

---

## Religiousness, Spirituality, and IQ: Are They Linked?

Regan Clark

### **Abstract**

Research has revealed a positive correlation between IQ and education, as well as a negative correlation between education and religiosity. However, there is little research linking IQ with religiosity and spirituality. Furthermore, researchers disagree about the operational definitions of religiousness and spirituality and about their relationship to one another. To probe the link among religiousness, spirituality, and IQ, I had participants complete the Wechsler Adult Intelligence Scale Third Edition (WAIS-III), the Spiritual Transcendence Scale (STS), and a questionnaire that asked about their religious background and behavior, academic achievement, and SAT scores. Religious belief and behavior were negatively related to self-reported quantitative SAT (QSAT) scores. Moreover, prayer fulfillment (one of the STS subscales) correlated negatively with father's education, and with self-reported scores on the Verbal SAT, QSAT, and Verbal IQ as measured by WAIS-III. In a regression analysis involving these predictors, only QSAT (which was related to father's education) was uniquely related to prayer fulfillment. The results suggest that an educated father influences his offspring's cognitive ability, which in turn reduces certain aspects of religiosity and spirituality. The results also suggest that the relationship between religiousness and spirituality is one of degree: both religious and spiritual individuals performed activities formally conceptualized as either "religious" or "spiritual," but religious individuals more frequently performed such activities.

### **Introduction**

Famous intellectuals have persistently disparaged religious beliefs. Marx (1844/2001) called religion "the opium of the people," meaning that religion is a trick perpetrated by economic elites on the struggling masses to keep them from rebelling against the social order (p. 15). Freud (1927/1962), in his provocatively titled book, *The Future of an Illusion*, argued that religion is a reflection of immature men-

tal representations of father, viewed as a large, imposing, potentially violent personage without whose protection and good graces poor mortals would be intolerably vulnerable. In contemporary “terror management theory” (Pyszczynski, Greenberg, & Solomon, 1997), religion is portrayed as a security blanket that people wrap around themselves at all ages to guard against full recognition of human mortality and meaninglessness. Steven Weinberg, the world-renowned physicist, went so far as to say during his acceptance speech for the Nobel Prize, “Religion is an insult to human dignity. Religion is complete nonsense and terribly damaging to human civilization” (quoted in *Freethought Today*, 2000).

These views have permeated intellectual discussions for over a hundred years, yet religious and spiritual beliefs remain extremely prevalent in the American population. A recent Gallup poll (1996) in the United States revealed that 96% of adults believe in God or a higher being, 90% believe in life after death, 87% say religion plays a very important role in their lives, and 90% pray (Hill, Pargament, Hood, McCullough, Swyers, Larson, & Zinnbauer, 2000), statistics that are comparable to those found in other sources (e.g., Shermer, 2000; Karren, Hafen, Smith, & Frandsen, 2002). At every point in the lifespan, religious and spiritual beliefs hold meaning to most Americans (Hill et al., 2000). Even most college undergraduates, who are widely thought to distance themselves from their childhood religious and spiritual beliefs (Feldman, 1969; McLennan, 1999), believe that one God created the universe and reigns supreme over it. There is no evidence that college students are more likely than older adults to be atheists (Greeley, 2002).

The prevalence of religious belief and behavior in America would presumably be astonishing to intellectual skeptics like Marx and Freud who viewed religion as misleading and largely damaging to humans. They would probably be even more shocked to learn that researchers have consistently linked religious beliefs and behavior to mental and physical health and personal well-being. Emmons (1999b), for example, found that religiosity is an important predictor of existential well-being, happiness, and general life satisfaction. Gartner (1991) showed that “the religiously faithful have lower suicide rates, lower drug use and abuse, less juvenile delinquency, lower divorce rates, higher marital happiness, better overall well-being, and better recovery from mental illness” (cited in Karren et al., 2002, p. 458). Religious belief correlates with received social support, healthy behaviors, and an increased sense of self-coherence and meaning in life (George, Larson, Koenig, & McCullough, 2000).

Emmons (1999b) argued, “Religions, as authoritative faith traditions, are systems of information that provide individuals with knowledge and resources for living a life of purpose and direction” (p. 879). Additionally, religion and spiritual beliefs contribute to the ability to cope effectively with illness, disability, and negative life events (Pargament, 1997), as does prayer (Poloma & Pendleton, 1989). A study of the religiosity and well-being of patients in a geriatric clinic found that those who were not religiously active had much higher rates of alcohol and tobacco use, depression, anxiety, and cancer than those who were very religiously active, who subsequently enjoyed “better overall physical and mental health” (Karren et al., 2002, p. 444). Religious and spiritual beliefs also contribute to health by positively imposing norms on sexual, diet, and health-care behaviors (Levin & Vanderpool, 1992). Religious and spiritual beliefs are also important in organizing human perceptions and cognitions. Emmons (1999b) noted that a spiritual sense is fundamental to “self-concept, identity, and relationship to God and others” (p. 875).

### **Religiousness, Spirituality, and IQ**

Only a few researchers have studied religiousness and spirituality as they relate to intelligence. More often, the research is more indirect, such as Shermer’s (2000) study of religiosity and education, which found a slightly negative correlation between religiosity and education. If there is a significant positive correlation ( $r = .63$ ) between intelligence and years of education (Mantarazzo & Herman, 1984; Rowe, Vesterdal, & Rodgers, 1998), then what is the link between intelligence and religiosity? Research by

Cacioppo and Petty (1982) revealed a slightly negative correlation between ACT scores and dogmatism, but dogmatism is not a very strong correlate of religious belief. Along the same lines, Simon and Ward (1975) found a negative correlation between intelligence and religious belief. Unfortunately, these studies measured intelligence in terms of self-reported ACT scores or the Raven Progressive Matrices test, instruments that are not widely-used indicators of IQ or general intelligence. Without studies based on valid measures of intelligence, such as the WAIS-III (Wechsler, 1997), it is impossible to be certain whether acceptance of religious and spiritual tenets is negatively related to general intelligence. It is also important to carefully define and operationalize *religiousness* and *spirituality*, something previous studies have often failed to do.

#### RELIGIOUSNESS AND SPIRITUALITY

After considering many diverse definitions of religion and spirituality, Emmons (1999a) defined the religious and the spiritual as “that realm of life which is concerned with ultimate purpose and meaning in life, a set of principles and ethics to live by, commitment to God or a higher power, a recognition of the transcendent in everyday experience, a selfless focus, and a set of beliefs and practices that is designed to facilitate a relationship with the transcendent” (p. 92). Although most researchers support this broad definition of religiousness and spirituality, there is little agreement about the distinction between the two constructs (Zinnbauer, Pargament, & Scott, 1999). According to Piedmont (1997), religiousness concerns the social and organizational aspects of relations with the divine, whereas spiritual transcendence, his term for spirituality, is a “personal search for connection with a larger sacredness” (p. 989). A spiritual search is an attempt to identify exactly what is sacred and what is worthy of committing oneself to (Emmons, 1999a). It is difficult to tell from the various conceptual discussions of religiousness and spirituality how similar and/or different the two states are.

In a study by Zinnbauer and Pargament (1998), 42% of respondents, a plurality, identified religiousness and spirituality as somewhat distinct while also sharing overlapping features, like two partially overlapping circles in a Venn diagram. The researchers did not, however, specify precisely what beliefs and behaviors are shared by and distinct to religiousness and spirituality.

#### THE CURRENT STUDY

Because previous studies of intelligence and religiosity have not been based on an optimal measure of IQ and have not distinguished clearly between religiosity and spirituality, I undertook a new study using better measures. I used the Wechsler Adult Intelligence Scale—Third Edition (WAIS-III; Wechsler, 1997), which is widely recognized as one of the best designed and standardized measures of IQ. The WAIS-III combines scores on tests of verbal concept formation, short-term and long-term memory, attention, visual-motor ability, perceptual organization, psychomotor speed, and pattern recognition to yield three scores: Verbal IQ (VIQ), Performance IQ (PIQ), and Full Scale IQ (FSIQ).

I operationalized spirituality with the Spiritual Transcendence Scale (STS; Piedmont, 1999). According to Piedmont, spiritual transcendence is a “personal search for connection with a larger sacredness” (p. 989), whereas religiousness concerns the social and organizational aspects of relations with the divine. Spiritual transcendence as measured by the STS comprises *connectedness* (the belief that one is an important link in the chain of humanity), *universality* (belief in the unity of all life), and *prayer fulfillment* (the joy and contentment that arise from communion with “a transcendent reality”).

I measured religiousness, as distinct from spirituality, in terms of religious background, self-classification, and behavior. I asked study participants about the involvement of their family and friends in religious activities; their family’s degree of religiosity; the number of years, if any, spent in a religiously affiliated school; and personal involvement in religious activities, such as attending church, praying, and

reading religious literature. I also asked participants whether they were religious, spiritual, atheistic, or agnostic, and with what if any religion they most closely identified. Participants also answered background questions about their age, parents' levels of education, SAT scores, and academic achievement (high school, last college quarter, and college cumulative grade point average, or GPA).

Past research suggests that correlating IQ with spirituality and religiosity will yield significant negative associations. I hypothesized that, using a valid measure of IQ, the current study will support this finding. By differentiating between religiousness and spirituality, the current study should also clarify whether the negative correlation between IQ or education and religiosity exists for spirituality as well, and help researchers distinguish between these constructs in future studies.

## Method

### PARTICIPANTS

Seventy-seven University of California, Davis, undergraduate students (60 women, 17 men), who were recruited for extra credit in introductory Psychology classes, participated in this study. When asked their ethnicity, 22 identified themselves as Asian or Asian American, 34 identified themselves as Caucasian, and the other 21 identified themselves as African American, Latino, Mixed, or Other. Their ages ranged from 17 to 24 years, with a mean of 19.40 years. The level of education of their fathers ( $M = 2.72$ , where 2 indicates some college and 3 indicates completing a college degree) was significantly higher than their mothers' level of education ( $M = 2.36$ , using the same scale) [ $t(74) = 2.87, p < .01$ ]. (Here and elsewhere in this paper,  $N$ 's that differ from 77—the numbers of participants—reflect missing data on some variables). The mean GPA of the participants in their major was 3.02 (a B average). Their mean self-reported Quantitative SAT (QSAT) score was 594.43 and their mean Verbal SAT (VSAT) score was 569.86, scores that are both above the national average (roughly 500). Their mean Verbal and Performance IQs (116.95 and 115.23, respectively) reached well into the High Average range of cognitive ability.

Forty-eight percent said they are religious (they believed in God and a structured form of religion, such as Christianity, Hinduism, Islam, or Judaism); 25% classified themselves as spiritual (they did not endorse a structured form of religion but believed in the existence of a higher power); 20% called themselves agnostic; and only 8% were atheists. Most respondents were Catholic (22%), Protestant (20%), Buddhist (13%), Jewish (8%), or placed themselves in the "Other" category (38%); however, those who identified themselves as Other were still likely to call themselves religious rather than agnostic or atheist.

### MEASURES

As mentioned earlier, the WAIS-III was used to measure IQ. Its high reliability and validity have been documented by numerous researchers (Wechsler, 1997). A background questionnaire was used to assess age, self-reported SAT Math and Verbal scores, major GPA, and parental levels of education. A religious background questionnaire designed especially for this study was used to assess each participant's religion, relationship to God, religious behavior, family religiousness, and religious schooling. The STS (Piedmont, 1999) was used to measure spirituality.

### PROCEDURE

First, each participant was given the WAIS-III, which was individually administered by a trained examiner. Participants took an abbreviated form of the WAIS-III. Research has demonstrated that abbreviating the WAIS-III does not significantly compromise VIQ, PIQ, or FSIQ scores (Wymer, Rayls, & Wagner, 2003); therefore, due to time constraints, participants were given only the Picture Completion, Vocabulary, Digit-Symbol-Coding, Similarities, Block Design, Arithmetic, Matrix Reasoning, Digit Span, and Information sub-tests (but not the Comprehension and Picture Arrangement sub-tests). Participants'

scores on sub-tests within the performance and verbal domains, respectively, were averaged to estimate the scores they would have obtained on the Comprehension and Picture Arrangement sub-tests, and then overall VIQ and PIQ scores were computed. The administration and scoring procedures were the ones described in the WAIS-III Administration and Scoring Manual (Wechsler, 1997), including the derivation of the FSIQ. In addition to being tested for intelligence, each participant completed a computer-based series of short questionnaires: a demographics questionnaire, a religious background questionnaire, and the STS. When a participant had successfully completed the questionnaires, he or she was thanked, provided with answers to any questions, and excused from the experiment. Each experimental session lasted between 35 and 60 minutes.

## Results

All data analyses were computed using the Statistical Package for the Social Sciences (2001; release 11.0). The descriptive statistics for all variables are shown in Table 1 (see Appendix).

### RELIGIOUSNESS, SPIRITUALITY, AND INTELLIGENCE

To assess the degree of association between pairs of continuous variables, I computed Pearson correlation coefficients. The results are displayed in Table 2. I wanted to explore the association between Relationship to God (whether someone identified him- or herself as religious, spiritual, agnostic, or atheist) and SAT scores. An analysis of variance (ANOVA) comparing the QSAT scores of participants in the four different relationship-to-God categories was significant ( $F(3,66) = 3.74, p < .02$ ). A Bonferroni post hoc comparison of means indicated that the significant difference was due primarily to religious individuals having lower QSAT scores than atheists. In order to see whether there was a similarly negative correlation between QSAT scores and the frequency of religious behavior, I combined the religious behavior items (frequency of reading sacred texts and other religious literature, attending religious services, and praying) to form an internally consistent religious behavior scale (Cronbach's alpha = .81). This scale was negatively correlated with QSAT ( $r = -.31, p < .05$ ).

Significant negative correlations emerged between Prayer Fulfillment (a sub-scale of the STS measuring "the joy and contentment that arise from communion with a transcendent reality") and self-reported Verbal SAT, self-reported Quantitative SAT, and Verbal IQ as measured by the WAIS-III ( $r_s = -.25, -.30, -.27$ ; all  $p_s < .05$ ). When these correlates of Prayer Fulfillment, all of which were also correlated with each other ( $r_s$  ranged from .25 to .62, all  $p_s < .05$ ), were entered into a regression analysis to predict Prayer Fulfillment, only self-reported QSAT ( $\beta = -.24, p = .054$ ) made a significant unique contribution, although all three beta coefficients were negative.

Because QSAT was also related to father's education level, I wanted to see if father's education was negatively related to the offspring's prayer fulfillment. Additional analysis, not planned a priori, revealed a significant negative correlation ( $r = -.24, p < .05$ ); however, when I tried to predict prayer fulfillment in a regression analysis from father's education level and participant's quantitative SAT score, the significant association between father's education and offspring's prayer fulfillment became insignificant. The only remaining significant predictor of prayer fulfillment was the participant's QSAT score.

Connectedness, another subscale of the STS that measures the belief that one is an important part of humanity and plays an integral role in its continued harmony, was positively correlated with current GPA in one's major ( $r = .29, p < .05$ ).

### IQ AND SAT SCORES

To evaluate the use of self-reported SAT scores as rough measures of intelligence, I ran a Pearson correlation. Verbal IQ and self-reported Verbal SAT were significantly correlated ( $r = .62, p < .05$ ) and

Performance IQ and Quantitative SAT were significantly correlated ( $r = .34, p < .05$ ), suggesting that people's remembered SAT scores were at least roughly accurate, and that the self-reported SAT scores were generally consistent with measured IQ scores. There was also a significant positive correlation between Verbal SAT scores and both parents' education levels (mother,  $r = .30, p < .05$ ; father,  $r = .37, p < .05$ ), but QSAT and VIQ scores were correlated only with the father's level of education ( $r = .30, p < .05, r = .26, p < .05$ ).

#### RELIGIOUSNESS AND SPIRITUALITY

Prayer Fulfillment and Universality (both sub-scales of the STS, the former self-explanatory and the latter measuring the unity of all life) were positively correlated with reading religious scripture ( $r = .46, p < .05, r = .53, p < .05$ ), reading other forms of religious literature ( $r = .36, p < .05, r = .28, p < .05$ ), praying ( $r = .54, p < .05, r = .52, p < .05$ ), and attending religious services on one's own ( $r = .53, p < .05, r = .31, p < .05$ ). Having friends who are involved in religious activities was correlated significantly with Prayer Fulfillment but not with Universality ( $r = .28, p < .05, r = .07, ns$ ). As mentioned earlier, these religious behavior items were combined to form an internally consistent religious behavior scale.

The association between this scale and self-categorization of Relationship to God (i.e., as religious, spiritual, agnostic, or atheistic) was assessed with an analysis of variance, and the resulting  $F$  value was statistically significant ( $F(3,73) = 26.72, p < .01$ ). The results, as well as parallel ANOVAs for the components of the scale, are shown in Table 3 (Appendix). Religious individuals reported a higher degree of religious behavior than spiritual, agnostic, or atheistic individuals. In considering the effects of religion-related self-categorization on the separate components of the religious behavior scale, notice that religious individuals scored higher on Prayer Fulfillment than spiritual, agnostic, and atheist participants as assessed by an ANOVA. Through the use of Bonferonni's multiple comparisons, I found that religious individuals pray significantly more than spiritual individuals, who pray more than agnostic individuals, who pray more than atheist individuals. Using this post hoc test, I also found that spiritual and religious individuals were significantly higher in Universality than either agnostics or atheists.

The results of an additional ANOVA indicated that Protestants had higher religious behavior scores than Buddhists. Participants who identified themselves as Protestant or Catholic were more likely to identify themselves as religious rather than spiritual, agnostic, or atheist. Atheists were more likely than other participants to be Buddhists. Agnostics were most likely to fall into the Other category of religions.

### Discussion

#### RELIGIOUSNESS, SPIRITUALITY, AND INTELLIGENCE

The main purpose of the study was to determine whether religiosity is negatively related to intelligence, and if it is, whether the same negative relationship exists for spirituality. I also wanted to know whether a well-validated measure of intelligence, the WAIS-III, would reveal a negative relation between religiosity and intelligence. The findings indicated that religious participants did have significantly lower QSAT scores than members of the other three relationship-to-God categories (spiritual, agnostic, and atheist). This result suggests that religious individuals are somewhat lower in quantitative ability, perhaps suggesting less rigor in certain kinds of reasoning. This pattern did not extend to the other relationship-to-God categories, suggesting that there is something special about the people who identified themselves as religious.

The pattern also did not extend to the other main measure of quantitative ability, the Performance IQ score, even though the two quantitative ability measures were significantly correlated with each other. These results suggest that acquired quantitative ability (as measured by the QSAT) may be more negatively related to religiosity than inherent quantitative ability (as measured by the PIQ score). Further research

would be needed to specify the precise kinds of incompatibility between trained quantitative reasoning and religiosity. It is interesting that father's education was significantly related, positively, to several of the ability measures, and related negatively to prayer fulfillment. This set of findings is consistent with the possibility that educated fathers help their children learn to think rigorously, a capacity that then lowers religiosity and spirituality in certain ways. This process is worth examining in future studies.

It is important to say more about what being "religious" means in the present context. Participants who placed themselves in the "religious" category were disproportionately Protestants and Catholics, rather than Jews, Buddhists, and other kinds of religious people ("Other"). Thus, religiosity for the people who called themselves religious seems likely to be some form of traditional Christianity. When several religious behavior items (e.g., reading religious literature, praying frequently, attending religious services) were combined to form an internally consistent religious behavior scale, the scale was negatively correlated with the quantitative SAT score (the same scale that related negatively to prayer fulfillment and being religious, according to self-categorization).

Prayer fulfillment, feeling that joy and contentment have been achieved through prayer, was negatively related to both SAT scores and verbal IQ as assessed by the WAIS-III. In a regression equation predicting prayer fulfillment from these three different indicators of intelligence, only the quantitative SAT score had a unique effect (a negative effect), suggesting that quantitative skill or something closely associated with it interferes with prayer fulfillment, at least when the latter is defined by the Spiritual Transcendence Scale. Because the QSAT predicted low prayer fulfillment better than performance IQ or either of the verbal measures, it seems likely that specific training in quantitative reasoning is an important factor.

Because QSAT was related to father's education level, and both were related to (lower) prayer fulfillment, I conducted a regression analysis to predict prayer fulfillment from both father's education and participant's QSAT score. Only participant's QSAT score remained as a significant predictor, suggesting again that the relation between father's education and offspring's prayer fulfillment is mediated by the offspring's QSAT score. It therefore seems possible that educated fathers, who in some cases have received advanced training in science and mathematics, have an influence on their offspring in both quantitative ability, as reflected in the QSAT score, and a lower level of prayer fulfillment. This correlation might mean that whatever rigorous reasoning or scientific skepticism was demonstrated by the father put the brakes on the offspring's ability to feel joyfully fulfilled by prayer.

Connectedness, the belief that one is an important link in the chain of humanity, seemed to work very differently than prayer fulfillment, even though the two variables were significantly correlated with each other (.23). Connectedness was positively correlated with GPA in one's major but not significantly related to any of the "intelligence" indicators. This finding suggests either that students perform better in college when they feel significant, less alienated, and well connected emotionally with their family and community, or that people who succeed in school tend to feel less alienated and more socially connected because of their success. There is a large body of research supporting the first interpretation (e.g., Lopez, Mitchell, & Gormley, 2002). It seems likely that this set of interconnected variables has little to do with intelligence, and in fact in the present study, perhaps surprisingly, GPA in one's major was not related significantly to the intelligence variables.

#### IQ AND SAT SCORES

This study also validated the use of self-report SAT scores as a rough measure of IQ and helped to clarify the relationship between parental education and IQ and SAT scores. There was a significant positive correlation between Verbal SAT scores and both parents' education levels, but QSAT and VIQ scores were correlated only with the father's level of education. Although Performance IQ should be a better

measure of quantitative intelligence than a self-reported QSAT score, the latter score proved in the present study to be a better predictor of religiosity and prayer fulfillment. This correlation suggests that the negative relationship between quantitative intelligence and traditional religiosity is not necessarily due to intelligence per se, if intelligence is conceptualized mainly as an inherent ability. Rather, the negative associations among QSAT, religiosity, and prayer fulfillment may be due to learned skills in reasoning, perhaps influenced in the home by the father's education level.

#### RELIGIOUSNESS AND SPIRITUALITY

This study helps to clarify the relationship between religiousness and spirituality. Individuals who identified themselves as religious prayed more, were more satisfied with their prayer, and engaged in more religious behavior (attending religious services, praying, and reading religious scripture and literature) than their spiritual, agnostic, and atheistic counterparts. They also had higher prayer fulfillment scores than those who identified themselves as spiritual. Because religious individuals' increased frequency of prayer was correlated with prayer fulfillment, which had been considered previously as existing within the spiritual sphere, it would seem better to view prayer fulfillment as an aspect of religiosity rather than of spirituality. Religiosity and spirituality as measured here seem to differ in degree rather than in kind; both religious and spiritual individuals performed activities thought to be either "religious" or "spiritual," but religious individuals did them more frequently. Moreover, along the same conceptual continuum, agnostics performed these behaviors less frequently than spiritual individuals, and atheists performed them least of all.

Spiritual and religious participants also reported higher family religiousness than agnostic participants, a result that is consistent with claims that parental religiousness is a good predictor of children's religiousness (Spilka, Hood, Hunsberger, & Gorsuch, 2003). Frequency of prayer also corresponded to the level of reported religiousness within the family, a relationship that suggests that certain religious behaviors, such as prayer, are learned first in the home and are then generally continued while attending college. This pattern may occur even after offspring categorize themselves as spiritual rather than religious, a move that they probably interpret as moving away from their parents' form of religion. This speculation—that spirituality is often a step away from a traditional form of religiosity associated with parents' beliefs and commitments—deserves further study.

#### LIMITATIONS AND IMPLICATIONS FOR FUTURE RESEARCH

Unfortunately, characteristics of my sample may limit generalization of the findings. One such characteristic is gender. The study consisted primarily of women, who are universally more religious than men (Stark, 2003). The mean IQ of the population is also an area of concern. Mean IQ scores for both men and women in this study reached well into the high-average range of cognitive ability (the general population mean is 100). The findings might be somewhat different, or even stronger, if a wider range of intellectual ability were sampled.

Religious self-identification by the participants may also limit generalization. Forty-eight percent of the participants declared themselves as religious, twenty-five percent as spiritual, twenty percent as agnostic, and eight percent as atheists. This distribution differs from that found in the United States population, which does not have as many atheists or agnostics (Shermer, 2000). The representation of religions in the current study was similarly skewed; most respondents were Protestant or Catholic.

Social desirability bias also poses a threat to the validity of this study. Past research has shown that studies regarding religion and spirituality elicit concern in a participant for what others would think about his or her answers, thus prompting people to answer in more socially desirable ways (Spilka et al.,

2003). Though confidentiality was ensured for each participant, the mere presence of the examiner could have elicited a social desirability bias.

Reliability of the measures was satisfactory in this study, but validity is a more problematic issue. The Spiritual Transcendence Scale, the WAIS-III, and the religiousness measure are just a few of many available measures of the constructs under consideration here. Though they are reliable, they may not be testing exactly what they are meant to test, so future researchers should attempt to develop even clearer definitions and more valid measures.

## References

- Emmons, R. (1999a). *The psychology of ultimate concerns: Motivation and spirituality in personality*. New York, NY: Guilford Press.
- Emmons, R. (1999b). Religion in the psychology of personality: An introduction. *Journal of Personality*, 67, 873-888.
- Feldman, K. (1969). Change and stability of religious orientations during college: Part I, Freshman-senior comparisons. *Review of Religious Research*, 11, 40-60.
- Freethought Today. (April, 2000). Retrieved from [http://www.ffrf.org/fttoday/april2000/weinberg\\_quotes.html](http://www.ffrf.org/fttoday/april2000/weinberg_quotes.html).
- Freud, S. (1927/1962). *The future of an illusion* (rev. ed.). London, UK: Hogarth Press.
- Gallup, G. Jr., & Newport, F. (January 30, 1996). Gallup poll of American religious beliefs. *Wall Street Journal*.
- George, L., Larson, D., Koenig, H., & McCullough, M. (2000). Spirituality and health: What we know, what we need to know. *Journal of Social and Clinical Psychology*, 19, 102-116.
- Greeley, A. (2002). *Religion in Europe at the end of the second millennium: A sociological profile*. New Brunswick, NJ: Transaction Publishers.
- Hill, P., Pargament, K., Hood, R., McCullough, M., Swyers, J., Larson, D., & Zinnbauer, B. (2000). Conceptualizing religion and spirituality: Points of commonality, points of departure. *Journal for the Theory of Social Behaviour*, 30, 51-77.
- Karren, K., Hafen, B., Smith, N., & Frandsen, K. (2002). *Mind/body health: The effects of attitudes, emotions, and relationships*. San Francisco, CA: Benjamin Cummings.
- Levin, J., & Vanderpool, H. (1992). Religious factors in physical health and the prevention of illness. In K. Pargament, K. Maton, & R. Hess (Eds.), *Religion and prevention in mental health: Research, vision, and action*. (pp. 41-64). New York, NY: Haworth Press.
- Lopez, G., Mitchell, P., & Gormley, B. (2002). Adult attachment orientations and college student distress: Test of a mediational model. *Journal of Counseling Psychology*, 49, 460-467.
- Mantarazzo, J., & Herman, D. (1984) Relationship of education and IQ in the WAIS-R standardization sample. *Journal of Consulting and Clinical Psychology*, 52, 631-634.
- Marx, K. (1844/2001). Contribution to the critique of Hegel's philosophy of law. Reprinted in S. Monahan, W. Mirola, & M. Emerson (Eds.). *Sociology of religion: A reader*. (pp. 15-16). Upper Saddle River, NJ: Prentice Hall.
- McLennan, S. (1999). *Finding your religion: When the faith you grew up with has lost its meaning*. New York, NY: HarperCollins.

- Piedmont, R. (1999). Does spirituality represent the sixth factor of personality? Spiritual transcendence and the five-factor model. *Journal of Personality*, 67, 985-1013.
- Poloma, M., & Pendleton, B. (1989). Exploring types of prayer and quality of life research: A research note. *Review of Religious Research*, 31, 46-53.
- Pyszczynski, T., Greenberg, J., & Solomon, S. (1997). Why do we need what we need? A terror management perspective on the roots of human social motivation. *Psychological Inquiry*, 8, 1-20.
- Rowe, D., Vesterdal, W., & Rodgers, J. (1998). Herrnstein's syllogism: Genetic and shared environmental influences on IQ, education, and income. *Intelligence*, 26(4), 405-423.
- Shermer, M. (2000). *How we believe*. New York, NY: W.H. Freeman.
- Simon, A., & Ward, L. O. (1975). Age, sex, intelligence and religious beliefs in 11- to 15-year old pupils. *The Irish Journal of Education*, 9, 108-114.
- Spilka, B., Hood, R., Hunsberger, B., & Gorsuch, R. (2003). *The psychology of religion: An empirical approach*. New York, NY: Guilford Press.
- Stark, R. (2003). Physiology and faith: Addressing the "universal" gender difference in religious commitment. *Journal for the Scientific Study of Religion*, 41, 495-506.
- Wechsler, D. (1997). *Manual for the Wechsler Adult Intelligence Scale-III*. San Antonio, TX: The Psychological Corporation.
- Wymer, J., Rayls, K., & Wagner, M. (2003). Utility of a clinically derived abbreviated form of the WAIS-III. *Archives of Clinical Neuropsychology*, 18, 917-927.
- Zinnbauer, B., & Pargament, K. (1998). Spiritual conversion: A study of religious change among college students. *Journal for the Scientific Study of Religion*, 37, 161-180.
- Zinnbauer, B., Pargament, K., & Scott, A. (1999). The emerging meanings of religiousness and spirituality: Problems and prospects. *Journal of Personality*, 67, 889-919.

## Appendix

**Table 1:  
Means and Standard Deviations**

***“Intelligence” Variables:***

	Mean	Standard Deviation	Possible Range
Verbal IQ	116.95	12.50	40-155
Performance IQ	115.23	11.60	40-155
Verbal SAT	569.86	92.34	200-800
Quantitative SAT	594.43	78.235	200-800
Current UCD GPA in your major	3.02	.619	0.00-4.00

***Religiousness and Spirituality Variables:***

	Mean	Standard Deviation	Possible Range
How often do you pray?	2.01	.90	1-4*
How often do you read sacred scriptures?	1.70	.65	1-4*
How often do you read other religious literature?	1.49	.53	1-4*
How often do you attend religious services on your own?	1.48	.82	1-4*
Total Religious Behavior Factor	8.7	3.09	6-24
How religious is your family?	2.22	.96	1-4^
Prayer Fulfillment	27.14	6.38	9-45
Connectedness	16.14	3.40	6-30
Universality	33.34	4.66	9-45

Note: \* Items were scored on a 1-4 scale where 1= Never, 2= Occasionally, 3= Daily, and 4= Several times a day.

^ Items were scored on a 1-4 scale where 1= Not at all religious, 2= Somewhat religious, 3= Religious, and 4= Very religious.

**Table 2:**  
**Correlation Coefficients for IQ, SAT, Religious Behavior, and Spirituality** (*all p < .05*)

	Verbal IQ	Performance IQ	Verbal SAT	Quantitative SAT	UCD GPA in major
Prayer Fulfillment	-.27*	-.10	-.25*	-.30*	-.16
Connectedness	-.06	-.16	0.87	-.10	.27*
Universality	-.10	-.05	-.04	-.22	-.02
How often do you pray?	-.04	.04	-.11	-.19	-.04
How often do you read sacred scriptures?-	.08-	.05	-.03	-.18	.02
How often do you read other religious literature?	.02	-.04	.03	-.30*	-.00
How often do you attend religious services on you own	-.11	-.03	.02	-.10	.11
Total Religious Behavior	-.14	-.04	-.12	-.31**	-.04
How religious is your family?	-.20	-.07	-.13	-.23	.00

**Table 3:**  
**ANOVA of Relationship to God by Religious Behavior and Spiritual Transcendence**

	Religious	Spiritual	Agnostic	Atheist	Possible Range
Religious Behavior	10.97 <sub>a</sub>	7.32 <sub>b</sub>	5.93 <sub>b</sub>	6.17 <sub>b</sub>	6-24
Frequency of Prayer	2.57 <sub>a</sub>	1.95 <sub>b</sub>	1.13 <sub>c</sub>	1.00 <sub>c</sub>	1-4*
Family Religiousness	2.54 <sub>a</sub>	2.26 <sub>a</sub>	1.33 <sub>b</sub>	2.33 <sub>a</sub>	1-4^
Prayer Fulfillment	30.51 <sub>a</sub>	26.05 <sub>b</sub>	22.13 <sub>b</sub>	22.33 <sub>b</sub>	9-45
Connectedness	15.76 <sub>a</sub>	17.89 <sub>a</sub>	15.47 <sub>a</sub>	14.67 <sub>a</sub>	6-30
Universality	34.97 <sub>a</sub>	34.63 <sub>a</sub>	30.27 <sub>b</sub>	27.00 <sub>b</sub>	9-45

Note: Means within a row that do not share a subscript are significantly different at  $p < .05$  according to a Bonferroni post hoc test.

\* Items were scored on a 1-4 scale where 1= Never, 2= Occasionally, 3= Daily, and 4= Several times a day.

^ Items were scored on a 1-4 scale where 1= Not at all religious, 2= Somewhat religious, 3= Religious, and 4= Very religious.