges more often than other associations (e.g., Hawley & DeHaan, 1996; Joughin et al., 1992; Perkins &



Luster, 1999). The current study intended to extend the existing literature by examining participants' patterns of responses when many items encompassing multiple theoretical dimensions of religiousness were included in a questionnaire administered to a large, population-based sample. Increased knowledge about how religion and eating disorder characteristics relate can inform future treatment and prevention efforts, and direct the field to areas that call for still more investigation.

Methodologically, much of the previous work has limited generalizability because of the populations studied and the manner of assessing eating disorders and religiousness. Many studies have included small, treatment-seeking samples. The benefit of these samples is apparent in qualitative research, where studies can gather salient, in-depth information to describe individuals' experiences in detail and inform future empirical studies. However, quantitative research is needed to supplement qualitative results to describe experiences more globally and validate potential treatments that could generalize to a broader population. Furthermore, most assessments of religiousness in existing empirical studies focus on a small number of features of religious life, rather than a construct with multiple domains, and use items or scales without robust psychometric support. The present study will extend the current literature by assessing religiousness with a measure developed with initial evidence of validity and estimated reliability, and with multiple assessments of eating disorders and disordered eating attitudes and behavior. Furthermore, no single study can generalize to the entire population. Nonetheless, by including participants from a large population-based study, results of the current investigation will provide data with greater external validity, particularly among individuals similar demographically to this study's participants, than that derived from studies of small clinical samples.

Based on this literature, a theoretical model depicts the conceptual association between eating disorders and religiousness for women with some eating disordered attitudes and beliefs (Appendix A). The foundation of this figure is the cognitive-behavioral conceptualization of eating disorders as a behavior cycle maintained by distorted cognition related to eating, the body, and the self (Fairburn & Beglin, 1994). As noted previously, cognitive theory posits that the way an individual thinks about the world influences her affect and behavior (Beck, 1995). Religiousness appears in the model in three ways. Most broadly, religiousness influences eating disordered attitudes and behavior within the worldview context of Global Religious Beliefs. Specifically, as described by Park and Folkman (1997), religion is a meta-schema influencing how individuals see the world, the self, and the self in the world, and how they make meaning out of everyday experiences and their reactions to them. Thus, a circumscription of all attitudes and behaviors, including those related to eating disorders among individuals affected by these conditions, depicts this meta-schema. Notably, this meta-schema is not a positive effect or a negative effect, but is an underlying worldview. This is consistent with studies that have observed similarities in core beliefs and values between individuals who have eating disorders and individuals who are religious (e.g., Baxter, 2001; Marx & Griffith, 2001), as well as studies that have observed women describe their eating disorder and treatment in religious terms (e.g., Berrett et al., 2007; Marsden et al., 2007; Morgan et al., 2000).

Religiousness is also depicted in the theoretical model with religious beliefs related to positive aspects of God being protective against (pictorially diverting) the negative cognition that maintains the eating disordered core beliefs and associated behaviors. Much of the literature on eating disorders assesses religious belief or internal religiousness and suggests

that they might be protective against increased pathology (e.g., Forthun et al., 2003; Joughin et al., 1992). Previous research therefore indicated that it might be appropriate to include religious belief in the model. More generally, health psychology literature has found that the content of beliefs is also important, and that belief in a benevolent and collaborative God has health benefits, whereas belief in other images of God has less consistent results (e.g., Hertel & Donahue, 1995; Schnittker, 2001; Smith et al., 2003). Notably, the model conceptualizes positive beliefs about God as deflecting the cycle of negative cognition that maintains the disordered attitudes and behavior, moving it in a different direction and not allowing the cycle to complete.

The final way in which religiousness theoretically relates to eating disorders in this model is through religious coping, depicted in the model as a break in the maintaining maladaptive cognitive cycle. In the literature, religious coping seems to be helpful in addressing many different mental and physical health stressors, particularly when individuals were religious prior to the onset of the stressful event (Abeles et al., 1999; Jacobs-Pilipski et al., 2005; Park & Folkman, 1997). Related to eating disorders, researchers have observed participants describe spiritual and religious coping as effective strategies to alleviate body dissatisfaction (Jacobs-Pilipski et al., 2005). Visually, religious coping is a break in the cycle because it is a way to address negative affect and thoughts that are already occurring, rather than a way of diverting affect and thoughts to go in a different direction.

Many questions remain regarding the potential association between eating disordered attitudes and behaviors and religiousness. Results of studies on religiousness and eating disorders, both qualitative and quantitative, are contradictory. Some authors suggest that religion has an inverse effect on eating disordered attitudes and behaviors (e.g., Joughin et

al., 1992), and some suggest that religion has a direct effect on eating disorders (e.g., Pinhas, et al., 2008). Others report that eating disorders affect religiousness (e.g., Berrett et al., 2007), and some report no association between religion and eating disorders (e.g., Cwikel et al., 2008). Given these inconsistencies, further research is needed. This study explored participants' patterns of responses to a large pool of items related to theoretical dimensions of religiousness, drawn in part from existing scales. Then, the association between the scales developed from these items and eating disorder variables will be evaluated to clarify the nature and direction of the association between the constructs of religiousness and disordered eating. The modeled association between eating disordered attitudes and behaviors and religiousness presented in Appendix A is theoretical. As with all theoretical models, future research needs to evaluate these associations to determine whether there is empirical support for the model, or whether there are other factors that contribute to eating disorder symptomatology etiology and correlates. This study will begin to address this model by evaluating dimensions of religiousness that emerge from the pool of items putatively related to the construct of religiousness, and their associations with eating disorder diagnostic status and domains of symptomatology such as body dissatisfaction and drive for thinness.

## **Hypotheses**

Based on cognitive behavioral theory, which proposes that the way an individual thinks about the world influences her affect and behavior, the primary hypothesis for this study is that there will be an association between eating disordered attitudes and behaviors and dimensions of religiousness. Two sets of analyses for this study organized results: first, the data exploration developed a parsimonious measure of religiousness and provided initial evidence of validity and estimated reliability for that measure. Because of the multiple

dimensions theoretically involved in religiousness, the hypothesis related to this part of the current study was that multiple factors would emerge, and that they would explain variance related to positive religious beliefs, negative religious beliefs, religious behaviors, and social aspects of religion.

After scale development using the religious items, those factors were used to evaluate the association between religiousness and eating disorder variables. Items measuring positive religious belief, in particular belief in positive aspects of God and religion such as personal involvement, theistic love, and benevolence, were hypothesized to be negatively related to eating disorder symptomatology. This hypothesis is based on the idea that, among individuals affected by eating disorders involving binge eating (bulimia nervosa and binge eating disorder), feelings of guilt and shame are common (Marsden et al., 2007). Experiencing shame and guilt is incongruent with the belief that a benevolent God is in control, because it places the burden on the individual to please God. Similarly, anorexia nervosa is often associated with a need to be in control or to be controlled by an external force (Marsden et al., 2007), which would not be necessary if an individual could confidently relinquish control to an omnipotent, benevolent God.

Another hypothesis of this study concerned predictions of eating disorder diagnostic status. It was hypothesized that religiousness will be associated with the likelihood of having an eating disorder diagnosis (i.e., has or does not have anorexia nervosa, binge eating disorder, or bulimia nervosa). This was based on literature suggesting there is an effect of religion on eating pathology, as described previously, although the reason or the nature of that effect is unclear (e.g., Dell & Josephson, 2000; Hill & Pargament, 2003; Joughin et al., 1992).

Finally, individuals' experiences with eating disordered attitudes and behaviors might be associated with religiousness. Therefore, this study evaluated eating disorder symptomatology and religiousness within groups of participants who met criteria for eating disorder diagnoses. It was hypothesized that within individuals who had bulimia nervosa at some point in their life, positive religious beliefs would be negatively associated with eating disorder symptomatology because it has been shown protect against greater symptom severity in previous literature (e.g., Hawley & DeHaan, 1996; Joughin et al., 1992; Perkins & Luster, 1999), and because religiousness might have increased through religious coping, which is positively correlated with poor mental and physical health (Wilbur & Colligan, 1981).

## **Method**

### **Participants**

Participants from this study come from a larger project using twins from the population-based Virginia Twin Registry (VTR), which is now part of the Mid-Atlantic Twin Registry (MATR, Mazzeo et al., 2003). This analysis excluded males because disordered eating is primarily a problem affecting women (Striegel-Moore et al., 1986). Female-female dyads were included, as were females who were part of a female-male dyad; male twins were not included. Participants were exclusively White (reflecting the ethnic composition of the VTR at the time of data collection) and were born between 1934 and 1974. Beginning in 1999, questionnaires including religious and eating disorder items were mailed to individuals who had participated in a previous twin study. No attempt was made to contact non-responders because of limited resources, except when the co-twin had responded. Participants were more likely to have responded if they were older, had more education, or were members of a monozygotic twin pair. The final sample included 1510 women; their mean age of the final sample was 42.5 years (Mazzeo et al., 2003).

### **Measures**

A table summarizing all measures used and their source is included in Table 1.

**Religiousness items.** Items compiled by Kendler and colleagues (2003) assessed religiousness. This set of items included 56 from existing scales, including: the Religious Attitudes and Practices Inventory (D’Onofrio et al., 1999), items used in the National

Table 1

*Measures Included in the Current Study*

Scale and Subscale Names	Source
Religious Attitudes and Practices Inventory Social Support	D'Onofrio et al., 1999
Items in National Comorbidity Survey	Kessler et al., 1994
Items in Gallup poll	Gallup Institute, 1995
Religiousness Scale	Strayhorn et al., 1990
"God images" scale	Hertel & Donahue, 1995
Multidimensional Measurement of Religiosity/ Spirituality	Abeles et al., 1999
Religious Coping	
Daily Spiritual Experiences	
New items	Kendler et al., 2003
the "nature of God"	
forgiveness versus revenge	
gratitude versus ingratitude	
love and caring	
Frost Multidimensional Perfectionism Scale	Frost et al., 1990; Frost et al., 1993
Personal Standards	
Concern over Mistakes	
Doubts about Actions	
Eysenck Personality Questionnaire (short form)	Eysenck & Eysenck, 1975
Neuroticism	
Extraversion	
Tridimensional Personality Questionnaire	Cloninger, 1987
Novelty Seeking	
Structured Clinical Interview for DSM-IV (SCID; adapted)	First et al., 1997; Mazzeo et al., 2006
Eating Disorder Inventory-II	Garner et al., 1983
Drive for Thinness	
Body Dissatisfaction	
Three-Factor Eating Questionnaire (adapted)	Mazzeo et al., 2003; Stunkard & Messick, 1985
Disinhibited Eating	
Restraint	
Hunger	



Comorbidity Survey (Kessler et al., 1994), items from a Gallup poll (Gallup Institute, 1995, as cited by Kendler et al., 2003), the religiousness scale of Strayhorn, Weidman, and Larson's (1990), the "God images" scale of Hertel and Donahue (1995), and the Multidimensional Measurement of Religiosity/Spirituality (Abeles et al., 1999). In addition, because of their interest in hypothesized dimensions of religiousness not assessed by these existing items and measures, Kendler and colleagues developed scales evaluating four other domains: (1) the "nature of God," (2) forgiveness versus revenge, (3) gratitude versus ingratitude, and (4) love and caring. This added 22 items, yielding 78 total items.

**Divergent validity measures.** The current study used several other measures that were part of the larger twin study to provide evidence of divergent validity for the measure of religiousness derived in the first part of this study. They included: a modified version of three subscales from the Frost Multidimensional Perfectionism Scale (Personal Standards, Concern over Mistakes, and Doubts about Actions; Frost, Heimberg, Holt, & Mattia, 1993; Frost, Marten, Lahart, & Rosenblate, 1990), the Neuroticism and Extraversion subscales of the Eysenck Personality Questionnaire short form (Eysenck & Eysenck, 1975), and the Novelty Seeking subscale of the Tridimensional Personality Questionnaire (Cloninger, 1987).

***Frost Multidimensional Perfectionism Scale.*** Tozzi and colleagues (2004) described this modified measure in detail. The three subscales included in the larger twin study that also created this study's data were: Personal Standards, setting high standards that are integral to self-evaluation, Concern over Mistakes, negative reactions to mistakes and beliefs that mistakes are failure, and Doubts about Actions, doubting ability to accomplish tasks.

These subscales were selected for the larger study because they focus on individuals' perfectionism, rather than parental aspects (Tozzi et al., 2004). Scores on these subscales all had acceptable estimates of reliability in the initial standardization study, which was replicated in a community sample (Personal Standards, Cronbach's alpha = .82; Concern over Mistakes, Cronbach's alpha = .86; Doubts about Actions, Cronbach's alpha = .66; Harvey, Pallant, & Harvey, 2004). Among college students, the measure showed good evidence for estimated temporal stability over ten weeks (Personal Standards,  $r = .73$ ; Concern over Mistakes,  $r = .78$ ; Doubts about Actions,  $r = .63$ ).

***Eysenck Personality Questionnaire.*** In a psychometric investigation of the Eysenck Personality Questionnaire (Loo, 1979), scores on the Neuroticism and Extraversion subscales were found to have good estimated internal consistency in a sample of 262 college students (Cronbach's alphas of .82 and .82, respectively). These estimates were consistent when males were excluded (Cronbach's alphas of .80 and .82, respectively). Items indicating predisposition to negative affect (such as depression and anxiety) assessed neuroticism. Evidence of convergent validity for the Extraversion scale was provided by comparison to the Extraversion-Introversion scale of the Myers-Briggs Personality Inventory ( $r = .74$ ; Steele & Kelly, 1976; see also Wakefield, Sasek, Brubaker, & Friedman, 1976).

***Tridimensional Personality Questionnaire.*** The present study used the Novelty Seeking subscale from the Tridimensional Personality Questionnaire (Cloninger, 1987) to evaluate divergent validity for the Religiousness subscales. Cloninger designed the original Tridimensional Personality Questionnaire to measure his Biosocial Learning Model. Evidence of convergent validity with the Multidimensional Personality Questionnaire Control subscale was adequate, with items negatively significantly correlated ( $r = -.32$  to

$r = -.64$ ; Waller, Lilienfeld, Tellegen, & Lykken, 1991). In a large standardization study, estimates of internal consistency grouped by sex and race were adequate (Cronbach's  $\alpha = .73$ ; Cloninger, Przybeck, & Svrakic, 1991). Novelty seeking was also significantly negatively associated with social desirability ( $r = -.33$ ; Cloninger et al., 1991).

**Eating disorders.** Disordered eating behaviors were assessed in three ways: (1) using self-report items adapted from the Structured Clinical Interview for *DSM-IV* (SCID; First et al., 1997); (2) using items from the Eating Disorder Inventory-II Drive for Thinness and Body Dissatisfaction subscales, and (3) using an adapted version of the Three-Factor Eating Questionnaire (Mazzeo et al., 2003). The following paragraphs describe each of these measures in detail.

***Self-report eating disorder items.*** Items assessing specific eating disorder symptoms were adapted from the SCID (First et al., 1997) to be consistent with the self-report format of the questionnaire, and were designed to assess all behavioral and psychological criteria from the *DSM-IV* (American Psychological Association, 1994) for anorexia nervosa, bulimia nervosa, and binge eating disorder (Mazzeo et al., 2006). Diagnostic algorithms were constructed for broad and narrow versions of each disorder from items associated with each criterion, participants who met criteria for each diagnosis formed diagnostic groups. Diagnoses included in analyses were: narrowly defined anorexia nervosa (AN narrow), broadly defined anorexia nervosa (AN broad), narrowly defined bulimia nervosa (BN narrow), broadly defined bulimia nervosa (BN broad), narrowly defined binge eating disorder (BED narrow), and broadly defined binge eating disorder (BED broad). Appendix B presents items contributing to each diagnostic criterion (Mazzeo et al., 2006). This table

also outlines scores on each item needed to meet criteria for a broad or narrow diagnosis of anorexia nervosa, bulimia nervosa, or binge eating disorder.

***Eating Disorder Inventory.*** Two subscales of the EDI also assessed eating disordered behaviors and attitudes: Drive for Thinness (EDI-DT) and Body Dissatisfaction (EDI-BD; Garner et al., 1983). Clinicians familiar with research and treatment for women with anorexia nervosa and bulimia nervosa developed the original EDI. Sample items include, “I feel extremely guilty after overeating” (EDI-DT) and “I think that my thighs are too large” (EDI-BD). For a full list of items included in this survey, and the scales to which they belong, see Appendix D. Participants rated each statement on a six-category rating scale of *never* to *always*. Two samples contributed to the development of the scale: women in treatment for anorexia nervosa, and a female comparison group. In the original standardization study, subscales had a minimum Cronbach’s alpha of .80. Reliability coefficients for the two scales included in the current study, namely EDI-DT (standardized Cronbach’s alpha for female comparison group = .85), and EDI-BD (standardized Cronbach’s alpha for female comparison group = .91), were acceptable. Limbert (2004) also reported adequate internal consistency in an exclusively nonclinical sample (EDI-DT, Cronbach’s alpha = .84; EDI-BD, Cronbach’s alpha = .78). To establish criterion-related validity, participants’ primary therapist, or a therapist familiar with the case, also rated the participant using the EDI scale (correlations of ratings: EDI-DT  $r = .53, p < .001$ ; EDI-BD  $r = .44, p < .001$ ). Furthermore, each of the EDI subscales has evidence supporting convergent validity with other eating disorder measures (Garner et al., 1983).

Since its development, the EDI has become the most widely used instrument for assessing eating disorder characteristics (Phelps & Bajorek, 1991). A principal-components

analysis performed by Eberenz and Gleaves (1994) of the original eight subscales on the EDI showed that the items essentially loaded onto components paralleling the intended scales. Although there were some exceptions with other subscales, EDI-DT and EDI-BD items (i.e., those used in the current study) both loaded onto their intended factor, providing support for the construct validity of these subscales. Convergent validity for EDI-DT was assessed by comparing scores on this subscale to those on other measures of restraint, including the Eating Attitudes Test ( $r = .51$ ) and the restraint scale ( $r = .50$ ; Garner et al., 1983). Support for the convergent validity of EDI-BD includes its association with a measure of general body dissatisfaction ( $r = .55$ ) and a measure of body dissatisfaction related to pubertal maturation ( $r = .69$ ; Garner et al., 1983). Evidence of divergent validity for both the EDI-DT and EDI-BD includes their nonsignificant correlations with both the Beck Depression Inventory (EDI-DT:  $r = .26$ , EDI-BD:  $r = .25$ ; Garner et al., 1983), and the Center for Epidemiologic Studies Depression Scale (EDI-DT:  $r = .24$ , EDI-BD:  $r = .36$ ). This distinction is important as depression often co-occurs with eating disorders (Espelage et al., 2003; Herzog, 1982). Researchers have also investigated the one-week estimated temporal stability of the EDI, and found that EDI-DT (nonclinical  $r = .91$ ) and EDI-BD (nonclinical  $r = .94$ ) yielded stable scores.

***Three-Factor Eating Questionnaire.*** Finally, the current study evaluated eating disordered behaviors using an adapted version of the 51-item Three-Factor Eating Questionnaire (TFEQ; Stunkard & Messick, 1985). This measure includes three subscales: Restraint (TFEQ-R), Disinhibition (TFEQ-D), and Hunger (TFEQ-H). Higher scores indicate greater restraint, disinhibited eating, and predisposition to hunger, respectively. For a full list of items included in this survey, and the subscales to which they belong, see Appendix D.

TFEQ-R includes items measuring intent to restrict food intake. It has both good estimated internal consistency (Cronbach's alpha = .80; Laessle, Ruschl, Kotthaus, & Pirke, 1989) and one-year estimated temporal stability ( $r = .81$ ; Bond, McDowell, & Wilkinson, 2001). TFEQ-D includes items measuring disinhibited eating despite intent to restrict. It also has good internal consistency (Cronbach's alpha = .83) and one-year test-retest reliability ( $r = .86$ ; Bond, McDowell & Wilkinson, 2001). TFEQ-H includes items measuring predisposition to feelings of hunger from internal or external loci. It yields scores with high estimated internally consistency (Cronbach's alpha = .84) and adequate one-year estimated temporal stability ( $r = .75$ ; Bond et al., 2001). The TFEQ-H and TFEQ-D had evidence supporting their convergent validity with the Eating Disorder Diagnostic Scale symptom composite ( $r = .53$  and  $.63$ , respectively; Stice et al., 2000). The TFEQ-R was significantly correlated with the Dutch Eating Behaviors Questionnaire ( $r = .89$ ) and the Eating Disorder Examination Questionnaire, Restraint subscale ( $r = .79$ , Bardone-Cone & Boyd, 2007). In addition, the TFEQ-R manifested discriminant validity with measures of social desirability including the Marlowe-Crowne Social Desirability Scale ( $r = .05$ ) and the Edwards Social Desirability Scale ( $r = -.21$ ; Allison, Kalinsky & Gorman, 1992). This finding is important because previous research has shown restraint to be a desirable trait for women to display (e.g., Mori et al., 1986).

The TFEQ items included in this survey were adapted from the original questionnaire. All original items were included except for 15 that had a response format not easily adaptable to the *rarely to always* scale used in the survey (e.g., Item 41, *easy to very difficult*), resulting in 36 items being included on the scales for the current study. However, when possible, items were adapted from their mixed true-false and Likert-type responses so that they could be included and rated on the same scale ranging from *rarely to always*. Additionally, study

designers moved items regarding dieting to the end of the questionnaire because prior research using this scale found that participants were likely to skip the dieting items and the remainder of the scale if they did not diet (Mazzeo et al., 2003). Mazzeo and colleagues (2003) has previously presented a complete description of the modifications made to the TFEQ for this data collection.

### **Procedure**

As described previously (Kendler et al., 2003), the initial pool of 78 religiousness items was administered with measures of eating disorder symptomatology as part of a larger study to participants in the Mid-Atlantic Twin Registry. I subsequently reviewed these 78 items, and found them to be consistent with the putative latent variable of religiousness, as defined in the section on Definitions and Measurement of Religiousness (p.5). All items were retained in the initial exploratory factor analyses to allow for maximum exploration of the religiousness variable, which is necessary because there is no “gold standard” criterion for religiousness in the existing literature. After developing a religiousness scale, associations with eating disorder diagnoses, attitudes, and behaviors were evaluated.

### **Statistical Analyses**

SPSS 17.0 (SPSS, Inc., 2009) was used for calculation of descriptive statistics, exploratory factor analysis (EFA), regressions, logistic regressions, and correlations. MPlus 4.1 (Muthén & Muthén, 2007) was used for confirmatory factor analyses (CFAs) because of its modeling capabilities. In the present study, the eleven eating disorder variables (five continuous symptomatology variables, and six binary diagnostic status variables) were dependent (or criterion) variables (DVs), and the continuous religiousness variables that emerge from factor analyses were the independent (or predictor) variables (IVs).

Descriptive statistics, including means, standard deviations, frequencies, and information on normality, were generated to clean the data and verify that they met assumptions of the planned analyses. Items met the assumption of having an approximately normal distribution if the absolute value of their skewness and kurtosis statistics were close to or below one. For items with skewness or kurtosis values greater than 1, values were divided by their standard error and the critical value of 3.29 applied (Tabachnick & Fidell, 2007).

Factor analyses were performed to generate religiousness variables. To detect patterns in responses for factor analyses, participants who had missing data for more than 25% of religious items were excluded from factor analyses, resulting in 1478 participants. However, because participants who omitted items likely did so in a non-random manner, all participants were included in all analyses other than the EFAs and CFAs. These participants were randomly divided into three groups to perform an EFA ( $n = 780$ ), CFA ( $n = 400$ ), and a replication of the CFA ( $n = 298$ ). Sample size was determined by allowing there to be a minimum ratio of ten participants for every item included, as recommended by Tinsley and Tinsley (1987). Within the EFA subsample, a subsequent EFA was performed after the initial factor structure and items are determined, to verify that the model is supported after items not meeting criteria are excluded.

In the EFA, several guidelines were considered in the determination of the best fitting factor structure. Two commonly used methods of determining the appropriate number of factors to extract are the Eigenvalue rule (Kaiser, 1960) of including variables with Eigenvalues greater than 1 and the scree test (Cattell, 1966), which focuses on the trend of Eigenvalues. The Eigenvalue rule is not appropriate to apply in the current study because the



data include more than 40 items and a large sample size (Tabachnick & Fidell, 2007); thus, the scree test results determined the number of factors.

In the current study, factor loadings were first examined using an orthogonal varimax rotation of the factors using a maximum likelihood extraction, and then with an oblique direct oblimin rotation of the factors using a maximum likelihood extraction. Initially, the factors correlated minimally with each other at .07, indicating that an orthogonal rotation was a more appropriate representation of participants' response patterns. Tabachnick and Fidell (2007) recommend the use of an orthogonal rotation when other analyses require orthogonal factors, or when factors will be used as independent or dependent variables in future analyses, both of which apply in this study. The cutoff criteria for item loadings was .55 onto one factor and no more than .36 on the other factor. These criteria were based on the recommendations of Comrey and Lee (1992), who suggest that factor loadings of .71 are excellent, .63 are very good, .55 are good, .45 are fair, and .32 are poor (Tabachnick & Fidell, 2007). Although many studies consider .32 an adequate cutoff, this study applied .55 because the goal of this factor analysis was to yield a parsimonious measure. Furthermore, criteria that were more liberal only allowed the inclusion of one additional item. In the present study, the cost of loosening criteria and allowing for a potentially poorer fit did not outweigh the benefit of gaining more items.

CFAs were conducted to test whether the model that reflected the structure determined by the previous EFA fit other subsamples of the data. The first CFA was conducted using maximum likelihood estimation on the second subsample to test the extent to which the model yielded by the EFA fit the data. Evaluation of model fit was based on: Chi-square ( $\chi^2$ ) significance and the ratio of  $\chi^2$  to degrees of freedom ( $\chi^2/df$ ), root mean

squared error of approximation (RMSEA), and comparative fit index (CFI). Both the  $\chi^2$  significance level and  $\chi^2/df$  were evaluated because a significant  $\chi^2$  test does not necessarily indicate a poor fit for the data in large sample sizes. Bollen (1989) cautioned that the  $\chi^2$  test is sensitive to sample size when there are more than 200 cases. Muthén and Muthén (2007) recommend that the  $\chi^2/df$  ratio be less than 3.84. RMSEA values range from 0 to 1, with a cutoff of less than .05 indicating good fit, a cutoff of .08 indicating fair fit, and all values over .10 indicating poor fit (Browne & Cudeck, 1992). More recently, Hu and Bentler (1999) suggested that .06 is a more appropriate cutoff for RMSEA. The CFI estimates model fit compared to a model assuming independence between items. CFI values also range from 0 to 1, with values greater than .95 indicating that the proposed model has better fit than the independence model (Kaplan, 2000, as cited by Garson, 2009). In addition, Cronbach's alpha, a measure of internal consistency, was evaluated for each subscale and the overall model.

To achieve good fit and parsimony, models were run iteratively omitting items from analyses. RMSEA is a functional Chi-square test that favors model parsimony (Garson, 2009; Muthén & Muthén, 2007). Therefore, the item that improved the model's RMSEA maximally when removed was trimmed from the model (Bollen, 1989) if it was consistent with theoretical consideration to do so (DeVellis, 2003). This follows the recommended procedure of first testing the model proposed by exploratory analysis or theory, then testing more parsimonious models as comparisons (Garson, 2009).

Next, another CFA was run on the third subsample. This additional CFA is recommended because statistical modifications of the factor model can be unique to the sample on which the statistics are performed, and therefore, the structure should be tested on

a separate sample. The same criteria used in the initial CFA were used in the second CFA. In addition, the change in Chi-square values ( $\Delta\chi^2$ ) and degrees of freedom ( $\Delta df$ ) were evaluated to determine whether the model significantly worsened when parameters were sequentially constrained. Muthén and Muthén (2007), in a procedure similar to the process recommended by Mulaik and Millsap (2000), recommend: (1) fitting the model separately in each subsample, (2) fitting the model in the subsamples combined, and (3) sequentially constraining parameters to be equal to assess the model for invariance. First, the model was fit separately in each subsample to establish that it is possible for the same structure to exist in both subsamples. Second, the model was fit in a single sample CFA using both subsamples combined to ensure that the data fit when all parameters are free. Third, a multiple group CFA for both subsamples with no measurement invariance was performed. This forces all parameters, notably the factor loadings and intercepts, to be different. It provides a baseline from which we can test if there is measurement or population invariance in factor loadings or intercepts. Invariance indicates that in the different subsamples, neither factor loadings nor intercepts are significantly different, which provides confirmation that the structure identified in the second subsample is replicated in the third subsample, and is therefore not statistically unique to the second subsample. After establishing the baseline, a multiple group CFA with measurement invariance of factor loadings was performed. This constrains factor loadings to be equal. The change between these results and the baseline model (with no invariance) was evaluated for significance, with the critical value of 3.84 applied. If the ratio of  $\Delta\chi^2/\Delta df$  is less than 3.84, then the model did not significantly worsen when factor loadings were constrained to be equal and thus, factor loadings have invariance. After establishing the baseline and that factor loadings have invariance, a multiple group

CFA with measurement invariance of factor loadings and intercepts was performed. This constrains both factor loadings and intercepts to be equal in both subsamples. Conceptually, intercepts represent the mean scores on the items and factors. Again, if the  $\Delta\chi^2/\Delta df$  ratio is less than 3.84, the model did not significantly worsen when factor loadings and intercepts were constrained to be equal and thus, factor loadings and intercepts have invariance.

Following completion of all factor analyses, the religiousness variables were evaluated for internal consistency, measured by Cronbach's alpha. Cronbach's alpha is a specialized form of split-half reliability that provides an average of all possible split halves (Devellis, 1991). Evidence of construct validity was evaluated by correlations among religiousness subscales and established scales in the initial item pool that were not retained in the final scale. Evidence of divergent validity was assessed by evaluating correlations among the religiousness subscales and measures of personality and perfectionism included in the larger study.

Associations among the religiousness variables and eating disorder diagnostic status variables were also evaluated. Binary logistic regressions were conducted with one criterion variable and one predictor variable in each analysis. The criterion variable was one of the six eating disorder diagnoses assessed (AN narrow, AN broad, BN narrow, BN broad, BED narrow, BED broad), and the predictor variable was one of the religiousness variables. Binary logistic regressions determine whether the predictor variable adds significant predictive power to group membership in the criterion variable.

Associations among the religiousness variables and continuous eating disorder variables were also evaluated in the overall sample. These results should indicate whether religiousness is associated with eating disorder symptomatology generally. Associations of

religiousness and continuous variables assessed were also evaluated within the subset of participants meeting criteria for an eating disorder diagnoses.

## Results

### Data Cleaning

The initial data set included 1510 participants. Before performing an exploratory factor analysis of religiousness variables, descriptive statistics for individual items and participants were reviewed to ensure that the data met assumptions for the analysis. Participants endorsed all religiousness variables along the full range of possible responses for the variables. A review of each item's skewness and kurtosis indicated that all had adequate variance to be included in the factor analysis. The skewness and kurtosis values of most items were close to or below a value of 1, indicating that they were approximately normally distributed. Using the critical value for normality as described above, all items were included in the analysis.

### Subsample 1: Exploratory Factor Analysis

Participants ( $n = 780$ ) from the original sample ( $N = 1478$ ) were randomly selected using a random number generator in Microsoft Excel to comprise the first subsample. The Kaiser-Meyer-Olkin measure of sampling adequacy (.97) and Bartlett's test of sphericity ( $\chi^2(3003) = 40483.46, p < .001$ ) indicated that variance in the subsample was sufficient to perform a factor analysis.

To determine the number of factors that best describe the data, Eigenvalues were examined. The scree test (Cattell, 1966, as cited by Devellis, 2003) suggested a one- or two-factor model. To examine how the factors would load parsimoniously, reanalysis was done

constraining extraction to two factors, following the procedure recommended when scree test results are ambiguous (Tabachnick & Fidell, 2007). Items loaded onto both factors, suggesting that the two-factor model could provide a good fit for the data. The two-factor model explained 41.88% of item variance.

Next, item loadings onto the factors were examined. Nine items loaded onto the first factor, and six items loaded onto the second factor using the criteria of being greater than .55 with no cross loading greater than .35. Because items loaded onto both factors, a two-factor model seemed to support a better scale. Sixty-three items were eliminated because they did not meet inclusion criteria. A subsequent EFA was performed on the remaining fifteen items, and the same criteria were applied. Five additional items were eliminated because they did not meet inclusion criteria when considering only the 15 items. Another EFA was performed on the remaining ten items, and the same criteria were applied. All items met inclusion criteria, resulting in a ten-item scale accounting for 70.24% of variance in scores. The 10 items in this scale and their loadings (on the primary factor for each item) are presented in Table 2.

### **Subsample 2: Confirmatory Factor Analysis**

Participants ( $n = 400$ ) were randomly selected from the remaining pool to perform a CFA. The ten items identified as best fitting the two-factor structure identified in the EFA conducted with subsample 1, were included in the CFA. The Kaiser-Meyer-Olkin measure of sampling adequacy (.91) and Bartlett's test of sphericity,  $\chi^2(45) = 2485.88, p < .001$ , indicated that variance in this subsample was adequate to perform a factor analysis. The Chi-square ( $\chi^2$ ) test of model fit was significant,  $\chi^2(34) = 122.25, p < .001$ . However, the ratio of  $\chi^2$  to degrees of freedom was 3.60. This is less than the recommended

Table 2

*Factor Loadings for Final Items*

Item	Factor	Factor Loadings		
		EFA: Sample 1 <sup>a</sup>	CFA: Sample 2 <sup>a</sup>	CFA: Sample 3 <sup>b</sup>
I believe in God.	Belief	0.69	0.65	0.71
I know that God loves me just as I am.	Belief	0.75	-	-
I believe that God often responds to the individual prayers of men and women.	Belief	0.80	0.89	0.88
No matter what I do, I know that God will always love me.	Belief	0.69	0.66	0.70
I believe that God is very interested in the day-to-day lives of men and women.	Belief	0.74	0.86	0.88
I feel surrounded by God's love every day.	Belief	0.70	0.82	0.78
I go to Sunday school often.	Attendance	0.83	0.86	0.87
Most of my best friends go to church.	Attendance	0.66	-	-
I often attend church activities such as Bible study and choir practice.	Attendance	0.84	0.85	0.85
How often in the last year did you attend religious services?	Attendance	0.81	0.86	0.91

*Note.* EFA = exploratory factor analysis; CFA = confirmatory factor analysis.

<sup>a</sup>Ten items entered simultaneously, factored into two factors. No cross loadings of > .35 were permitted. Only loadings on each item's primary factor are reported. <sup>b</sup>Eight items entered simultaneously, as before.



value of 3.84 (Muthén & Muthén, 2007), indicating that the model is an acceptable fit for the data. The comparative fit index, an additional measure of model fit, also indicated good fit (CFI = .97). However, the root mean squared error of approximation (RMSEA) indicated a fair fit (RMSEA = .08, CI = .07 to .10). Cronbach's alpha, a measure of internal consistency, was .89.

To achieve good fit and parsimony, models were run iteratively omitting items from analyses. When one item ("I know that God loves me just as I am") was omitted, the RMSEA decreased to .05, indicating a good fit. For this model, the Chi-square statistic was again significant,  $\chi^2(26) = 51.88, p < .01$ . However, the ratio of Chi-square to degrees of freedom was 2.00, indicating acceptable fit. Additionally, the CFI was .99, also indicating good fit. When this item was eliminated, Cronbach's alpha still indicated that the scale scores had high estimated internal consistency (.88). Additional evidence justifying deleting this item comes from the modification indices. They indicated that the overall fit of the model would improve if this item were dropped because this item had high correlations with three of the four other items on this factor.

Models were again iteratively run with additional omissions. When one additional item ("Most of my best friends go to church") was omitted, the RMSEA improved (.04, CI = .00 to .06). For this model, the Chi-square value was marginal,  $\chi^2(19) = 29.29, p = .06$ . Additionally, the CFI was .995, also indicating good fit. With this item eliminated, Cronbach's alpha still indicated that the scale scores had high estimated internal consistency (.87). Additionally, the modification indices indicated that model fit would improve if this item were deleted because it cross-loaded with the other factor (modification index = 11.43) and was highly correlated with another item on its factor (modification index = 6.25).

Models were again iteratively run with additional omissions. When one item (“I believe in God”) was omitted, the RMSEA improved (.03). However, omitting this item would change the conceptual interpretation of this factor, and so this item was retained in the scale. The factors and their loadings are presented in Table 2.

### **Subsample 3: Confirmatory Factor Analysis Replication**

The remaining participants were included in a replication of the previous CFA conducted with the second subsample. As outlined in the Statistical Analysis section, the model was evaluated for invariance by performing a sequence of CFAs, following several authors’ recommendations (Mulaik & Millsap, 2000; Muthén & Muthén, 2007).

First, a single group CFA of the two-factor, eight-item model was performed on the third subsample ( $n = 298$ ). The Chi-square ( $\chi^2$ ) test of model fit was significant,  $\chi^2(19) = 39.44, p < .01$ . However, the ratio of  $\chi^2$  to degrees of freedom was 2.08. Other fit indices also indicated adequate fit (CFI = .99, RMSEA = .06, CI .03 to .09).

A single group CFA of the same model was then performed on the second and third subsamples combined ( $n = 698$ ). The Chi-square ( $\chi^2$ ) statistic was significant,  $\chi^2(19) = 47.27, p < .01$ . However, the ratio of  $\chi^2$  to degrees of freedom was 2.49. Other fit indices also indicated adequate fit (CFI = .99, RMSEA = .05, CI .03 to .06).

To establish a baseline model, a multiple group CFA for subsamples two and three with no measurement invariance was performed. Chi-square ( $\chi^2$ ) was 68.72, with 38 degrees of freedom ( $df$ ).

Based on these results, a multiple group CFA with measurement invariance of factor loadings was performed. Chi-square ( $\chi^2$ ) was 76.55, with 44 degrees of freedom ( $df$ ). The difference between these statistics in this model compared to the baseline model with no

invariance was  $\Delta\chi^2 = 7.83$ ,  $\Delta df = 6$ , for a ratio of  $\Delta\chi^2/\Delta df = 1.30$ . Because this is below the recommended 3.84, this result suggests that the fit of the model did not significantly worsen when factor loadings were constrained to be equal and factor loadings have invariance. This provides evidence that the factor structure identified in subsample two was replicated in subsample three.

Finally, a multiple group CFA with measurement invariance of factor loadings and intercepts was performed. Chi-square ( $\chi^2$ ) was 80.12, with 50 degrees of freedom ( $df$ ). The difference between these statistics in this model compared to the baseline model (which specified no invariance) was  $\Delta\chi^2 = 7.83$ ,  $\Delta df = 6$ , for a ratio of  $\Delta\chi^2/\Delta df = .60$ . Because this is below the recommended 3.84, this result suggests that the fit of the model did not significantly worsen when factor loadings and intercepts were constrained to be equal. This indicates that the model structure, including factor loadings and intercepts, from subsample two is replicated in subsample three.

### **Factor Interpretation and Internal Consistency**

Eight of the initial 78 items were retained after exploratory and confirmatory factor analyses on subsamples of participants (see Table 2). These items form the Religious Attendance and Belief (Rel-AB) Scale, which includes two subscales: the five-item Belief subscale, a measure of internal religiousness indicating belief in a personal God who is loving and accepting, and a three-item Attendance subscale, a measure of external religiousness indicating participation in different aspects of religion. Items belonging to each of these subscales are shown in Table 2.

Cronbach's alphas for the Rel-AB Scale and subscales were .87 for the full scale, .87 for the Belief subscale, and .87 for the Attendance subscale. The Pearson correlation between the two subscales was .52 ( $p < .01$ )

### **Evidence of Scale Validity**

To provide evidence for the validity of the Religious Attendance and Belief (Rel-AB) Scale, the Belief and Attendance subscales were compared to previously established scales embedded in the original religiousness item pool that did not have any item overlap with the final items for the Rel-AB Scale. A tabulation of the results supporting both convergent and divergent validity is shown in Table 3. Because the Belief subscale included items hypothesized to measure the putative latent variable of internal religiousness, correlations with the Daily Spiritual Experiences subscale and the Religious Coping subscale of the Multidimensional Measure of Religiosity/Spirituality (Abeles et al., 1999) were evaluated for evidence of convergent validity. One subscale in the initial 78-item pool evaluated external religiousness: the social support subscale of the Religious Attitudes and Practices Inventory (D'Onofrio et al., 1999). The Attendance subscale included both attendance-specific items from that subscale, along with the broader attendance question "How often in the last year did you attend religious services?" (Kendler et al., 2003). Because of the overlap between these scales, two of the remaining items on the social support scale were evaluated for theoretical similarity to the Attendance items. Although most items on the social support subscale focused on emotional or lifestyle aspects of religious social support, two items were about emotions related to attendance more than to support more generally: "I like to worship and pray with others," and "Being with other people who share my religious views is

Table 3

*Correlations among Religiousness Variables and Validity Scales*

Item	Religiousness	
	Belief	Attendance
Convergent Validity		
Daily Spiritual Experiences	.71 ***	
Religious Coping	.68 ***	
God as Love	.66 ***	
“I like to worship and pray with others.”		.77 ***
“Being with other people who share my religious views is important to me.”		.67 ***
Divergent Validity: Perfectionism		
Personal Standards	-.03	-.01
Doubts about Action	.03	.01
Concern over Mistakes	.06 *	.01
Divergent Validity: Personality		
Neuroticism	<.01	-.01
Extraversion	-.04	.01
Novelty Seeking	-.02	-.02

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

important to me.” The following paragraphs review psychometric properties for these subscales.

**Multidimensional Measurement of Religiosity/Spirituality.** Two subscales from the Multidimensional Measurement of Religiosity/Spirituality (Abeles et al., 1999) provided evidence supporting convergent validity for the scale developed as part of this study: the Religious Coping and Daily Spiritual Experiences subscales. The Multidimensional Measurement of Religiosity/Spirituality was developed specifically for use within health psychology, to address aspects of religiousness that might have a benefit to patients’ health (Abeles et al., 1999). The scale was included in the General Social Survey, a large national survey intended to gather information on various attitude and behavior trends in American society. The Daily Spiritual Experiences subscale included six items designed to measure an individual’s perception of God involved in his daily life, with an emphasis on experiences instead of cognition. Participants responded to each statement on a six-category rating scale of *many times a day to never or almost never*. A full list of these items is included in Appendix C. The estimated internal consistency for this domain was .91 (Abeles et al., 1999). The Religious/Spiritual Coping subscale included seven items assessing positive and negative religious coping. Positive religious coping reflected a benevolent worldview particularly as it related to life stressors, and negative religious coping reflected religious struggle. Items for this subscale were evaluated on a four-category rating scale of *a great deal to not at all*. Estimated internal consistency for this subscale was estimated for positive and negative coping separately (Cronbach’s alpha = .81 and .54, respectively; Abeles et al., 1999).

**Religious Attitudes and Practices Inventory.** Two items from the Social Support subscale (also called the Peer Religiousness subscale) of the Religious Attitudes and Practices Inventory were used to evaluate convergent validity of the scale developed in this study. The scale was developed among children and adolescents participating in a twin study, to create a multidimensional measure of religiousness that relevant to health psychology. Twelve items from this scale were included in the current study: seven from the Social Support subscale, three about religious views on drug use, and two assessing theism.

**Convergent validity results.** Results indicated that the Belief subscale was significantly correlated with both the Daily Spiritual Experiences ( $r = .71, p < .001$ ) and the Religious Coping ( $r = .68, p < .001$ ) subscales. The correlation between the God as Love subscale and the Belief subscale was also evaluated, with the one overlapping item removed from the Belief subscale ( $r = .66, p < .001$ ). All of these correlations were large, providing strong evidence that the Belief subscale is measuring internal religiousness.

Of the scales included in the original religiousness item pool, no scale was conceptually similar to the Attendance subscale that did not overlap with items included on the Attendance subscale. However, there were two items from the Religious Social Support subscale of the Religious Attitudes and Practices Inventory (D'Onofrio et al., 1999) appeared to assess individuals' motivation to attend religious activities. These items were: "I like to worship and pray with others," and "Being with other people who share my religious views is important to me." Correlations of these items with the Attendance subscale were evaluated and were found to be strongly association ( $r = .77, p < .001$  and  $r = .67, p < .001$ , respectively).

**Divergent validity results.** Correlations with three subscales of Frost's Multidimensional Scale of Perfectionism (Personal Standards, Concern over Mistakes, and Doubts about Action; Frost et al., 1993; Frost et al., 1990; Tozzi et al., 2004) were evaluated to provide evidence of divergent validity. The Personal Standards and Doubts about Action subscale correlations with the Belief subscales were both nonsignificant ( $r = -.03, p = .34$  and  $r = .03, p = .33$ , respectively). The Concern over Mistakes subscale was significantly correlated with the Belief subscale, but its absolute value was very small ( $r = .06, p = .03$ ). Correlations between Personal Standards, Concern over Mistakes, and Doubts about Action subscales with the Attendance subscale were all nonsignificant ( $r = -.01, p = .80$ ;  $r = .01, p = .61$ , and  $r = .01, p = .72$ , respectively). This provides evidence of divergent validity such that the latent variable measured by the Religiousness subscales of Belief and Attendance were not related to perfectionism.

In addition, three personality scales were used to provide further evidence of divergent validity. Correlations between the Neuroticism and Extraversion subscales of the Eysenck Personality Questionnaire and the Belief ( $r = <.01, p = .92$  and  $r = -.04, p = .17$ , respectively) and Attendance ( $r = -.01, p = .80$  and  $r = .01, p = .72$ , respectively) subscales were nonsignificant. Correlations between the Novelty Seeking subscale of the Tridimensional Personality Questionnaire and the Belief and Attendance subscales ( $r = -.02, p = .54$  and  $r = -.02, p = .44$ , respectively) were also nonsignificant.

### **Demographics**

Correlations between demographic variables and the religiousness variables were evaluated to better describe the variables (see Table 4). Belief was significantly positively associated with education,  $r = .11, p < .001$ , significantly negatively associated with



Table 4

*Descriptive Statistics*

Variable	<i>n</i>	<i>M</i>	<i>SD</i>
Demographics			
Age (years)	1510	42.50	8.16
Education (years)	1508	13.90	2.16
Number of Children	1117	1.86	1.01
Disordered Eating			
Body Dissatisfaction	1474	37.39	10.68
Drive for Thinness	1454	20.69	7.48
Restraint	1077	27.21	5.13
Disinhibited Eating	1067	25.12	6.77
Hunger	1076	19.11	5.58
Religiousness			
Attendance	1461	3.00	1.21
Belief	1463	1.64	0.71
Personality			
Neuroticism	1411	2.99	2.86
Extraversion	1411	5.34	2.40
Novelty Seeking	1225	7.25	3.46
Perfectionism			
Personal Standards	1464	12.06	3.76
Concern over Mistakes	1463	8.75	4.19
Doubts about Actions	1472	7.16	3.38

participants' age,  $r = -.09$ ,  $p = .001$ , and number of children,  $r = -.19$ ,  $p < .001$ . Attendance was not associated with education,  $r = -.03$ ,  $p = .29$ , but was significantly negatively associated with participants' age,  $r = -.09$ ,  $p = .001$ , and number of children,  $r = -.23$ ,  $p < .001$ .

### **Diagnostic Status and Religiousness**

To test the hypothesis that religiousness would be associated with eating disorder diagnosis status, binary logistic regressions were evaluated for each of the eating disorder diagnoses (AN Broad, AN Narrow, BN Broad, BN Narrow, BED Broad, BED Narrow) with the religiousness subscales as individual predictor variables. Cases with missing data were excluded from analyses. Frequencies of women meeting criteria for each diagnosis are presented in Table 5.

The first analyses evaluated the association between religiousness subscale scores, as predictor variables, and diagnostic status narrowly defined for anorexia nervosa (AN narrow) and diagnostic status broadly defined for anorexia nervosa (AN broad). Cases with data on diagnostic status and religiousness subscale scores were included in the analysis. Results showed that cases were overclassified into the largest group, no diagnosis, and Religious Belief did not significantly improve classification of AN narrow or AN broad compared to the baseline model of prediction of all cases as having membership in the larger group,  $n = 377$ ,  $\chi^2(1) = .00$ ,  $p = .99$ , for AN narrow; and  $n = 409$ ,  $\chi^2(1) = .78$ ,  $p = .38$ , for AN broad. Likewise, Religious Attendance also did not significantly improve classification of AN narrow or AN broad compared to the baseline model,  $n = 382$ ,  $\chi^2(1) = 1.01$ ,  $p = .32$ , for AN narrow; and  $n = 413$ ,  $\chi^2(1) = .18$ ,  $p = .67$ , for AN broad.

Table 5

*Frequencies of Diagnoses*

Eating Disorder Diagnosis	<i>n</i>	Overall %
Anorexia Nervosa		
Narrowly Defined	6	0.4%
Broadly Defined	51	3.4%
Bulimia Nervosa		
Narrowly Defined	38	2.5%
Broadly Defined	118	7.8%
Binge Eating Disorder		
Narrowly Defined	43	2.8%
Broadly Defined	61	4.0%

The associations between religiousness subscale scores and diagnostic status narrowly defined for bulimia nervosa (BN narrow) and diagnostic status broadly defined for bulimia nervosa (BN broad) were also evaluated. Cases with data on both diagnostic status and religiousness subscale scores were included in the analysis. Results showed that cases were overclassified into the largest group, no diagnosis, and Religious Belief did not significantly improve classification of BN narrow compared to the baseline model of classification of all cases as having membership in the larger group,  $n = 271$ ,  $\chi^2(1) = .10$ ,  $p = .75$ . However, there was a trend such that Belief improved classification of BN broad compared to the baseline model,  $n = 271$ ,  $\chi^2(1) = 2.72$ ,  $p = .10$ . Religious Attendance did not significantly improve classification of BN narrow or BN broad compared to the baseline model,  $n = 275$ ,  $\chi^2(1) = .42$ ,  $p = .52$ , for BN narrow; and  $n = 275$ ,  $\chi^2(1) = .02$ ,  $p = .89$  for BN broad.

The religiousness subscale scores and diagnostic status narrowly defined for binge eating disorder (BED narrow) and diagnostic status broadly defined for binge eating disorder (BED broad) were similarly evaluated for significant associations. Cases with data on both diagnostic status and religiousness subscale scores were included in the analysis. Results showed that cases were overclassified into the largest group, no diagnosis, and Religious Belief did not significantly improve classification of BED narrow or BED broad compared to the baseline model which classified all cases as having membership in the larger group,  $n = 258$ ,  $\chi^2(1) = .11$ ,  $p = .74$ , for BED narrow; and  $n = 267$ ,  $\chi^2(1) = 1.46$ ,  $p = .23$ , for BED broad. Likewise, Religious Attendance did not significantly improve classification of BED narrow or BED broad compared to the baseline model,  $n = 261$ ,  $\chi^2(1) = .54$ ,  $p = .46$ , for BED narrow; and  $n = 265$ ,  $\chi^2(1) = .07$ ,  $p = .79$ , for BED broad.

Because twin data is by nature correlated, post hoc analyses were run using Mplus 4.1 to assess whether clustering data by family would influence the results. Religious Belief was still not a significant contributor to classification of AN narrow ( $p = .99$ ), AN broad ( $p = .31$ ), BN narrow ( $p = .64$ ), BED narrow ( $p = .86$ ), or BED broad ( $p = .28$ ). However, the significance levels for BN narrow improved marginally, and there was a trend of Belief significantly improving the classification of individuals into BN narrow diagnostic categories (odds ratio = 1.35,  $p = .08$ ). Similarly, Religious Attendance was still not a significant contributor to the classification of any of the diagnostic categories: AN narrow ( $p = .37$ ), AN broad ( $p = .63$ ), BN narrow ( $p = .51$ ), BN broad ( $p = .75$ ), BED narrow ( $p = .44$ ), or BED broad ( $p = .81$ ).

### **Associations between Eating Disorder Symptomatology and Religiousness**

To test the hypothesis that eating disorder symptomatology would be associated with religiousness, regressions were evaluated for each of the continuous eating disorder variables (EDI-BD, EDI-DT, TFEQ-R, TFEQ-D, TFEQ-H) with the religiousness subscale scores in separate analyses. These were evaluated using all cases in the sample that did not have missing data or violate assumptions of normality. No variables were skewed or kurtotic after the critical value of 3.29 was applied (Tabachnick & Fidell, 2007). One case was excluded from the regression with TFEQ-R as the dependent variable because it was a univariate outlier on the TFEQ-R variable, with a score greater than 42.61 ( $M = 27.21$ ,  $SD = 5.13$ ), three standard deviations above the mean. Seven cases were excluded from the regression with TFEQ-D as the dependent variable because they were univariate outliers on the TFEQ-D scale, with scores greater than 45.42 ( $M = 25.12$ ,  $SD = 6.77$ ). Twelve cases were excluded

from the regression with TFEQ-H as the dependent variable because they were univariate outliers on the TFEQ-H scale, with scores greater than 35.84 ( $M = 19.11$ ,  $SD = 5.57$ ).

Standard regressions were performed between eating disorder symptomatology subscales and the Religious Belief and Attendance independent variables. In the first regression, Religious Belief was not associated with EDI-BD in the overall sample,  $F(1,1432) = 1.10$ ,  $p = .30$ . Likewise, in the next regression, Attendance was not associated with EDI-BD,  $F(1,1429) = .19$ ,  $p = .67$ . Neither Belief nor Attendance were associated with EDI-DT,  $F(1,1412) = .71$ ,  $p = .40$ , and  $F(1,1413) = .23$ ,  $p = .63$ , respectively. Neither Belief nor Attendance were associated with TFEQ-R  $F(1,1049) = .36$ ,  $p = .55$ , and  $F(1,1053) = .51$ ,  $p = .48$ , respectively. Neither Belief nor Attendance were associated with TFEQ-D,  $F(1,1036) = .61$ ,  $p = .44$ , and  $F(1,1039) = .16$ ,  $p = .69$ , respectively. Neither Belief nor Attendance were associated with TFEQ-H,  $F(1,1035) = 2.27$ ,  $p = .13$ , and  $F(1,1030) = .02$ ,  $p = .89$ , respectively.

### **Associations among Individuals Meeting Eating Disorder Diagnostic Criteria**

To evaluate the hypothesis that religiousness was associated with eating disorder symptomatology in individuals who meet criteria for eating disorder diagnoses, regressions were evaluated in subsamples of participants who met criteria for AN broad, BN narrow, BN broad, BED narrow, and BED broad. A summary of regression results is shown in Table 6. Regressions within AN narrow were not evaluated because only five participants met criteria for this diagnosis. All means and standard deviations for eating disorder symptomatology and religiousness variables within diagnoses are presented in Table 7. Variable assumptions of normality were all met: within all diagnoses, no variables were skewed or kurtotic. There were four univariate outliers. One case was excluded from the analysis of EDI-BD within

Table 6

*Summary of Regressions Results within Diagnoses*

Eating Disorder Diagnosis	Body Dissat.		Drive for Thinness		Restraint		Disinhibited Eating		Hunger	
	<i>F</i>	<i>p</i>	<i>F</i>	<i>p</i>	<i>F</i>	<i>p</i>	<i>F</i>	<i>p</i>	<i>F</i>	<i>p</i>
Overall Sample										
Attendance	0.19	0.67	0.23	0.63	0.51	0.48	0.16	0.69	0.02	0.89
Belief	1.10	0.30	0.71	0.40	0.36	0.55	0.61	0.44	2.27	0.13
Anorexia Nervosa, Broad										
Attendance	3.35	0.40#	0.66	0.42	0.19	0.67	0.84	0.36	0.22	0.65
Belief	0.45	0.50	0.00	0.98	0.34	0.57	<b>2.92</b>	<b>0.04#</b>	0.68	0.42
Bulimia Nervosa, Narrow										
Attendance	0.00	1.00	0.00	0.95	0.22	0.64	0.03	0.86	0.60	0.44
Belief	0.57	0.45	1.22	0.28	0.98	0.33	2.18	0.15	3.38	0.19#
Bulimia Nervosa, Broad										
Attendance	1.63	0.21	1.00	0.32	0.00	1.00	0.00	0.99	0.13	0.72
Belief	<b>5.03</b>	<b>0.02#</b>	<b>3.45</b>	<b>0.02#</b>	0.79	0.38	2.92	0.15	<b>4.58</b>	<b>0.05#</b>
Binge Eating Disorder, Narrow										
Attendance	0.00	0.98	0.18	0.67	0.14	0.71	0.74	0.40	1.64	0.21
Belief	1.23	0.27	0.34	0.36	1.33	0.26	0.70	0.41	2.67	0.11
Binge Eating Disorder, Broad										
Attendance	0.14	0.71	0.16	0.69	0.18	0.67	0.00	0.98	0.03	0.86
Belief	0.85	0.36	0.22	0.64	0.28	0.60	2.23	0.14	<b>6.13</b>	<b>0.03#</b>

Note. Number signs denote p-values after controlling for correlated nature of twin data.

Table 7

*Means and Standard Deviations for Religiousness and Measures of Disordered Eating by Diagnosis for Eating Disorders Broadly and Narrowly Defined*

Eating Disorder Diagnosis	Religious Belief		Religious Attendance		Body Dissat.		Drive for Thinness		Restraint		Disinhibited Eating		Hunger		
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	
<b>Anorexia Nervosa</b>															
Narrowly Defined	1.63	0.56	3.61	1.24	42.67	3.83	29.67	8.45	30.17	5.85	30.4	11.28	22.17	7.14	
Broadly Defined	1.7	0.68	3.18	1.15	39.84	8.81	26.63	7.73	29.63	6.16	26.41	7.27	19.58	4.72	
<b>Bulimia Nervosa</b>															
Narrowly Defined	1.76	0.88	3.36	1.19	46.24	8.54	32.11	6.74	30.18	5.07	34.97	7.83	26.48	7.29	
Broadly Defined	1.79	0.85	3.27	1.18	44.89	9.33	28.35	7.48	28.8	5.86	32.1	7.43	23.54	6.61	
<b>Binge Eating Disorder</b>															
Narrowly Defined	1.7	0.69	3.36	1.16	45.26	9.55	29.88	7.79	29.24	5.63	34.26	8.04	25.68	6.45	
Broadly Defined	1.62	0.65	3.28	1.14	45.51	9.31	29.32	7.45	28.53	5.54	34.72	7.58	25.79	6.91	



BN narrow because it was less than 20.62 ( $M = 46.24$ ,  $SD = 8.54$ ). One case was excluded from the analysis of TFEQ-H within BN broad because it was greater than 43.36 ( $M = 23.54$ ,  $SD = 6.61$ ). One case was excluded from the analysis of EDI-BD within BED narrow because it was less than 16.59 ( $M = 45.26$ ,  $SD = 9.55$ ). One case was excluded from the analysis of EDI-BD within BED broad because it was less than 17.57 ( $M = 45.51$ ,  $SD = 9.31$ ).

First, regressions within AN broad were evaluated. There was a trend such that Belief was associated with TFEQ-D,  $F(1, 36) = 2.92$ ,  $p = .10$ . After controlling for the correlated nature of twin data by clustering, this association became significant ( $p = .04$ ). Belief was not associated with EDI-BD,  $F(1,46) = .45$ ,  $p = .50$ ; EDI-DT,  $F(1,46) = .00$ ,  $p = .98$ ; TFEQ-R,  $F(1, 37) = .34$ ,  $p = .57$ ; or TFEQ-H,  $F(1,37) = .68$ ,  $p = .42$ ). There was a trend such that with AN broad, Attendance was associated with EDI-BD,  $r = .26$ ,  $F(1,47) = 3.35$ ,  $p = .07$ . However, after clustering twin pairs, this trend disappeared ( $p = .40$ ). Attendance was not associated with EDI-DT,  $F(1,47) = .66$ ,  $p = .42$ ; TFEQ-R,  $F(1,38) = .19$ ,  $p = .67$ ; TFEQ-D,  $F(1,37) = .84$ ,  $p = .36$ ; or TFEQ-H,  $F(1,38) = .22$ ,  $p = .65$ .

Regressions within BN narrow were also evaluated. There was a trend such that Belief was negatively associated with TFEQ-H,  $r = -.32$ ,  $F(1,30) = 3.38$ ,  $p = .08$ . However, this trend disappeared after clustering by family ( $p = .19$ ). Belief was not associated with EDI-BD,  $F(1,35) = .57$ ,  $p = .45$ ; EDI-DT,  $F(1,33) = 1.22$ ,  $p = .28$ ; TFEQ-R,  $F(1,31) = .98$ ,  $p = .33$ ; or TFEQ-D,  $F(1,31) = 2.18$ ,  $p = .15$ . Likewise, Attendance was not associated with EDI-BD,  $F(1,35) = .00$ ,  $p = 1.00$ ; EDI-DT,  $F(1,33) = .00$ ,  $p = .95$ ; TFEQ-R,  $F(1,31) = .22$ ,  $p = .64$ ; TFEQ-D,  $F(1,31) = .03$ ,  $p = .86$ ; or TFEQ-H,  $F(1,30) = .60$ ,  $p = .44$ .

Regressions also evaluated the sample of women meeting broad diagnostic criteria for bulimia nervosa. Belief was significantly negatively associated with EDI-BD,  $r = -.21$ ,  $F(1,112) = 5.03$ ,  $p = .03$ ; and TFEQ-H,  $r = -.21$ ,  $F(1,100) = 4.58$ ,  $p = .04$ . These associations remained significant after controlling for the correlated nature of twin data ( $p = .02$  and  $p = .05$ , respectively). There was a trend such that participants who had higher scores on the Belief variable had lower EDI-DT than participants with lower Belief scores,  $r = -.17$ ,  $F(1,110) = 3.45$ ,  $p = .07$ , which became significant after controlling for family ( $p = .02$ ). There was also a trend where greater Belief were associated with lower TFEQ-D scores,  $r = -.17$ ,  $F(1,99) = 2.92$ ,  $p = .09$ , although this significance did not endure with clustered data ( $p = .15$ ). Belief was not associated with TFEQ-R,  $F(1,98) = .79$ ,  $p = .38$ . Furthermore, participants perception of the discrepancy between their ideal and actual silhouette, another measure of body dissatisfaction, was significantly negatively associated with Belief,  $r = -.20$ ,  $F(1,111) = 4.74$ ,  $p = .03$ . Attendance was not associated with EDI-BD,  $F(1,100) = 1.63$ ,  $p = .21$ ; EDI-DT,  $F(1,99) = 1.00$ ,  $p = .32$ ; TFEQ-R,  $F(1,99) = .00$ ,  $p = 1.00$ ; TFEQ-D,  $F(1,99) = .00$ ,  $p = .99$ ; or TFEQ-H ( $F(1,101) = .13$ ,  $p = .72$ ).

Next, regressions within BED narrow were evaluated. Belief was not associated with EDI-BD,  $F(1,40) = 1.23$ ,  $p = .27$ ; EDI-DT,  $F(1,39) = .34$ ,  $p = .36$ ; TFEQ-R,  $F(1,35) = 1.33$ ,  $p = .26$ ; TFEQ-D,  $F(1,36) = .70$ ,  $p = .41$ ; or TFEQ-H,  $F(1,34) = 2.67$ ,  $p = .11$ . Furthermore, there was a trend such that participants who had higher scores on the Belief variable had higher BMIs than participants who had lower scores on the Belief variable,  $r = .29$ ,  $F(1,41) = 3.76$ ,  $p = .06$ . Attendance was not associated with EDI-BD,  $F(1,40) = .00$ ,  $p = .98$ ; EDI-DT,  $F(1,39) = .18$ ,  $p = .67$ ; TFEQ-R,  $F(1,35) = .14$ ,  $p = .71$ ; TFEQ-D,  $F(1,36) = .74$ ,  $p = .40$ ; or TFEQ-H,  $F(1,34) = 1.64$ ,  $p = .21$ .

Regressions using religiousness variables and variables of eating disorder symptomatology were also evaluated among women meeting broadly defined BED. Belief was significantly negatively associated with TFEQ-H,  $r = -.33$ ,  $F(1,49) = 6.13$ ,  $p = .02$ , which endured after controlling for the correlated nature of twin data ( $p = .03$ ). Belief was not associated with EDI-BD,  $F(1,58) = .85$ ,  $p = .36$ ; EDI-DT,  $F(1,56) = .22$ ,  $p = .64$ ; TFEQ-R,  $F(1,50) = .28$ ,  $p = .60$ ; or TFEQ-D,  $F(1,50) = 2.23$ ,  $p = .14$ . Attendance was not associated with EDI-BD,  $F(1,58) = .14$ ,  $p = .71$ ; EDI-DT,  $F(1,56) = .16$ ,  $p = .69$ ; TFEQ-R,  $F(1,50) = .18$ ,  $p = .67$ ; TFEQ-D,  $F(1,50) = .00$ ,  $p = .98$ ; or TFEQ-H,  $F(1,49) = .03$ ,  $p = .86$ .

## **Discussion**

The exact cause of eating disorders and their subthreshold forms remains somewhat unclear, although most researchers agree that biological, psychological, and social factors likely play important roles in their etiology (Morris & Twaddle, 2007). There are large gaps in the literature concerning the relationship between religiousness, a psychosocial factor with some biological influences that is often imprecisely measured (Vance, 2008), and eating disorders (Hill & Pargament, 2003). The current study contributed to bridging this gap in two ways: (1) it developed a measure of Religious Attendance and Belief and examined its psychometric properties, and (2) it evaluated associations among the Belief and Attendance subscales, eating disorder diagnostic status, and eating disorder symptomatology in a population-based sample of women. Belief and Attendance were not related to eating disorders in the overall sample, but individuals diagnosed with broadly defined bulimia nervosa who had greater belief in a personal and loving God reported less eating disorder symptomatology across a variety of subscales compared with individuals with less belief in a personal and loving God.

### **Religious Attendance and Belief Scale**

The original hypotheses for this study fell into two categories: hypotheses about dimensions of religiousness, and hypotheses about how those dimensions would relate to eating disorder diagnoses and disordered eating attitudes and behaviors. Although many of the ways in which researchers choose to measure religiousness use one- or two-items (e.g.,

Barrett et al., 1997; Boyatzis et al., 2007; Cwikel et al., 2008; Guisado Macías & Vaz Leal, 2003; Jacobs-Pilipski et al., 2005; Latzer et al., 2008; Perkins, 1991; Perkins & Luster, 1999; Pinhas et al., 2008, see also review by Weaver et al., 1998) or a unidimensional scale (e.g., Boyatzis & McConnell, 2006; Graham et al., 1991; Joughin et al., 1992; Marino et al., 2008; Oliver et al., 1999; Sancho et al., 2008), there is a growing desire for religion to be treated as a multi-dimensional construct. Religion has been described as multidimensional previously (Abeles et al., 1999; Kendler et al., 2003; Vance, 2008), which has important potential applications because, theoretically, different forms and aspects of religion can lead to distinct experiences for individuals (Kendler et al., 2003; Vance, 2008). Furthermore, Gorsuch (1984) argued that single item assessment is inadequate for advancing methodology for measuring religion, although this is currently the most widespread practice and has some evidence of predictive validity (Gorsuch, 1988). Some dimensions of religiousness have been adequately measured, such as Religious Commitment (Worthington et al., 2003), religious motivation (Gorsuch & Veneble, 1983), and religious coping (e.g., Pargament et al., 1998). However, other dimensions have not been measured well, most notably religious attendance, which is typically measured a single item measuring frequency of attending religious services. Specific beliefs have also not been measured, including the beliefs individuals have about God's nature, such as whether God is loving and collaborative.

The current study developed and evaluated a religiousness measure derived from a large pool of items encompassing multiple hypothesized dimensions of religiousness. The developed measure has two subscales that have evidence supporting their internal consistency, structure, and construct validity. These subscales are Belief (in a personal, collaborative and loving God) and Attendance (of events and activities related to religion).

Because there are not similar scales to the Rel-AB scale developed in the current study, the Rel-AB scale could add to other available instruments that assess the multidimensional nature of religiousness.

Exploratory factor analysis (EFA) empirically evaluated individuals' patterns of responses to the items and interpreted the dimensions formed. Development of this measure was consistent with the principle that a good assessment of any construct does not need to include subscales of all potential domains of a theoretically multi-dimensional variable. Rather, a measure can contribute to the body of literature by including parsimonious and therefore practical subscales of dimensions that are psychometrically robust.

It was hypothesized that multiple, psychometrically robust dimensions of religiousness would emerge when patterns of participants' responses were evaluated. Specifically, it was hypothesized that there would be dimensions of religiousness related to beliefs, behaviors, coping, and social support, based on aspects of religiousness that have been studied in previous research (e.g., Abeles et al., 1999; D'Onofrio et al., 1999; Flannelly et al., 2006; Kendler et al., 2003; Park & Folkman, 1997). The two factors that emerged, belief in a personal and loving God (Belief) and attendance at religion-related activities (Attendance), were conceptually similar to religious belief and behaviors, respectively. These factors were also similar to the well-established dimensions of intrinsic and extrinsic religiousness (e.g., D'Onofrio et al., 1999; Forthun et al., 2003), except that the factors in the current study focused more on what an individual believes and what activities she attends, rather than internal and external motivators to be religious.

In the context of existing literature on religiousness, the results of this factor analysis are important because the items from which the scale was developed encompassed many

putative dimensions of religiousness. By allowing exploration of a variety of items drawn from existing scales as well as new items, this study discovered where these participants' responses grouped, which provided information on the potential dimensions of religiousness. These analyses yielded two strong factors of Belief and Attendance, with psychometric evidence for validity and estimated internal consistency. Results provided support that religiousness is not a unidimensional construct. Results also expanded current understanding of attendance beyond frequency of church attendance, as has been measured in the past. Rather, the factor included items about attendance at religious services and other activities such as choir practice, Bible study, and Sunday school. From this factor analysis, it is also important to observe that other factors of religiousness, such as one specific to religious social support or perceptions of negative images of God, did not emerge. Although this could have been a result of conservative statistical choices made to create a parsimonious scale rather than a scale with all potential dimensions included (Kendler et al., 2003), it also seems to indicate that those additional factors might be less robust, at least as measured by the items included in this study.

### **Connecting the Religious Attendance and Belief Scale with Other Constructs**

To evaluate whether the subscale was measuring what it seemed to assess, the Belief subscale was compared to pre-existing scales of theoretically related concepts. The Belief subscale was compared to the Daily Spiritual Experiences subscale of the Multidimensional Measure of Religiosity/Spirituality (Abeles et al., 1999) because the Daily Spiritual Experiences subscale measured the putative latent variable of an individual's internal religious or spiritual experience, and the Belief subscale also had an internal cognitive theme. Individuals who were high on the Belief subscale were also likely to have high scores on the

Daily Spiritual Experiences subscale. The Belief subscale was also compared to the Religious Coping subscale of the same Multidimensional Measure of Religiosity/Spirituality because positive religious beliefs about God, as are reflected on the Belief subscale, have been shown to have positive and protective health effects, and might be a problem-focused method of coping with distress stemming from daily experiences. Individuals high on the Belief subscale were likely to report more religious coping (as measured by the Religious Coping subscale), suggesting that belief in positive aspects of God might factor into this coping mechanism. However, this must be investigated further using a design with more control than a cross-sectional study to establish the nature of the relationship between the two constructs.

The Attendance subscale was also compared with two items from a conceptually similar scale to evaluate whether it measured what it seemed to assess. The Attendance subscale was strongly related to two items from the Social Support subscale of the Religious Attitudes and Practices Inventory: “I like to worship and pray with others,” and “Being with other people who share my religious views is important to me,” (D’Onofrio et al., 1999). More broadly, because social support is related to external religiousness, this suggested that the Attendance subscale might also be measuring a component of external religiousness.

The Belief and Attendance subscales were also compared with conceptually distinct subscales. The comparison subscales were related to perfectionism, Frost et al., 1993; Frost et al., 1990; Tozzi et al., 2004) and personality (Cloninger, 1987; Eysenck & Eysenck, 1975). Because appearing religious can be socially desirable (e.g., Sargalou & Garland, 2004), it is important to know that the construct being measured by the Rel-AB Scale developed in this study was separate from a desire to be perfect, especially because perfectionism can overlap



with religiousness (Heise & Steitz, 1991; Sorotzkin, 1998). Further, previous literature has also shown perfectionism and disordered eating attitudes and behaviors to be related in White women, Franko et al., 2004; Garner et al., 1983; Garner, Olmsted, Polivy, & Garfinkel, 1983), which, if perfectionism were driving either of the religiousness factors, could lead to a misinterpreted result. The small and non-existent relationships among Belief and Attendance and the subscales related to perfectionism suggested that the religiousness subscales were not tapping into the perfectionism construct. Personality traits assessed were not associated with scores on Belief or Attendance, which provided evidence that neuroticism, extraversion, or novelty seeking did not overly influence the religiousness subscales. However, it is possible that any of these factors, particularly perfectionism because of its putative relationship to both religiousness and disordered eating, could mediate the relationship between religiousness and eating disordered symptomatology in the general population or among women meeting criteria for diagnoses. Future research using longitudinal designs should investigate these relations to come closer to an understanding of the etiology and maintenance of eating disorders and their subthreshold forms.

### **Applications for the Religious Attendance and Belief Scale**

Use of the Religious Attendance and Belief (Rel-AB) Scale could be beneficial in evaluating the appropriateness of adding a religious component to a treatment, or assessing religious aspects of how individuals perceive the world. In particular, it could be useful to include when designing interventions for subthreshold forms of bulimia nervosa, as this study provided evidence that belief in a personal and loving God was associated with lower symptom severity in individuals with a BN broad diagnosis. This study did not establish any temporal order between bulimia nervosa and religiousness; thus, it is not known whether

religiousness decreased disordered eating, whether disordered eating decreased religiousness, or whether there was some other factor at work. Thus, if this scale were to inform interventions, more research would be needed on the nature of the relation between religiousness and disordered eating, and the treatment potential for religiousness.

For researchers, this scale has the potential for application beyond investigations related to eating disorders. This scale could be included in studies looking at images of God, because of its contribution of a scale measuring belief in a personal and loving God. Furthermore, any study aiming to evaluate attendance at religious activities could use the Attendance subscale, instead of using psychometrically problematic one- or two-item assessments.

### **Eating Disorders and Religiousness**

Findings from this study extend prior research on the association between religiousness and eating disorders. The premise for comparisons among religiousness and eating disorders comes from published accounts of clinical experience with individuals who reported religion to be salient and important in their treatment of an eating disorder, particularly among those using religious coping in treatment (e.g., Berrett et al., 2007; Jacobs-Pilipski et al., 2005). It has been established that some women with eating disorders perceive a causal relationship between religiousness and eating disordered attitudes and behaviors (Marsden et al., 2007), but this association does not have substantial or consistent empirical support. In addition to measuring religiousness and disordered eating symptomatology in a population-based sample overall, the current study examined religiousness constructs among women meeting criteria for eating disorders from the same sample. The Rel-AB scale, measuring Attendance and Belief (in a personal and loving God)

dimensions of religiousness, showed that these constructs were related to disordered eating and diagnostic status in only a small number of cases. Results showed that among women with broadly defined bulimia nervosa, having higher levels of belief in a personal and loving God was associated with having fewer symptoms of disordered eating (i.e., body dissatisfaction, drive for thinness, predisposition to hunger, and disinhibited eating). This partially confirmed the first hypothesis that the Belief subscale, including items measuring beliefs in positive aspects of God and religion, was negatively related to eating disorder symptomatology. This result is consistent within the larger context of eating disorder psychopathology because guilt and shame affect individuals feel typify bulimia nervosa more than anorexia nervosa or binge eating disorder (Dell & Josephson, 2000; Graham et al., 1991; Marsden et al., 2007; Safer et al., 2009; Sorotzkin, 1998). Feelings of guilt and shame are incongruent with the belief that God is loving and personally involved with the individual. If God were loving and cared about individuals, then belief in that God should diffuse feelings of guilt and shame because God is also involved with individuals' experiences. To support this conclusion further, binge eating was negatively associated with Belief within the group of women who met narrowly defined criteria for anorexia nervosa.

The Belief subscale assessing belief in a personal and loving God would seem to be in direct opposition to guilt and shame. It is possible that the protective mechanism at work is one of cognitive dissonance: having belief in a personal and loving God provides dissonance for these negative emotions, and that uncomfortable state could lead to less intense feelings of guilt and shame, and potentially less pathology (Smith & Petrie, 2008; Stice, Marti, Shaw, & O'Neil, 2008; Stice, Rohde, Gau, & Shaw, 2009). Alternatively,

because this study does not make an assumption about causality, it could be that individuals with less severe pathology are more open to the belief that God is personal and loving.

Results did not show any pattern of association with anorexia nervosa. Anorexia nervosa is often associated with a need to be in control or to have an external force control the individual (Marsden et al., 2007). Thus, it was hypothesized that belief in an omnipotent, benevolent God would be negatively associated with eating disordered symptomatology among women meeting criteria for anorexia nervosa, because an omnipotent, benevolent God would be the locus of control for their lives, and they would therefore not have the same anxiety related to personal control. It is possible that this result was not found because the subscales that emerged from factor analysis of all religious items did not include strong components of control. The Belief subscale described a benevolent God who is personally involved in individuals' lives, but did not address the ability of the same God to intervene effectively in individuals' problems. Statistically, it is also possible that this result was not found because the hypothesis was not evaluated within participants meeting AN narrow diagnostic criteria due to low power.

Nonsignificant results from this study were also meaningful. Religious Belief and Attendance did not predict any eating disorder diagnostic status. Cognitive theory posits that individuals' core beliefs will influence their emotions and behaviors. This leads to the inference that core beliefs related to religion will influence whether individuals develop eating disorders. Therefore, the current study's lack of support for this hypothesis suggests that these religious variables might not have sufficient cognitive influence to cause pathology, and might not be related to the core beliefs that perpetuate the eating disorder cycles in the overall population. This is notable given the number of articles that hypothesize

a strong relationship between religion and eating disorders. Alternatively, some previous research has suggested that religiousness increases in the course of illness. The nonsignificant results of this study imply, because diagnoses are lifetime and not simply current, that individuals with eating disorders might not have had increased religiousness because of their disorder. However, the cross-sectional design of this study does not allow these inferences to become conclusions; future research should address the cognitive influence of religiousness on the etiology and maintenance of eating disorders through experimental manipulation.

### **Contributions to the Literature**

The development of the Religious Attendance and Belief (Rel-AB) Scale contributes to the overall literature on religiousness in several ways. As mentioned previously, the factor analysis provided some evidence as to the underlying dimensionality of religiousness. Furthermore, this measure can contribute to future research assessing attendance by providing a subscale with evidence of validity and good estimated internal consistency. The factor describing participants' belief in a personal and loving God (i.e., the Belief subscale) is noteworthy because it evaluates a view of God that is positive and that values the individual. Overall, this scale is a measure that can be used in future research to address religiousness in individuals, which authors have cited as a limitation in most of psychology's conceptualization of individuals in research and practice (Graham et al., 1991; Hill & Pargament, 2003; Pargament, 2002b).

The results of this study also contribute the body of literature on religion within health psychology. Previously, research has shown that religiousness is associated with positive health benefits (e.g., Forthun et al., 2003; George et al., 2000; Fosarelli, 2008; Miller

& Thoresen, 2003; see also review by McMinn, Hathaway, Woods, & Snow, 2009). Some studies have suggested that religious involvement and social support are the protective mechanisms at work within religiousness (e.g., Institute for the Future, 2000). Other studies have suggested that religiousness is protective because it counters the effects of stress on both physical and mental health (Kendler et al., 1997; Kendler et al., 1999; Schnittker, 2001; Smith et al., 2003). This study contributes to these findings by noting that in the general population, religiousness does not have an overall protective effect on eating disorder diagnoses or symptomatology. However, the finding that religiousness and disordered eating were negatively associated among women meeting criteria for broadly defined bulimia nervosa supports the idea that religiousness might counteract the effects of stress or negative affect. In particular, bulimia nervosa is characterized by pervasive feelings of guilt and shame (Safer et al., 2009), which might be counteracted by belief in a God who is personally concerned with individuals' well-being.

### **Limitations**

In evaluating the results of this study, it is important to consider the limitations that apply to its design and analysis. First, because this is a cross-sectional study, it cannot draw conclusions regarding the causal direction of the constructs. As shown in the literature, some studies have concluded that religiousness triggers eating disorder symptoms (e.g., Dell & Josephson, 2000), while others have found that religiousness increases in the course of the illness (e.g., Joughin et al., 1992). However, because we do not have any data regarding participants' levels of religiousness or eating disorder pathology prior to this study, we cannot draw any conclusions regarding causality or temporal sequence of these variables.

Further research using longitudinal designs and controlling for confounding variables is needed to address these issues.

An additional potential limitation of this study is that all of the measures were self-report and therefore, participants' self-perception might have introduced bias.

Methodologically, the reliance on one form of data, particularly self-report, means that neither objective behavioral observation, nor randomized controlled manipulation, supports the results (Tabachnick & Fidell, 2007). Despite this, performing in-person interviews or behavioral observations would have been impractical given the number of participants whom researchers contacted, and who responded. Fairburn and Beglin (1994) also suggest that because self-report formats are less intrusive for eating disordered attitudes and behaviors, which often have secrecy components, self-report might be more likely to elicit honest responses and provide a better ratio of costs to benefits of participation.

There is also a possible confound regarding treatment-seeking for individuals who meet criteria for a lifetime diagnosis of any eating disorder, and individuals who endorsed eating disorder characteristics. Treatment could affect not only eating disordered behaviors, but also spirituality and religiousness. Furthermore, if participants completed the questionnaire after being treated, they might report having had an eating disorder while reporting current religious beliefs that are dissimilar from their beliefs when the eating disorder was most severe.

Another potential limitation of the current study was the response rate of participants. The modest response rate (36.3%; Kendler et al., 2003) is on par with other studies using religious variables, but might indicate a response bias such that nonresponders could have differed in a significant way from responders (McMinn et al., 2009). Although the overall

size of the sample is a strength of this study, the number of individuals who met narrow or broad diagnostic criteria for eating disorders is a limitation. In particular, only 37 participants met criteria for BN narrow, 42 participants met criteria for BED narrow, and 6 participants met criteria for AN narrow. The population from which participants in this sample were drawn was population-based, not clinical. Therefore, some of the nonsignificant results might have been due to Type II error, and associations among religiousness variables and eating disorder symptomatology should be evaluated in samples with more participants meeting diagnostic criteria. However, sample size is a strength in this study when considering eating disorder attitudes and behavior because those variables were continuous, and represented along the continuum of eating disorder symptomatology that includes nonclinical levels. This is particularly important in the eating disorder field where subthreshold levels of disordered eating are far more common than clinical diagnoses are, Fairburn & Beglin, 1990).

The demographic representativeness of participants in the current study is also a limitation. Participants were white women from Virginia; results cannot generalize to other race groups, ethnicities, cultures, or genders. Nonetheless, research has found the highest base rates of eating disorders in White women and the typical age of onset is adolescence or early adulthood (American Psychiatric Association, 2000) and therefore, using a sample from this population is demographically appropriate. Furthermore, the measure of religiousness used in this study, although it includes internal and external dimensions, does not differentiate between individuals who consider themselves religious but not spiritual, spiritual but not religious, both, or neither. The Rel-AB Scale, and the items initially administered to participants, emphasizes monotheistic religion and Christian religion more



specifically. Many of the questions that were included in the items administered to participants were written to describe Christian beliefs, including items overtly making reference to “church,” “Bible study,” and “choir.” The item pool did not incorporate representations of items outside of Christianity, such as references to multiple gods, reincarnation, or karma, among other possibilities. Results from this study should not be generalized to other forms of religiousness or spirituality besides Christianity. However, despite this emphasis in the scales that limits generalizability, it is also important to note that the current religious distribution in the United States also emphasizes Judeo-Christian orientations (Abeles et al., 1999).

There are also limitations surrounding the development of this measure. Although preliminary evidence of validity and internal consistency was found, this needs to be replicated in an independent sample using only the final questions. This would provide further evidence that the model of the data that emerged from this study is not unique to this sample. This would also show whether participants who see only the eight final scale items respond similarly to when participants respond to the full item pool.

### **Strengths**

It is also important to emphasize this study’s strengths. The most notable strength of this study is that it empirically evaluates the association between religiousness and eating disorders. The measure developed in this study, the Rel-AB Scale, shows evidence of good psychometric properties. The factors that came out of the items initially administered are also consistent with theoretical dimensions of religiousness, despite the potential for multiple other dimensions to emerge.

The way in which eating disorders are evaluated is also a strength of this study. Most existing research evaluates clinical eating disorders or symptomatology. This study uses both types of variables by having variables of whether individuals meet narrowly or broadly defined diagnostic criteria for anorexia nervosa, bulimia nervosa, or binge eating disorder and having continuous variables of body dissatisfaction, drive for thinness, restraint, disinhibited eating, and predisposition to hunger.

### **Future Directions for Research**

There are large gaps in the literature concerning empirical evidence of the association between eating disorder diagnoses and symptomatology and religiousness. This study provides some information on their association, but future research is needed to have a more complete understanding of the cognitive, behavioral and affective processes that occur. The following paragraphs present and discuss some future directions research in this area should explore.

As previously discussed, the eating disorder field needs more information on the causes and risk factors of eating disorders and their subthreshold counterparts. Research with longitudinal designs can inform the true nature of how religiousness, a psychosocial factor that might contribute to the development or maintenance of eating disorders such as bulimia nervosa, is related to eating disordered attitudes and behaviors. In particular, research with several potential mediators (e.g., perfectionism, perceived body image discrepancy, physiological and psychological history factors, sociocultural attitudes toward the thin ideal, social reference groups) would be beneficial because it could address the mechanism through which religiousness might affect individuals' cognitions and affect related to body image and weight concerns.

Another limitation previously discussed was the use of only self-report items in the current study. Future research might benefit from including objective assessments of religiousness, such as coding individuals' participation while attending an activity related to religion. This would provide additional, criterion-related evidence of the scale's validity, as well as ensuring that self-report items did not produce systematic error that obscured the results.

Conceptually, belief in a personal and loving God is a positive faith characteristic with an intrinsic understanding that if God values individuals and is invested in their lives, then individuals must not be worthless. This belief is markedly different from other views of God that describe a world where the individual is insignificant or deserving punishment instead of love. Future research should investigate these alternative images of God and the world with eating disorder diagnoses and symptomatology.

As mentioned previously, one of the limitations in the development of the Rel-AB Scale was that the measures providing evidence of convergent validity were included in the initial pool of religiousness items. Future research should aim to provide independent evidence of the scale's validity by comparing the final scale to measures that were not included in the initial item pool, such as a measure of intrinsic and extrinsic religiousness (e.g., Gorsuch & Veneble, 1983). This would provide further evidence that the model of the data that emerged from this study is not unique to this sample or due to statistical variance rather than measurement of similar constructs. Including only the final items would also show whether participants who see only the eight final scale items respond similarly to when participants respond to the full item pool.

Future research building off the current study would benefit from including other age, racial, ethnic, socioeconomic, and sexuality groups, and men. Many of these groups have different experiences with religiousness than White women, as well as different perceptions of body image and norms related to eating and exercise. Thus, the association between religiousness and eating disorders might be different for these groups. Furthermore, this study focused on religiousness typical to Christian religions, especially Protestant denominations, because of the nature of the items that emerged in the final scale. Future research might benefit from incorporating individuals from different religious traditions to determine if the religiousness subscales are similar in those groups, or whether the association between the religiousness subscales and eating disorder variables are different in those groups. Finally, the participants in the current study were recruited from the general population. Therefore, the number of women meeting criteria for diagnoses, particularly narrowly defined diagnoses, was small. Future research should replicate this study in larger, clinical populations.

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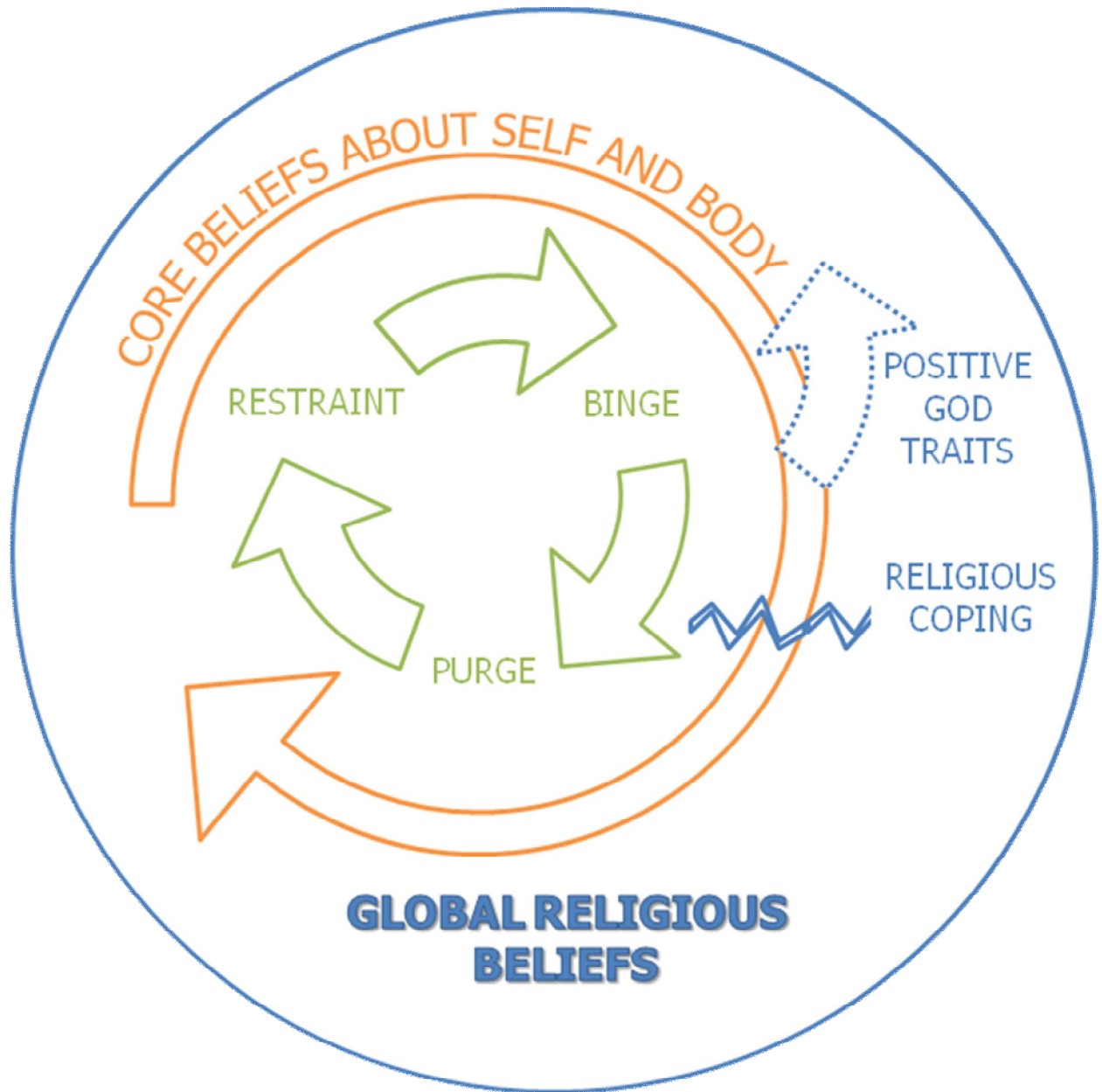
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## **Appendices**

Appendix A

*Theoretical Model of Association between Eating Disorders and Religiousness in Women  
with Disordered Eating*



## Appendix B

**TABLE 3. Diagnostic assessment for eating disorders (Mazzeo et al., 2006, pp. 206-207)**

Questions Used to Assess Diagnostic Criteria	Narrow	Broad
AN Criterion A “Have you ever had a period of time when you weighed much less than other people thought you should?” (Yes or no response options provided) Reported BMI at time of low weight	Endorsed low weight item BMI at that time was $\leq 17.5$	Endorsed low weight item BMI at that time was $\leq 18.5$
AN Criterion B “During the time you were at this low weight, how afraid were you that you might gain weight or become fat?” (Response options ranged from not afraid to extremely afraid).	Very afraid or extremely afraid	Slightly afraid to extremely afraid
AN Criterion C “During the time when you were at this low weight, did you feel fat?” (Response options ranged from not at all to extremely).	Very much or extremely	Slightly to extremely
AN Criterion D “Before this time, had your periods already started?” “If your periods had already started, did they stop? If yes, for how long?”	Primary amenorrhea (no periods and $\geq 16$ years of age) or secondary amenorrhea with a duration of $\geq 3$ months	Amenorrhea not required
BN Criterion A1 “Have you ever had eating binges when you ate what most people would regard as an unusually large amount of food in a short period of time?” (Yes or no response options provided)	Yes	Not used in current study
BN Criterion A2 “When you were having eating binges, did you feel that your eating was out of control?” (Response options ranged from not at all to extremely)	Somewhat to extremely	Not used in current study
BN Criterion B “During your most extreme efforts to control your shape and weight, how often did you: 1. Make yourself vomit? 2. Use laxatives? 3. Use diuretics (water pills)? 4. Use diet pills (over the counter or prescription)? 5. Exercise > 2 hours per day? 6. Fast or not eat, For $\geq 24$ hr)? 7. Use other methods (please indicate)?	“A few days a week” to “every day”	Not used in current study
BN Criterion C “For how long did you have binge eating episodes?” “When you were bingeing the most, how many binges would you have in a month?”	Duration of binge eating $\geq 3$ months $\geq 8$ binges per month	Not used in current study
BN Criterion D Participants rated the importance of weight to their self-evaluation	Endorsed either “Weight or shape is the most important thing that affects how I feel about myself” or “Weight or shape plays a major part in how I feel about myself”	Not used in current study
BED Criterion A Assessed using the same items as Criterion A for BN	Yes to bingeing and “somewhat” to “extremely” out of control during binges	Not used in current study



**TABLE 3. Continued**

Questions Used to Assess Diagnostic Criteria	Narrow	Broad
<b>BED Criterion B</b> Binge characteristics were assessed by asking, "During eating binges did you: 1. Eat much more rapidly than usual? 2. Eat until you felt uncomfortably full? 3. Eat large amounts of food when you didn't feel physically hungry? 4. Eat alone because you were embarrassed by how much you were eating? 5. Feel disgusted with yourself, depressed, or very guilty after overeating?"	Endorsed $\geq 3$ of these binge characteristics	Not used in current study
<b>BED Criterion C</b> "How upset or distressed did binge eating usually make you feel?" (Response options ranged from not at all to extremely)	Very much or extremely	Not used in current study
<b>BED Criterion D</b> "For how long did you have binge eating episodes?" "When you were binging the most, how many binges would you have in a month?"	Duration of binge eating $\geq 6$ months 8 binges per month	Not used in current study
<b>BED Criterion E</b> "Have you ever done or used the following during a time when you were binge eating: made yourself vomit, use laxatives, use diuretics (water pills), exercise > 2 hr per day, fast or not eat, For $\geq 24$ hr), other methods—please indicate"	Do not endorse any compensatory behaviors	Not used in current study

Note AN = anorexia nervosa, BMI = body mass index, BN = bulimia nervosa, BED = binge eating disorder

## Appendix C

### *Religiousness Measure<sup>1</sup>*

1. I ask God to help me make important decisions. (RAPI—theism)
2. I know I can count on people from my church when I need help. (RAPI—social support)
3. I feel that without God, there would be no purpose in life. (RAPI—theism)
4. Spiritual experiences are important to me. (RAPI—spirituality)
5. Being with other people who share my religious views is important to me. (RAPI—social support)
6. I believe drinking alcohol is a sin. (RAPI—religious views on drug use)
7. My friends and I often talk about religious matters. (RAPI—social support)
8. My faith in God helps me through hard times. (RAPI—theism)
9. I feel like I can always count on God. (RAPI—theism)
10. I try to live how God wants me to live. (RAPI—theism)
11. I believe smoking marijuana is a sin. (RAPI—religious views on drug use)
12. I consider myself to be a very spiritual person. (RAPI—spirituality)
13. My faith in God shapes how I think and act every day. (RAPI—theism)
14. I help others with their religious questions and struggles. (RAPI—spirituality)
15. Every day I see evidence that God is active in the world. (RAPI—theism)
16. I seek out opportunities to help me grow spiritually. (RAPI—spirituality)

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<sup>1</sup> Original Sources: RAPI = Religious Attitudes and Practices Inventory; MMR/S = Multidimensional Measure of Religiosity/Spirituality

17. Most of my best friends are religious. (RAPI—social support)
18. I take time for periods of private prayer or meditation. (RAPI—spirituality)
19. I believe that smoking cigarettes is a sin. (RAPI—religious views on drug use)
20. I like to worship and pray with others. (RAPI—social support)
21. I believe in God. (RAPI—theism)
22. I go to Sunday school often. (RAPI—social support)
23. Most of my best friends go to church. (RAPI—social support)
24. I often attend church activities such as Bible study and choir practice. (RAPI—social support)
25. I know that God loves me just as I am. (Parental influences on God images—"God as love")
26. I believe that God often responds to the individual prayers of men and women. (Kendler et al., 2003)
27. It is alright to get back at someone who hurts or offends you. (Kendler et al., 2003)
28. I feel thankful for what I have received in life. (Kendler et al., 2003)
29. I believe that if I do a lot of wrong things, God will stop loving me. (Parental influences on God images—"God as love")
30. I try to live by the saying, "Love thy neighbor as thyself." (Kendler et al., 2003)
31. I believe that God frequently alters the course of human events. (Kendler et al., 2003)
32. I can forgive even if someone hurts me on purpose. (Kendler et al., 2003)
33. The only person I have to thank for what I have received in life is me. (Kendler et al., 2003)
34. No matter what I do, I know that God will always love me. (Kendler et al., 2003)

35. If people are not kind to me, I am not going to be kind to them. (Kendler et al., 2003)
36. When someone hurts me, I want to get whatever revenge I can. (Kendler et al., 2003)
37. I believe that God is very interested in the day-to-day lives of men and women. (Kendler et al., 2003)
38. I try to care for other people even if I don't really like them. (Kendler et al., 2003)
39. I believe God has a lot of rules about how people should live their lives. (Parental influences on God images—"God as authority")
40. I believe that you have to care about people regardless of how they treat you. (Kendler et al., 2003)
41. I feel grateful nearly every day. (Kendler et al., 2003)
42. I feel surrounded by God's love every day. (Kendler et al., 2003)
43. Even when it is difficult, I try to forgive people who have hurt or offended me. (Kendler et al., 2003)
44. I believe that God can be counted on to reward goodness and punish evil. (Kendler et al., 2003)
45. People tell me that I am not grateful enough for what I have in life. (Kendler et al., 2003)
46. When someone hurts or offends me, I can only get over it when I have figured out how to get my revenge. (Kendler et al., 2003)
47. I believe God is very strict. (Parental influences on God images—"God as authority")
48. When I look at the world, I don't see much to be grateful for. (Kendler et al., 2003)
49. I believe God will punish me if I do something wrong. (Parental influences on God images—"God as authority")
50. I try to be forgiving toward other people. (Kendler et al., 2003)

51. I feel deep love for the world and all the creatures in it. (Kendler et al., 2003)
52. I can find much in my life to be thankful for. (Kendler et al., 2003)
53. In general, how important are your religious or spiritual beliefs in your daily life?  
(Kender et al., 1997)
54. How often in the last year did you attend religious services? (Kender et al., 1997)
55. To what extent are you conscious of some religious goal or purpose in life which serves  
to give you direction? (Kender et al., 1997)
56. When you have problems or difficulties in your family, work, or personal life, how often  
do you seek spiritual comfort? (Kender et al., 1997)
57. How satisfied are you with your spiritual life? (Kender et al., 1997)
58. Do you believe in God or in a universal spirit? (Kender et al., 1997)
59. Do you believe that this God or universal spirit observes your actions and rewards or  
punishes you for them? (Kender et al., 1997)
60. Have you been born again, that is, had a turning point in your life when you committed  
yourself to Jesus Christ? (Kender et al., 1997)
61. Please tell me whether you agree or disagree with the following statement: "The Bible is  
the actual word of God and is to be taken literally, word for word." (Kender et al., 1997)
62. I feel God's presence. (MMR/S—daily spiritual experiences)
63. I find strength and comfort in my religion. (MMR/S—daily spiritual experiences)
64. I feel deep inner peace or harmony. (MMR/S—daily spiritual experiences)
65. I feel God's love for me, directly or through others. (MMR/S—daily spiritual  
experiences)
66. I am spiritually touched by the beauty of creation. (MMR/S—daily spiritual experiences)

67. Other than at mealtime, I pray to God privately. (Kendler et al., 1997)
68. I think about how my life is part of a larger spiritual force. (MMR/S—religious coping)
69. I work together with God as partners to get through hard times. (MMR/S—religious coping)
70. I express anger at God for letting terrible things happen. (MMR/S—religious coping)
71. I look to God for strength, support, and guidance in crises. (MMR/S—religious coping)
72. I feel that stressful situations are God's way of punishing me for my sins or lack of spirituality. (MMR/S—religious coping)
73. I try to find the lesson from God in crises. (MMR/S—religious coping)
74. I try to make sense of the situation and decide what to do without relying on God. (MMR/S—religious coping)
75. I confess my sins and ask for God's forgiveness. (MMR/S—religious coping)
76. I wonder whether God has abandoned me. (MMR/S—religious coping)
77. I question whether God really exists. (MMR/S—religious coping)
78. To what extent is your religion involved in understanding or dealing with stressful situations in any way? (MMR/S—religious coping)

## Appendix D

### *Eating Disorder Inventory*<sup>2</sup>

1. I eat sweets and carbohydrates without feeling nervous. (EDI-DT)
2. I think that my stomach is too big. (EDI-BD)
3. I think about dieting. (EDI-DT)
4. I think that my thighs are too large. (EDI-BD)
5. I feel extremely guilty after overeating. (EDI-DT)
6. I think that my stomach is just the right size. (EDI-BD)
7. I am terrified of gaining weight. (EDI-DT)
8. I feel satisfied with the shape of my body. (EDI-BD)
9. I exaggerate or magnify the importance of weight. (EDI-DT)
10. I like the shape of my buttocks. (EDI-BD)
11. I am preoccupied with the desire to be thinner. (EDI-DT)
12. I think that my hips are too big. (EDI-BD)
13. If I gain a pound, I worry that I will keep gaining. (EDI-DT)
14. I think that my thighs are just the right size. (EDI-BD)
15. I think that my buttocks are too large. (EDI-BD)
16. I think that my hips are just the right size. (EDI-BD)

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<sup>2</sup> Subscales: Drive for Thinness (EDI-DT), Body Dissatisfaction (EDI-BD)

## Appendix E

### *Three-Factor Eating Questionnaire<sup>3</sup>*

1. When I smell a sizzling steak or see a juicy piece of meat, I find it very difficult to refrain from eating, even if I have just finished a meal. (TFEQ-D)
2. I eat too much at social occasions like parties and picnics. (TFEQ-D)
3. I am so hungry that I eat more than three times a day. (TFEQ-H)
4. When I have eaten my quota of calories, I am good about not eating any more. (TFEQ-R)
5. I deliberately take small helpings as a means of controlling my weight. (TFEQ-H)
6. Things just taste so good that I keep on eating when I am no longer hungry. (TFEQ-R)
7. Since I am often hungry, I wish that while I am eating, an expert would tell me that I have had enough or that I can have something more to eat. (TFEQ-D)
8. When I am anxious, I find myself eating. (TFEQ-H)
9. I believe that life is too short to worry about dieting. (TFEQ-D)
10. Since my weight goes up and down, I have gone on reducing diets. (TFEQ-R)
11. I feel so hungry that I just have to eat something. (TFEQ-D)
12. When I am with someone who is over- eating, I overeat too. (TFEQ-H)
13. I have a pretty good idea of the number of calories in common food. (TFEQ-D)
14. When I start eating, I just can't seem to stop. (TFEQ-R)
15. It is difficult for me to leave something on my plate. (TFEQ-D)

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<sup>3</sup> Subscales: Restraint (TFEQ-R), Disinhibition (TFEQ-D), Hunger (TFEQ-H)



16. At certain times of the day, I get hungry because I have gotten used to eating then.  
(TFEQ-D)
17. Being with someone who is eating makes me hungry enough to eat also. (TFEQ-H)
18. When I feel blue, I overeat. (TFEQ-R)
19. I enjoy eating too much to spoil it by counting calories or watching my weight. (TFEQ-H)
20. When I see a real delicacy, I get so hungry that I have to eat it right away. (TFEQ-D)
21. I stop eating when I am not really full as a conscious means of limiting the amount that I eat. (TFEQ-R)
22. I get so hungry that my stomach seems like a bottomless pit. (TFEQ-H)
23. My weight has gone up and down in the last ten years. (TFEQ-R)
24. I am always hungry so it is hard for me to stop eating before I finish the food on my plate. (TFEQ-H)
25. When I feel lonely, I console myself by eating. (TFEQ-D)
26. I consciously hold back at meals in order not to gain weight. (TFEQ-H)
27. I get very hungry late in the evening or at night. (TFEQ-D)
28. I eat anything I want, any time I want. (TFEQ-R)
29. Without even thinking about it, I take a long time to eat. (TFEQ-H)
30. I count calories as a conscious means of controlling my weight. (TFEQ-R)
31. I do not eat some foods because they make me fat. (TFEQ-D)
32. I am hungry enough to eat at any time. (TFEQ-R)
33. I pay a great deal of attention to changes in my figure. (TFEQ-R)
34. Dieting is so hard for me because I just get too hungry. (TFEQ-H)

35. While on a diet, if I eat food that is not allowed, I consciously eat less for a period of time to make up for it. (TFEQ-R)
36. While on a diet, if I eat a food that is not allowed, I then splurge and eat other high calorie foods. (TFEQ-D)

## Vita

Janet AEthra Lydecker was born on March 28, 1984, in Reading, Massachusetts, and is an American citizen. She graduated from Reading Memorial High School in Reading, Massachusetts in 2002. She completed her undergraduate studies in Spring 2006 at Amherst College in Amherst, Massachusetts and received a Bachelor of Arts in Psychology and French, *cum laude*. During her time at Amherst College, she completed an undergraduate thesis on pluralistic ignorance and disordered eating under the direction of Catherine Sanderson, Ph.D. After completing her undergraduate work, she worked at Massachusetts General Hospital in the Neuroendocrine Unit for two years as a clinical research coordinator on studies related to anorexia nervosa and obesity. She began her graduate work in the Counseling Psychology doctoral program at Virginia Commonwealth University in August, 2008 under the direction of Suzanne Mazzeo, Ph.D.