Article

Dimensions of Religiosity and Their Relationship to Lifetime Psychiatric and Substance Use Disorders

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Objective: The role of religion in mental illness remains understudied. Most prior investigations of this relationship have used measures of religiosity that do not reflect its complexity and/or have examined a small number of psychiatric outcomes. This study used data from a general population sample to clarify the dimensions of religiosity and the relationships of these dimensions to risk for lifetime psychiatric and substance use disorders.

Method: Responses to 78 items assessing various aspects of broadly defined religiosity were obtained from 2,616 male and female twins from a general population registry. The association between the resulting religiosity dimensions and the lifetime risk for nine disorders assessed at personal interview was evaluated by logistic regression. Of these disorders, five were "internalizing" (major depression, phobias, generalized anxiety disorder, panic disorder, and bulimia nervosa), and four were "externalizing" (nicotine dependence, alcohol dependence, drug abuse or dependence, and adult antisocial behavior).

Results: Seven factors were identified: general religiosity, social religiosity, involved God, forgiveness, God as judge, unvengefulness, and thankfulness. Two factors were associated with reduced risk for both internalizing and externalizing disorders (social religiosity and thankfulness), four factors with reduced risk for externalizing disorders only (general religiosity, involved God, forgiveness, and God as judge), and one factor with reduced risk for internalizing disorders only (unvengefulness).

Conclusions: Religiosity is a complex, multidimensional construct with substantial associations with lifetime psychopathology. Some dimensions of religiosity are related to reduced risk specifically for internalizing disorders, and others to reduced risk specifically for externalizing disorders, while still others are less specific in their associations. These results do not address the nature of the causal link between religiosity and risk for illness.

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While a focus of increasing interest, the role of religion in mental illness and mental health remains understudied (1–5). In a prior article, we addressed this issue by asking 10 questions about religious beliefs and practices in a sample of more than 1,900 female twins from a population-based registry (6). We extracted two factors reflecting religious devotion and religious conservatism. Both of these dimensions were consistently associated with levels of substance use and misuse, had an inconsistent relationship with depression, and bore no association with anxiety or eating disorder symptoms or diagnoses.

A limitation of this and many other prior studies in this area (7, 8) has been the relatively simplistic approach taken toward the measurement of religiosity. Religion is a complex, multidimensional construct (9). Each of the numerous dimensions of religious beliefs, attitudes, and behavior might relate in a different way to the risk for psychiatric and substance use disorders.

This report has two goals. Using results from a new survey containing 78 items reflecting a diversity of religiosity constructs, we first sought to elucidate the dimensions of religiosity. Second, we attempted to clarify the relationship of these dimensions to the risk for lifetime psychiatric and substance use disorders.

Method

Sample and Diagnostic Methods

The twin sample for this study was derived from two interrelated projects that used the population-based Virginia Twin Registry (10). The female-female twin pairs, with birth years between 1934 and 1974, became eligible if both members previously responded to a mailed questionnaire, to which the response rate was ~64%. The eligible female twin pairs were approached for four waves of personal interviews from 1988 to 1997. The male-male and male-female twin pairs, with birth years between 1940 and 1974, were ascertained in a separate study and were approached for two waves of interviews from 1993 to 1998.

In late 1999, we mailed out questionnaires to all prior participants in these two studies (N=7,230). Very limited resources were available for follow-up of nonresponders. We received 2,621 questionnaires, a 36.3% response rate.

In prior waves, clinical interviewers assessed psychiatric and substance use disorders by personal interview using an adaptation of the Structured Clinical Interview for DSM-III-R (11) and the DSM-III-R criteria, with six exceptions. First, diagnostic hierarchies were not used. Second, a 1-month rather than a 6-month minimum

duration of illness was used for generalized anxiety disorder (12). Third, assessment of drug abuse and dependence, which examined seven substance classes (cannabis, sedatives, stimulants, cocaine, opiates, hallucinogens, and other drugs), utilized the DSM-IV criteria (13). Fourth, nicotine dependence was defined as a score of ≥7 on the Fagerstrom Tolerance Questionnaire (14) during the period of heaviest lifetime use. Fifth, we utilized a broad definition of panic disorder requiring a history of spontaneous panic attacks meeting ≥2 symptomatic criteria reaching maximal intensity within 30 minutes (15). Sixth, phobia was defined as an irrational fear with objective behavioral impact on the respondents' behavior as judged by the trained interviewer (16). The research reported here was approved by the Institutional Review Board of Virginia Commonwealth University, which required participants to provide signed consent before face-to-face interviews and mailed questionnaires and verbal assent before phone interviews.

Assessment of Dimensions of Religiosity

We sought to assess broadly religiosity, spirituality, and related attitudes, including forgiveness and gratitude. Our selection of scales and measures was based on an attempt to saturate the empirically ill-defined multivariate space that we call religiosity. As Little et al. (17) have argued, when constructs are poorly defined, attempts to maximize heterogeneity among items, all else being equal, will lead to the best representations of the underlying constructs.

After reviewing the literature, we selected 78 items from a number of sources (Appendix 1). First, we included all 24 items from the Religious Attitudes and Practices Inventory (18), which had four subscales: theism, with eight items; spirituality, with six items, social support, with seven items, and religious views on drug use, with three items. Second, we used all 10 items from our previous study of religiosity (6) (selected from items used in the National Comorbidity Survey [19], a Gallup poll [20], and the religiousness scale of Strayhorn et al. [21]). Third, we utilized six items from the "God images" scale (22): three each from the "God as love" and "God as authority" subscales. Fourth, from the Multidimensional Measurement of Religiousness/Spirituality (23), we included 11 items from the religious/spiritual coping scale and five items from the daily spiritual experiences scale. In four areas we were unable to find satisfactory items and developed our own: 1) "nature of God" scale, reflecting the level of perceived involvement of God in his creation, which consisted of four items (developed by K.S.K.), 2) forgiveness versus revenge, consisting of six items (developed by M.E.M. partly on the basis of a previous scale [24]), 3) gratitude versus ingratitude, consisting of six items (developed by M.E.M), and 4) love and caring, consisting of six items (developed by K.S.K.). With few exceptions, the items had four to six response options.

Repeated measures (mean=89.5 months apart, SD=5.1) were available for the 10 items on religiosity previously assessed (6) among ~1,000 female twins. According to standard or weighted kappas (25, 26), item stability ranged from 0.33 to 0.67, with stability for most items between 0.45 and 0.60.

Statistical Analysis

To examine how many separable dimensions existed in our item pool, we submitted a product-moment correlation matrix for all 78 items to a factor analysis and VARIMAX rotation (27). Ten factors had an eigenvalue ≥1.0. However, the scree plot indicated seven important factors (the final three having eigenvalues just above 1 and substantial loadings on only two or three items). In the service of parsimony, we utilized seven factors that explained 57.3% of the total variance. We examined the replicability of the factor structure by repeating our factor analysis in split-halves of the study sample. The observed structure was quite stable, with congruency coefficients (28) of 0.96 for factor 7 and ≥0.98 for factors 1–6.

TABLE 1. Correlation of Religiosity Factors With Age, Sex, and Years of Education in 2,621 Male and Female Twins From a General Population Twin Registry[a]

Factor	Beta for Age (per decade) (df=1,869)[a]	Beta for Sex (df=694)[a,b]	Beta for Education (year of education) (df=694)[a]
General religiosity	0.16†	0.36†	–0.14
Social religiosity	0.18†	0.27†	–0.29***
Social religiosity—M[c]	0.18†	0.28†	–0.02
Involved God	0.06**	0.26†	–0.41†
Forgiveness	0.08**	0.25†	–0.09
God as judge	0.00	–0.09*	–1.16†
Unvengefulness	0.02	0.17†	0.28***
Thankfulness	0.09†	0.18†	0.08

[a] Beta weights represent the change in the religiosity factors, in SD units, for each unit change in the predictor variables of age, sex, and years of education. Degrees of freedom are adjusted to account for the correlational structure for twins.
[b] Positive value means significant association in women; negative value means significant association in men.
[c] Excludes three constituent items of the social religiosity factor that are related to attitudes about substance use.
*p<0.05. **p<0.01. ***p<0.001. †p<0.0001.

Factor-derived scales were formed by assigning an item to the scale on which it loaded most heavily, given that the loading exceeded 0.40. Individuals with missing data for ≥50% of scale items were removed. For those completing ≥50% but <100% of the items (0.5% of the sample), scores on the missing items were imputed from the endorsed items. Three items did not load substantially on any factor.

We report three groups of analyses. First, given our modest response rate, we examined the representativeness of our sample by predicting cooperation from demographic, psychopathological, and (for female subjects only) religious variables. Since the analyses utilized a dichotomous dependent variable, they were performed by using logistic regression. To correct for correlated observations within twin pairs, we utilized generalized estimating equations implemented in PROC GENMOD in SAS (29). Second, we predicted our dimensions from demographic variables of sex, age, and educational level by using linear regression operationalized in PROC MIXED in SAS (29), treating individuals within pairs as repeated observations. Third, we examined the relationship between scores on these scales and risk for lifetime psychopathology and substance use disorder using logistic regression, with age, sex, and years of education as control variables. The religiosity measures were standardized, so the odds ratio reflected the change in risk for a disorder associated with a one standard deviation change in the religiosity factor.

Results

Representativeness of Sample

One each of the 10 previously assessed religiosity items (6) and nine psychiatric and substance use disorders significantly predicted cooperation, a pattern not different from chance expectation (30). However, participation was substantially predicted by female sex (odds ratio=2.14, χ^2= 192.0, df=1, p<0.0001), increasing age (odds ratio=1.33 [per decade], χ^2=82.1, df=1, p<0.0001), increasing education (odds ratio=1.12 [per year], χ^2=113.4, df=1, p<0.0001), and monozygosity (odds ratio=1.47, χ^2=43.3, df=1, p<0.0001).

TABLE 2. Association Between Religiosity Factors and Lifetime History of Nine Psychiatric and Substance Use Disorders in 2,621 Male and Female Twins From a General Population Twin Registry[a]

	Major Depression		Generalized Anxiety Disorder		Phobia		Panic Disorder		Bulimia Nervosa		Nicotine Dependence	
Factor	Odds Ratio	95% CI	Odds Ratio	95% CI	Odds Ratio	95% CI	Odds Ratio	95% CI	Odds Ratio	95% CI	Odds Ratio	95% CI
General religiosity	1.00	0.92–1.09	1.03	0.93–1.15	0.99	0.91–1.08	1.16*	1.01–1.34	0.97	0.63–1.50	0.76†	0.67–0.85
Social religiosity	0.83†	0.76–0.90	0.87**	0.78–0.96	0.89*	0.81–0.98	0.90	0.78–1.03	0.91	0.60–1.38	0.65†	0.57–0.74
Social religiosity—M[b]	0.82†	0.75–0.90	0.87**	0.78–0.96	0.88**	0.80–0.97	0.90	0.79–1.03	0.90	0.59–1.35	0.67†	0.59–0.76
Involved God	0.94	0.86–1.02	0.92	0.84–1.02	0.97	0.88–1.05	1.03	0.90–1.19	0.93	0.68–1.28	0.82**	0.74–0.92
Forgiveness	0.98	0.90–1.07	1.02	0.92–1.14	0.92	0.84–1.01	1.05	0.91–1.22	0.83	0.67–1.04	0.86**	0.77–0.96
God as judge	1.04	0.95–1.14	1.05	0.94–1.18	1.09	1.00–1.20	1.02	0.88–1.17	0.89	0.57–1.38	0.91	0.81–1.04
Unvengefulness	0.86***	0.79–0.93	0.83***	0.75–0.92	0.90*	0.83–0.98	0.93	0.81–1.06	0.53**	0.38–0.76	0.98	0.87–1.11
Thankfulness	0.81†	0.74–0.88	0.82†	0.75–0.91	0.84†	0.77–0.91	1.01	0.89–1.16	0.60***	0.45–0.81	0.84***	0.75–0.93

[a] Age, sex, and years of education controlled in all analyses. Odds ratio reflects the change in risk for a disorder associated with a 1-SD change in the religiosity factor.
[b] Excludes three constituent items of the social religiosity factor that are related to attitudes about substance use.
*p<0.05. **p<0.01. ***p<0.001. †p<0.0001.

Dimensions of Religiosity

The first dimension included 30 items reflecting 1) the person's concern and involvement with spiritual issues, including sensing his/her place within the universe and 2) his/her active involvement with God on a day-to-day basis and at times of crisis (Appendix 1). The items in this factor came from two subscales of the Religious Attitudes and Practices Inventory (spirituality and theism), two subscales of the Multidimensional Measurement of Religiousness/Spirituality (daily spiritual experiences and religious coping), and the scale developed for our previous study (6). No single term captures entirely this factor, but *general religiosity* seemed appropriate.

The second dimension consisted of 12 items reflecting the degree of interaction with other religious individuals, the frequency of church attendance, and attitudes about substance use. Ten of the 12 items came from the Religious Attitudes and Practices Inventory subscales for social support and religious views on drug use. We called this dimension *social religiosity*. Because an association between this factor and substance use disorders might be "driven" by the three substance use items, we also used another version of this dimension, called *social religiosity—M*, from which these items were omitted.

Factor 3 included seven items from a range of sources, all of which included the word "God" and reflected a belief in a deity who is actively and positively involved in human affairs. We called this factor *involved God*.

Factor 4 consisted of seven items reflecting a caring, loving, and forgiving approach to the world. All of these items, which were positively worded, came from the love and caring or forgiveness versus revenge scales. The term God did not appear in these items. We termed this factor *forgiveness*.

All six items in factor 5 also contained the word "God" but differed from those in factor 3 by emphasizing the judgmental and punitive nature of the divinity. All three items from the "God as authority" subscale of the "God images" scale (22) were in this factor, which we called *God as judge*.

Factor 6 consisted of eight items reflecting an attitude toward the world emphasizing personal retaliation rather than forgiveness. With one exception, these items came from the forgiveness versus revenge and gratitude versus ingratitude scales and included all of the negatively worded items. For consistency, we scored these items in the positive direction, so that the factor was termed *unvengefulness*.

Factor 7 contained four items from the gratitude versus ingratitude and religious coping scales that reflected feelings of thankfulness versus anger toward life and God. We called this scale *thankfulness*.

Religiosity and Demographic Variables

Only two of the seven factors (God as judge and unvengefulness) were unrelated to age (Table 1). Five factors were positively associated with age, with the strongest relationship seen for social religiosity.

Significant sex differences were seen for all seven factors. For six factors, higher levels were seen for female than for male subjects, with the effect being particularly large for general religiosity and also substantial for social religiosity, involved God, and forgiveness. For one factor—God as judge—men had significantly higher levels than did women.

For four of the seven factors, a significant association was seen with years of education. For three of these factors (social religiosity, involved God, and God as judge), the relationship was negative. One factor, unvengefulness, was positively and significantly associated with years of education. The magnitude of the association with education was strongest for God as judge.

Religiosity and Lifetime Psychiatric and Substance Use Disorders

Table 2 shows the association, with age, sex, and years of education controlled, between the seven religiosity factors examined one at a time and the lifetime risk for nine psychiatric or substance abuse syndromes. We divided these nine syndromes into two groups: 1) five internalizing disorders—major depression, generalized anxiety disorder, phobia,

Alcohol Dependence		Drug Abuse or Dependence		Adult Antisocial Behavior	
Odds Ratio	95% CI	Odds Ratio	95% CI	Odds Ratio	95% CI
0.80†	0.72–0.90	0.79†	0.71–0.88	0.71*	0.51–0.99
0.69†	0.61–0.78	0.63†	0.55–0.71	0.71*	0.51–0.99
0.70†	0.62–0.80	0.66†	0.59–0.75	0.62**	0.44–0.87
0.76†	0.69–0.84	0.82***	0.75–0.91	0.75*	0.58–0.97
0.91	0.82–1.01	0.90*	0.81–0.99	0.84	0.68–1.04
0.86*	0.77–0.97	0.85*	0.76–0.96	0.72	0.51–1.03
0.99	0.89–1.10	1.01	0.91–1.11	0.80	0.57–1.11
0.82***	0.74–0.91	0.84***	0.76–0.92	1.06	0.77–1.47

panic disorder, and bulimia nervosa; and 2) four externalizing disorders—nicotine dependence, alcohol dependence, drug abuse or dependence, and adult antisocial behavior.

The level of general religiosity was significantly and positively related to risk for one of five internalizing disorders (panic disorder) and inversely and significantly linked with all four externalizing disorders. Levels of social religiosity were significantly and inversely related to risk for three of the five internalizing and all four externalizing disorders. The odds ratios were substantially lower for externalizing than internalizing disorders. Repeating these analyses with the modified social religiosity factor produced little change. Scores on the involved God factor were not significantly associated with risk for any internalizing disorder, but were inversely associated with risk for all four externalizing disorders.

Levels of forgiveness were related significantly to two disorders, with high levels associated with low risk for nicotine dependence and drug abuse or dependence. High levels of the God as judge factor were significantly associated only with a decreased risk for alcohol dependence and drug abuse or dependence. High levels of unvengefulness were associated with a significantly decreased risk for four of five internalizing disorders but no externalizing disorders. Increased levels of thankfulness were associated with a decreased risk for all disorders except panic disorder and adult antisocial behavior.

Discussion

This report sought to 1) clarify the number of meaningful religiosity dimensions and 2) determine the association between these dimensions and risk for common psychiatric and substance use disorders.

Structure of Religiosity

Our results confirmed the complexity of the construct of "religiosity" (23). While we make no claims for coverage of all relevant dimensions (a recent book reviewed 126 published scales for religiosity [9]!), our findings do strongly support the multidimensionality of religiosity. We emphasize six results. First, we identified a "social religious" factor that is similar to what others have termed religious "social support" (18, 23). Second, although others have claimed separable dimensions of religiosity and spirituality (9, 18), we could *not* distinguish these two domains. For example, most items from the Religious Attitudes and Practices Inventory spirituality subscale (18) and the daily spiritual experiences scale (23) loaded most heavily on the first general religiosity factor. A factor analysis using an oblique rotation (PROMAX) produced similar results. Third, we found no evidence for a separate "religious coping" factor (23) distinguishable from more general religious beliefs. Fourth, we identified a factor—God as judge—that resembles what we previously termed "religious conservatism" (6) and reflects beliefs about the nature of God most prominently seen in fundamentalist American Protestants. This factor had two distinct sociodemographic correlates, being more strongly endorsed by men and most strongly correlated with education. Fifth, attitudes often but not always associated with religiosity (e.g., forgiveness, gratitude, and love) could be separated from more formal religious and spiritual beliefs (9, 23). However, we did not discriminate these dimensions from one another. Rather, they split on positive or negative wording rather than on their item content.

Dimensions of Religiosity Associated With Psychiatric and Substance Use Disorders

Our seven factors were divisible into three groups with differing patterns of illness association. Two factors (social religiosity and thankfulness) were related to lifetime risk for both internalizing and externalizing disorders. Four factors (general religiosity, involved God, forgiveness, and God as judge) appeared to be more specific, with high scores predicting reduced risk only for externalizing disorders. One factor (unvengefulness) had the opposite pattern, as it was associated with internalizing but not externalizing disorders.

We are unaware of a specific precedent for this pattern of results or of a conceptual framework within which to view them. However, a number of specific findings are consistent with the literature. We comment on six. First, our results accord well with prior evidence that high levels of religious involvement predict a reduced risk for substance misuse (8, 31–35). Second, the observed inverse relationship between social religiosity and risk of illness is consistent with the hypothesis that religious activity reflects, in a "community of faith," a potent form of social integration (36). Third, a prior review of the relationship between religiosity and depression suggested that "intrinsic" religious motivation may be the aspect of religiosity most protective for depressive disorders (37). Is it possible that our measures of unvengefulness and thankfulness best tap those intrinsic attitudes that reduce risk for major depression? Fourth, the pattern for generalized anxiety dis-

order, phobia, and bulimia nervosa closely resembled that for major depression, with risk inversely related to levels of social religiosity, unvengefulness, and thankfulness. The pattern for panic disorder was different in that, consistent with prior literature (8, 38), high levels of general religiosity were associated with increased risk. Fifth, while several studies have examined the association between religiosity and smoking (6, 39, 40), far fewer have investigated nicotine dependence (6). The relationships between the dimensions of religiosity and nicotine dependence were very similar to those seen for drug use disorders. Finally, our results are consistent with a range of studies reporting an inverse relationship between religiosity and antisocial behaviors (3, 41, 42).

Limitations

These results should be viewed in the context of six methodologic limitations. First, we did not address the causal nature of the reported associations. Religiosity may alter risk of illness, the experience of illness may have an effect on religiosity, or some third factor may influence both. Further research, particularly using a longitudinal design (43), will clarify this critical question.

Second, although our sample was large, we examined rare disorders, especially panic disorder, bulimia nervosa, and adult antisocial behavior. In several analyses, odds ratios for these disorders were similar to those seen for other conditions, but the results were not significant—a pattern likely due to low power.

Third, given our modest response rate, the representativeness of our sample is questionable. While neither a history of psychiatric and substance use disorders nor levels of religiosity predicted participation, strong effects were seen for age, sex, years of education, and zygosity. We examined the relationship between our religiosity dimensions and the risk for psychiatric or substance use disorders as a function of these four variables. For each variable, 63 analyses were performed (nine disorders times seven factors), and the number of significant interactions detected (6 of 63 for age, 7 of 63 for sex, 5 of 63 for years of education, and 6 of 63 for zygosity) did not significantly exceed chance expectation (30). We also weighted our data to the eligible sample as a function of these four variables and repeated a subset of the analyses seen in Table 2. No substantial differences emerged. Regarding the relationship between religiosity and psychopathology, our sample is probably representative of the twins who participated in the earlier interview waves.

Fourth, we took an approach to dissecting the dimensions of religiosity that was strictly empirical. This approach has strengths, especially when an extensive pool of items is applied to a large, representative population. However, it also has limitations in ignoring issues of face validity or prior work on scale dimensions. We argue that the distinctive relationships seen between our identified dimensions and both demographic factors and psychopathology speak to their validity.

Fifth, because of the rarity of certain disorders, we did not assess schizophrenia, bipolar illness, or anorexia nervosa and cannot address the relationship of religiosity to risk for these important disorders. Sixth and finally, our sample consisted of white men and women born in Virginia. Our findings may not generalize to other cultural or ethnic groups.

APPENDIX 1. Items Constituting Seven Religiosity Dimensions From a Factor Analysis of Questionnaire Data for 2,621 Male and Female Twins From a General Population Twin Registry[a]

Religiosity Factor and Questionnaire Item	Source of Item
Factor 1. General religiosity	
I ask God to help me make important decisions.	Religious Attitudes and Practices Inventory (18)—theism
I feel that without God, there would be no purpose in life.	Religious Attitudes and Practices Inventory (18)—theism
Spiritual experiences are important to me.	Religious Attitudes and Practices Inventory (18)—spirituality
My faith in God helps me through hard times.	Religious Attitudes and Practices Inventory (18)—theism
I feel like I can always count on God.	Religious Attitudes and Practices Inventory (18)—theism
I try to live how God wants me to live.	Religious Attitudes and Practices Inventory (18)—theism
I consider myself to be a very spiritual person.	Religious Attitudes and Practices Inventory (18)—spirituality
My faith in God shapes how I think and act every day.	Religious Attitudes and Practices Inventory (18)—theism
I help others with their religious questions and struggles.	Religious Attitudes and Practices Inventory (18)—spirituality
Every day I see evidence that God is active in the world.	Religious Attitudes and Practices Inventory (18)—theism
I seek out opportunities to help me grow spiritually.	Religious Attitudes and Practices Inventory (18)—spirituality
I take time for periods of private prayer or meditation.	Religious Attitudes and Practices Inventory (18)—spirituality
I feel surrounded by God's love every day.	Love and caring[b]
In general, how important are your religious or spiritual beliefs in your daily life?	Item used in previous study of female-female twins (6)
To what extent are you conscious of some religious goal or purpose in life that serves to give you direction?	Item used in previous study of female-female twins (6)
When you have problems or difficulties in your family, work, or personal life, how often do you seek spiritual comfort?	Item used in previous study of female-female twins (6)
How satisfied are you with your spiritual life?	Item used in previous study of female-female twins (6)
Other than at mealtime, I pray to God privately.	Item used in previous study of female-female twins (6)
I feel God's presence.	Multidimensional Measurement of Religiousness/Spirituality (23)—daily spiritual experiences[c]

(continued)

APPENDIX 1. Items Constituting Seven Religiosity Dimensions From a Factor Analysis of Questionnaire Data for 2,621 Male and Female Twins From a General Population Twin Registry[a] *(continued)*

Religiosity Factor and Questionnaire Item	Source of Item
Factor 1. General religiosity *(continued)*	
I find strength and comfort in my religion.	Multidimensional Measurement of Religiousness/Spirituality (23)—daily spiritual experiences[c]
I feel deep inner peace or harmony.	Multidimensional Measurement of Religiousness/Spirituality (23)—daily spiritual experiences[c]
I feel God's love for me, directly or through others.	Multidimensional Measurement of Religiousness/Spirituality (23)—daily spiritual experiences[c]
I am spiritually touched by the beauty of creation.	Multidimensional Measurement of Religiousness/Spirituality (23)—daily spiritual experiences[c]
I think about how my life is part of a larger spiritual force.	Multidimensional Measurement of Religiousness/Spirituality (23)—religious coping[c]
I work together with God as partners to get through hard times.	Multidimensional Measurement of Religiousness/Spirituality (23)—religious coping[c]
I look to God for strength, support, and guidance in crises.	Multidimensional Measurement of Religiousness/Spirituality (23)—religious coping[c]
I try to find the lesson from God in crises.	Multidimensional Measurement of Religiousness/Spirituality (23)—religious coping[c]
I try to make sense of the situation and decide what to do without relying on God.	Multidimensional Measurement of Religiousness/Spirituality (23)—religious coping[c]
I confess my sins and ask for God's forgiveness.	Multidimensional Measurement of Religiousness/Spirituality (23)—religious coping[c]
To what extent is your religion involved in understanding or dealing with stress situations in any way?	Multidimensional Measurement of Religiousness/Spirituality (23)—religious coping[c]
Factor 2. Social religiosity	
I know I can count on people from my church when I need help.	Religious Attitudes and Practices Inventory (18)—social support
Being with other people who share my religious views is important to me.	Religious Attitudes and Practices Inventory (18)—social support
My friends and I often talk about religious matters.	Religious Attitudes and Practices Inventory (18)—spirituality
Most of my best friends are religious.	Religious Attitudes and Practices Inventory (18)—social support
I like to worship and pray with others.	Religious Attitudes and Practices Inventory (18)—social support
I go to Sunday school often.	Religious Attitudes and Practices Inventory (18)—social support
Most of my best friends go to church.	Religious Attitudes and Practices Inventory (18)—social support
I often attend church activities such as Bible study and choir practice.	Religious Attitudes and Practices Inventory (18)—social support
How often in the last year did you attend religious services?	Items used in previous study of female-female twins (6)
I believe that smoking marijuana is a sin.	Religious Attitudes and Practices Inventory (18)—religious views on drug use
I believe drinking alcohol is a sin.	Religious Attitudes and Practices Inventory (18)—religious views on drug use
I believe that smoking cigarettes is a sin.	Religious Attitudes and Practices Inventory (18)—religious views on drug use
Factor 3. Involved God	
I believe in God.	Religious Attitudes and Practices Inventory (18)—theism
I know that God loves me just as I am.	Parental influences on God images (22)—"God as love"
I believe that God often responds to the individual prayers of men and women.	Nature of God scale[b]
I believe that God is very interested in the day-to-day lives of men and women.	Nature of God scale[b]
Do you believe in God or in a universal spirit?	Items used in previous study of female-female twins (6)
I question whether God really exists (scored negatively).	Multidimensional Measurement of Religiousness/Spirituality (23)—religious/spiritual coping, religious doubts[c]
Factor 4. Forgiveness/love	
I try to live by the saying "love thy neighbor as thyself."	Love and caring[b]
I can forgive even if someone hurts me on purpose.	Forgiveness versus revenge[b]
I try to care for other people even if I don't really like them.	Love and caring[b]
I believe that you have to care about people regardless of how they treat you.	Love and caring[b]
Even when it is difficult, I try to forgive other people who have hurt and offended me.	Forgiveness versus revenge[b]
I try to be forgiving toward other people.	Forgiveness versus revenge[b]
I feel deep love for the world and all the creatures in it.	Love and caring[b]
Factor 5. God as judge	
I believe that God has a lot of rules about how people should live their lives.	Parental influences on God images (22)—"God as authority"
I believe that God can be counted on to reward goodness and punish evil.	Nature of God scale[b]
I believe God is very strict.	Parental influences on God images (22)—"God as authoriity"
I believe God will punish me if I do something wrong.	Parental influences on God images (22)—"God as authority"
Do you believe that this God or universal spirit observes your actions and rewards or punishes you for them?	Items used in previous study of female-female twins (6)

(continued on p. 502)

APPENDIX 1. Items Constituting Seven Religiosity Dimensions From a Factor Analysis of Questionnaire Data for 2,621 Male and Female Twins From a General Population Twin Registry[a] *(continued)*

Religiosity Factor and Questionnaire Item	Source of Item
Factor 5. God as judge *(continued)*	
I feel that stressful situations are God's way of punishing me for my sins or lack of spirituality.	Multidimensional Measurement of Religiousness/Spirituality (23)—religious coping[c]
The Bible is the actual word of God and is to be taken literally word for word.	Item used in previous study of female-female twins (6)
Factor 6. Unvengefulness	
It is all right to get back at someone who hurts or offends you (scored negatively).	Forgiveness versus revenge[b]
I believe that if I do a lot of wrong things, God will stop loving me (scored negatively).	Parental influences on God images (22)—"God as love"
The only person I have to thank for what I have received in life is me (scored negatively).	Gratitude versus ingratitude[b]
When someone hurts me, I want to get whatever revenge I can (scored negatively).	Forgiveness versus revenge[b]
If people are not kind to me, I am not going to be kind to them (scored negatively).	Forgiveness versus revenge[b]
People tell me that I am not grateful enough for what I have in life (scored negatively).	Gratitude versus ingratitude[b]
When someone hurts or offends me, I can only get over it when I have figured out how to get my revenge (scored negatively).	Forgiveness versus revenge[b]
When I look at the world, I don't see much to be grateful for (scored negatively).	Gratitude versus ingratitude[b]
Factor 7. Thankfulness	
I feel thankful for what I have received in life.	Gratitude versus ingratitude[b]
I feel grateful nearly every day.	Gratitude versus ingratitude[b]
I express anger at God for letting terrible things happen (scored negatively).	Multidimensional Measurement of Religiousness/Spirituality (23)—religious coping[c]
I wonder whether God has abandoned me (scored negatively).	Multidimensional Measurement of Religiousness/Spirituality (23)—religious coping[c]

[a] Results of submitting a product-moment correlation for 78 items to factor analysis and VARIMAX rotation. The seven factors explained 57.3% of the total variance.
[b] Scale developed by authors and consultants.
[c] Item reflects statement selected in response to the following instructions: "Think about how you try to understand and deal with major problems in your life. To what extent is each involved in the way you cope?"

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