

# Understanding the Relationship Between Religiousness, Spirituality, and Underage Drinking: The Role of Positive Alcohol Expectancies

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**Abstract** Research has consistently found that religiousness and spirituality are negatively associated with underage drinking. However, there is a paucity of research exploring the mechanisms by which these variables influence this important outcome. With 344 underage young adults (ages 18–20; 61 % women), we investigated positive alcohol expectancies as a mediator between religiousness and spirituality (measured separately) and underage alcohol use. Participants completed the Religious Commitment Inventory-10, Daily Spiritual Experiences Scale, Alcohol Expectancies Questionnaire, and Drinking Styles Questionnaire. Results indicate less positive alcohol expectancies partially mediate the relationship between both religiousness and spirituality and underage alcohol use. This suggests religiousness and spirituality's protective influence on underage drinking is partly due to their influence on expectations about alcohol's positive effects. Since underage drinking predicts problem drinking later in life and places one at risk for serious physical and mental health problems, it is important to identify specific points of intervention, including expectations about alcohol that rise from religious and spiritual factors.

**Keywords** Underage drinking · Religiousness · Spirituality · Expectancies

## Introduction

Underage alcohol consumption is a pervasive problem in the United States. According to the National Survey on Drug Use and Health (SAMHSA 2007), rates of alcohol use and binge drinking increase sharply from age 12 to 20, topping out with 54 % of 20-year-olds reporting alcohol consumption in the past month and 40 % reporting binge drinking in the past month. These rates of alcohol use in an underage population are worrisome as there

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are a variety of risks associated with underage alcohol consumption that are less pronounced later in life (Zeigler et al. 2005). The physical health risks include problems in brain development and neuropsychological functioning that may persist into adulthood (Brown et al. 2008), as well as greater risk for accidental injury or death (Courtney and Polich 2009; Ham and Hope 2003). Underage alcohol consumption is also associated with legal repercussions, interpersonal problems, low academic achievement, and sexual risk taking (Courtney and Polich 2009; Halpern-Felsher et al. 1996; Ham and Hope 2003; Langer et al. 2001). Finally, heavy underage alcohol use is linked to the development of alcohol use disorders in later adulthood (Brown et al. 2008; Hingson et al. 2000; O'Neill et al. 2001).

Given the risks associated with underage alcohol use, it is important to develop specific points of intervention. Identifying protective factors, variables associated with lower rates of underage alcohol use, is an important first step in developing interventions for underage alcohol use. Toward this effort, much research has studied the role of religiousness and spirituality in adolescents' and young adults' alcohol use. To summarize this large body of research (e.g., Nonnemaker et al. 2003; Wills et al. 2003; Stewart 2001), greater religiousness and spirituality predict less underage alcohol use, but the mechanisms by which this occurs are largely unknown. Although it may not be practical or ethical to design interventions for underage alcohol consumption around increasing religiousness and spirituality, understanding *how* these factors exert their influence may provide important information on which to build interventions. Thus, the purpose of the present study is to investigate the mechanisms through which religiousness and spirituality, as separate variables, act as protective factors against underage alcohol use.

Religiousness is broadly defined as having belief in the existence of sacred involvement in human life, subscription to the formalized ideological principles associated with a group, and adherence to practices (e.g., prayer, service attendance, etc.) motivated by this group affiliation. Religiousness can be measured in several ways, including belief in God, frequency of service attendance, frequency of prayer, and the importance of religion in one's life; these indicators are highly inter-correlated (McCullough et al. 2005) and are negatively associated with alcohol use in underage samples (Mason and Windle 2002; Nonnemaker et al. 2003; Rostosky et al. 2007; Wills et al. 2003). In fact, religiousness is often associated with abstinence from alcohol altogether (Wallace et al. 2003). However, when underage individuals high in religiousness do consume alcohol, the frequency and quantity of their alcohol use is significantly lower than peers who do not identify as religious (Nonnemaker et al. 2003; Poulson et al. 1998; Rew and Wong 2006). Religiousness may act as a protective factor against underage alcohol use as religious traditions offer specific proscriptions against defiling the sanctity of one's physical, mental, or spiritual self (Worthington 1993) or breaking societal laws (Benda et al. 2006).

Spirituality is also defined by the belief that there is sacred involvement in human life; however, distinct from religiousness, which emphasizes group affiliation and prescribed actions, spirituality involves one's personal relationship with transcendent in daily life (Piedmont 1999). Like religiousness, spirituality is generally associated with less underage alcohol use (Leigh et al. 2005; Stewart 2001; Sussman et al. 2006), although the magnitude of this relationship is smaller than that between religiousness and alcohol use. Perceived strength or support from one's subjective connectedness with a higher power is associated with decreased distress and greater well-being (Waldren-Perrine et al. 2011). Perhaps lower underage alcohol consumption in individuals that identify as spiritual may be due to less reliance on alcohol for distress management or feelings of connectedness to others, as

these needs are fulfilled through their relationships with the transcendent (Ciarrocchi and Brelsford 2009).

In contrast to religiousness and spirituality, the cognitive process of positive alcohol expectancies (Ham and Hope 2003; Hittner 1997; Lewis and O'Neill 2000; Thompson et al. 2009; Werner et al. 1995) represents a major risk factor for underage drinking. Generally speaking, expectancies are learned beliefs about the outcomes of future behaviors (Tolman 1932). Positive alcohol expectancies, in particular, include beliefs that alcohol will alleviate tension and anxiety or that alcohol will enhance social functioning. Strong positive alcohol expectancies predict the onset of underage alcohol consumption, the maintenance of maladaptive drinking behavior, and alcoholism (Goldman et al. 1991; Smith et al. 1995). Further support for the role of expectancies in predicting alcohol consumption has been demonstrated through experimental research in which challenging positive expectancies reduced alcohol consumption in heavy-drinking college students (Darkes and Goldman 1998). Overall, it appears that alcohol expectancies are an important factor in the initiation and maintenance of drinking behavior.

Religiousness, spirituality, and alcohol expectancies are all considered distal factors in the prediction of alcohol consumption. Alcohol expectancies are conceptualized as a distal factor because there is evidence to suggest that beliefs about alcohol are formulated in children as young as 8 years old, well before any alcohol use (Miller et al. 1990). Similarly, religiousness and spirituality are cultivated at a young age and are often derived from one's family of origin (Mahoney 2010). It seems likely that beliefs about the effects of alcohol, formed early in life, may be shaped by religious and spiritual traditions within the family. Further, it seems likely that individuals high in religiousness and spirituality may have less positive expectancies about alcohol consumption, leading to lower consumption of alcohol than individuals without such religious/spiritual beliefs. Although the above relationships among religiousness, spirituality, and alcohol expectancies are probable, very little research has examined such relationships. Johnson et al. (2008) explored relationships between religiousness, spirituality, alcohol expectancies, and alcohol use in a college student sample. Unfortunately, because a composite score was used to assess religiousness and spirituality together, it is difficult to draw conclusions regarding the differential pathways through which religiousness and spirituality predict alcohol consumption. Additionally, items that assessed positive expectations about the effects of alcohol were worded such that participants indicated how often they drank due to a particular expectation, making it difficult to assess beliefs (unrelated to actions) in individuals that do not consume alcohol or do so infrequently.

The purpose of the current study was to investigate alcohol expectancies as a mechanism through which religiousness and spirituality, as separate variables, act as protective factors against underage alcohol use. The current study had two specific aims: (1) to examine the extent to which religiousness and spirituality are associated with less positive alcohol expectancies, and (2) to test alcohol expectancies as a mediator of the relationship between religiousness and spirituality and alcohol consumption.

## Method

### Participants

All 344 participants were between 18 and 20 years old ( $M_{\text{age}} = 18.8$ ,  $SD = 0.68$ ) and attended a large, public university in the southeastern United States. Most participants were

women (60.5 %,  $n = 208$ ). The racial and ethnic background of participants was as follows: White/Caucasian, non-Hispanic (88.9 %,  $n = 306$ ), Black/African American (5.5 %,  $n = 19$ ), Asian (2.0 %,  $n = 7$ ), multi-racial (1.7 %,  $n = 6$ ), Hispanic/Latino (1.5 %,  $n = 5$ ), and American Indian/Alaskan Native (0.4 %,  $n = 1$ ). Participants' religious preference included Christianity (80.5 %,  $n = 277$ ), Buddhism (0.3 %,  $n = 1$ ), Hinduism (0.3 %,  $n = 1$ ), Islam (0.3 %,  $n = 1$ ), other (7.8 %,  $n = 27$ ), and none (10.2 %,  $n = 35$ ); less than 1 % ( $n = 2$ ) of participants did not report a religious preference. Participants' employment status included unemployed (62.2 %,  $n = 227$ ), employed part-time (33.2 %,  $n = 121$ ), employed full-time (0.5 %,  $n = 2$ ), and "other" (4.1 %,  $n = 15$ ).

## Procedures

Due to the focus on underage alcohol use among young adults, eligibility for this study required being between 18 and 20 years old. Participants were recruited through entry-level psychology courses that were open for enrollment to all university students. Course instructors announced the study in class, and participants were given extra credit toward their coursework for completion. To guard against coercion, students were provided an alternative extra credit assignment if they declined study participation. Participants were given a link to an online survey to complete study procedures in a private setting. All participants provided informed consent, and responses were kept anonymous. Research procedures were approved by the University of Kentucky Institutional Review Board. Data were collected during the spring of 2009.

## Measures

### *Demographic Form*

All demographic variables were assessed using single items, which allowed participants to choose from several categorical response options.

### *Drinking Styles Questionnaire (DSQ)*

The DSQ is a comprehensive measure of alcohol use that is composed of two factors: (1) Drinking/Drunkness and (2) Alcohol-Related Problems (Smith et al. 1995). The Drinking/Drunkness factor was used in this study and assesses typical frequency and quantity of alcohol consumption, most alcohol consumed on one occasion, lifetime experience of hangover/nausea/vomiting, frequency of drunkness, and proportion of time drinking leads to drunkness. Participants responded to DSQ items by choosing from available response options, the number and nature of which varies from item to item. Research has found that the Drinking/Drunkness factor correlates highly with collateral reports of drinking in both male and female samples, giving support to the convergent validity of the DSQ (Smith et al. 1995). In this sample, internal consistency for the Drinking/Drunkness factor was found to be acceptable ( $\alpha = .75$ ).

### *Religious Commitment Inventory-10 (RCI-10)*

The RCI-10 measures "the degree to which a person adheres to his or her religious values, beliefs, and practices and uses them in daily living" (Worthington et al. 2003, p. 85).

Sample items from the RCI-10 include “My religious beliefs lie behind my whole approach to life,” “I enjoy working in the activities of my religious organization,” and “Religion is especially important to me because it answers many questions about the meaning of life.” Responses to all items are rated on a 5-point scale (1 = *not at all true* and 5 = *totally true*). A total score and two subscale scores (Interpersonal and Intrapersonal Religious Commitment) are calculated. Previous research has found that the RCI-10 has strong test–retest reliability, and high convergent and discriminant validity (Worthington et al. 2003). In this sample, the RCI-10 subscale scores were highly correlated ( $r = .87, p < .001$ ), and internal consistency for the total scale was  $\alpha = .95$ . Consequently, the RCI-10 total score was used as an index of religious commitment.

#### *Daily Spiritual Experiences Scale (DSES; Idler et al. 2003)*

The DSES is a six-item measure of the subjective experience of the transcendent in daily life. The DSES was designed to tap ordinary spiritual experiences rather than rare experiences of mysticism, and items were intended to apply equally to experiences within and outside the Judeo-Christian tradition. Sample item: “I am spiritually touched by the beauty of creation.” All items are scored on a 6-point frequency scale from 1 (“many times a day”) to 6 (“never or almost never”), and items are reverse scored such that higher responses indicate greater spiritual experiences. In this sample, coefficient alpha for the DSES was high ( $\alpha = .95$ ).

#### *Alcohol Expectancy Questionnaire (AEQ)*

The AEQ measures expected positive consequences of alcohol consumption, such as social and personal enhancement (Brown et al. 1980, 1987). A forced-choice response format was used, such that participants indicated disagreement (“0”) or agreement (“1”) with each item. Examples of items include “When I am drinking, it is easier to open up and express my feelings,” “My feelings of alienation and isolation decrease when I drink,” and “I often feel sexier after I have had a couple of drinks.” Scoring for the AEQ involved aggregating item scores to produce subscale scores, which were then aggregated to produce a total positive expectancy score. Internal consistency for the AEQ in the current sample was very high ( $\alpha = .95$ ).

## **Results**

### **Preliminary Analyses**

First, it was important to establish that the sample represented a broad range of alcohol use to ensure interpretive power. Scores on the Drinking/Drunkenness scale of the DSQ ranged from 5 to 30 ( $M = 18, SD = 6.9$ ); 88.9 % ( $n = 306$ ) of this underage sample reported having at least one alcoholic drink in their lives. The majority of participants (73.3 %,  $n = 252$ ) reported having an alcoholic drink at least once a month, and the typical quantity of alcohol consumed for most participants (75.6 %,  $n = 260$ ) was described as at least “moderate.” Finally, the frequency of drunkenness was such that the majority of participants (59.3 %,  $n = 204$ ) were found to report getting drunk at least once a month.

## Correlational Analyses

The first hypothesis was that religiousness and spirituality would be significantly related to alcohol expectancies and alcohol use. As can be seen in Table 1, religiousness and spirituality were positively associated with each other and negatively associated with alcohol use and positive alcohol expectancies. Additionally, consistent with predictions, results indicate that positive alcohol expectancies are significantly related to greater alcohol use. These results justify the planned mediational analyses.

## Mediational Analyses

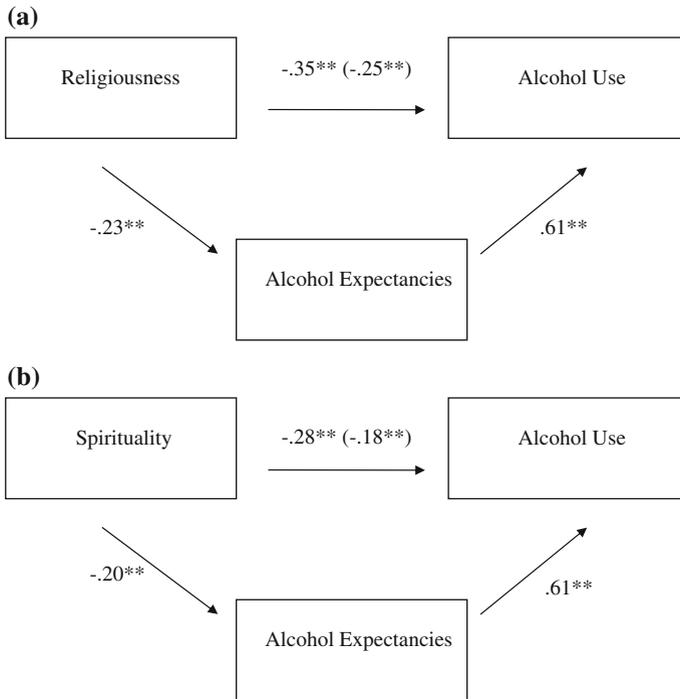
The second hypothesis was that alcohol expectancies would mediate the relationships between both religiousness and spirituality and alcohol use in an underage sample. Religiousness and spirituality were examined separately, using the regression-based methods described by Baron and Kenny (1986), MacKinnon et al. (2000), and Sobel (1982) for testing a mediational hypothesis. Religiousness was a significant negative predictor of both alcohol use and alcohol expectancies, and alcohol expectancies were a significant positive predictor of alcohol use, satisfying the first criteria for mediation. The next step is the test of the relationship between the predictor variable and the outcome variable when the mediating variable is included in the model. The prediction in this case was that the magnitude of the relationship between religiousness (predictor variable) and alcohol use (outcome variable) would be significantly reduced when alcohol expectancies (the mediator variable) was included in the model. To test this, alcohol use was simultaneously regressed onto religiousness and alcohol expectancies. As hypothesized, alcohol expectancies remained a significant predictor of alcohol use over and above religious commitment. Additionally, consistent with the prediction of mediation, the predictive utility of religiousness for alcohol use was decreased (beta dropped from  $-.35$  to  $-.25$ ) with the inclusion of alcohol expectancies in the model. A  $t$  test (MacKinnon et al. 2000) showed that this drop in the regression coefficient was significant,  $t(343) = 3.5$ ,  $p < .01$ . Additionally, a Sobel test of the indirect path between religiousness and alcohol use (through alcohol expectancies) was significant ( $z = 3.72$ ,  $p < .01$ ). These results provide support for the hypothesis that alcohol expectancies mediate the relationship between religiousness and alcohol use. Results can be seen in Fig. 1a.

The above steps were repeated to test the hypothesis that alcohol expectancies mediate the relationship between spirituality and alcohol use. Results can be seen in Fig. 1b. As expected, spirituality is a significant predictor of both alcohol use and alcohol expectancies. When level of alcohol use was simultaneously regressed onto both spirituality and alcohol expectancies, the predictive utility of spirituality decreased (beta dropped from

**Table 1** Correlations among study variables

| Variable                              | 1      | 2      | 3      | 4 |
|---------------------------------------|--------|--------|--------|---|
| 1. Drinking/Drunkenness (DSQ)         | 1      |        |        |   |
| 2. Religiousness (RCI-10 total)       | -.36** | 1      |        |   |
| 3. Daily Spiritual Experiences (DSES) | -.28** | .76**  | 1      |   |
| 4. Alcohol Expectancies (AEQ)         | .62**  | -.23** | -.20** | 1 |

All correlations are Pearson's  $r$



**Fig. 1** Test of mediation by alcohol expectancies of the relationship between religiosity and alcohol use (a) and between spirituality and alcohol use (b). All values are beta coefficients. The value in *parentheses* shows the relationship between the independent variable and alcohol use when the mediator is included in the model

-.28 to -.18), whereas alcohol expectancies remained a significant predictor of alcohol use. A *t* test confirmed that this drop in predictive utility for spirituality was significant,  $t(343) = 4.5, p < .01$ . The Sobel test of the indirect path between spirituality and alcohol use (through alcohol expectancies) was also significant ( $z = 3.24, p < .05$ ). These findings suggest that alcohol expectancies partially mediate the relationship between spirituality and alcohol use.

## Discussion

The primary goal of the present study was to explore the role of alcohol expectancies as a mechanism through which religiosity and spirituality protect against underage alcohol consumption. The first specific aim was to assess how and to what extent religiosity and spirituality are related to the degree to which one's alcohol expectancies are positive. As expected, religiosity and spirituality were both negatively associated with positive alcohol expectancies and alcohol consumption. For religiosity, these results are consistent with the notion that individuals who adhere strongly to religious values and related practices are less likely to have positive expectations about the effects of alcohol. It is likely that religion offers specific proscriptions against defiling the sanctity of one's physical, mental, and spiritual well-being (Worthington 1993) and that these rules are

incorporated into beliefs about alcohol. Further, results suggest that individuals high in spirituality, who already experience reduced distress and subjective closeness with the transcendent through daily spiritual experiences (Ciarrocchi and Brelsford 2009; Waldren-Perrine et al. 2011), may not view alcohol as the best way to facilitate emotion regulation or social closeness. Overall, it is possible that beliefs about the effects of alcohol, formed early in life, may be shaped by religious and spiritual traditions within the family.

The second goal of the present study was to investigate whether alcohol expectancies mediate the relationship between religiousness and spirituality and alcohol consumption. Consistent with hypotheses, individuals high in religiousness and spirituality exhibit less positive expectancies about alcohol consumption, which may lead to lower consumption of alcohol. This represents important finding because although religiousness and, to a lesser degree, spirituality have been shown consistently to be protective factors against underage alcohol use, the mechanisms for these relationships have remained less clear. Development of less positive expectations about the effects of alcohol, perhaps due to religious prescriptions against alcohol use or spiritual beliefs that alcohol may limit emotional contact with the transcendent, may explain the negative relationship between religiousness and spirituality and alcohol use. It is important to note, however, that alcohol expectancies was a partial mediator of the relationships between religiousness and spirituality and alcohol consumption. Other potential mediators to explore may be increased self-restraint, which is cultivated in many religious traditions (Regnerus 2003), and reluctance to break societal laws, which may be discouraged by Judeo-Christian traditions (Benda et al. 2006).

Several limitations of the study must be noted. Since study results are based on a cross-sectional design, the temporal relationships described in this study should be interpreted with caution. For example, because the data were collected at one time point, the possibility that religious/spiritual beliefs do not precede the development of alcohol expectancies or that drinking behaviors drives alcohol expectancies cannot be ruled out. Due to feasibility, cross-sectional data are often used to explore mediational hypotheses prior to conducting more costly longitudinal designs; however, cross-sectional analyses can lead to misleading estimates of longitudinal processes (for a review see: Cole and Maxwell 2003). Consequently, future longitudinal research should explore the development of religiousness and spirituality and assess the influence that these variables have on the formation of alcohol expectancies. Additionally, results suggest that alcohol expectancies only partially mediate the relationships between religiousness and spirituality and underage alcohol consumption; future research should explore other potential mediators of these relationships.

Further, despite conceptually distinct definitions of religiousness and spirituality, assessing them empirically as separate, reliable constructs has been proven in the literature to be a difficult endeavor (Gorsuch 1984). As frequently highlighted in religious and spiritual research (Mason and Windle 2002; Rostosky et al. 2007; Burris et al. 2009; Hodge et al. 2007; Saucier and Skrypinska 2006; Zinnbauer et al. 1997), previous research has often been hampered by unreliable measurement (e.g., the use of only one to three indicators or items; see Mason and Windle 2002; Rostosky et al. 2007) and treatment of religiousness and spirituality as interchangeable constructs or measuring them together as one. Despite our efforts to address these issues by using separate, validated measures of both religiousness and spirituality, the correlation between these constructs in the present study was quite high (.78; though not as high at the correlation between the subscales of religiousness: .87). The frequent use of the term “God” in our measure of spirituality may have led to an inflated correlation between religiousness and spirituality in our predominantly Christian sample. Future research should include samples with greater religious

diversity so that the distinct pathways through which religiousness and spirituality protect from alcohol use can be more adequately explored.

Finally, other sampling limitations that restrict the generalizability of findings must also be considered. First, the present sample was predominantly Caucasian, which limits the ability to draw conclusions about racial and ethnic minority groups. Additionally, our sample was limited undergraduates between the ages of 18 and 20, an age-group in which drinking levels may be temporarily inflated (White et al. 2005) and religiousness and spirituality may be minimized. Although generalizability to community samples may be limited, studying protective factors against alcohol consumption in a college sample is important given the increased risks associated with heavy drinking in this age-group (i.e., brain development problems and sexual trauma).

### Conclusions and Future Directions

The present study suggests that individuals high in religiousness and spirituality exhibit less positive expectancies about alcohol consumption, which leads to lower consumption of alcohol. This is one of the few studies to examine the processes by which religiousness and spirituality influence underage alcohol use, thereby making an important contribution to the study of alcohol use. Religiousness is considered a robust protective factor against underage alcohol use, and there is emerging evidence to suggest that spirituality may also buffer against this risk. It is difficult to translate these protective factors into intervention strategies, as it may not be practical or ethical to attempt to alter a young adult's religious or spiritual beliefs. However, understanding the mechanisms through which religiousness and spirituality exert their benefits may be helpful in identifying targets of intervention that are more amenable to change. Positive alcohol expectancies represent an important risk factor for drinking, and the present study suggests that the protective relationship between religiousness/spirituality and alcohol use can be partially accounted for by fewer positive expectancies about alcohol consumption. A next step in this line of research is to investigate specific alcohol expectancies attributable distinctly to religiousness or spirituality. For example, religiousness may lead to beliefs that alcohol may corrupt the sanctity of the body and mind while spirituality may lead decreased beliefs that alcohol is a means to reduce negative affect. Targeting young adults positive expectancies about the effects of alcohol and providing alternate methods to achieve what drinking is believed to achieve (reduced distress and social enhancement) may be a fruitful target of intervention.

### References

- Baron, R., & Kenny, D. (1986). The moderator-mediator distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology*, *51*, 1173–1182.
- Benda, B., Pope, S., & Kelleher, K. (2006). Church attendance or religiousness: Their relationship to adolescents use of alcohol, other drugs, and delinquency. *Alcoholism Treatment Quarterly*, *24*, 75–87.
- Brown, S. A., Christiansen, B. A., & Goldman, M. S. (1987). The Alcohol Expectancy Questionnaire: An instrument for the assessment of adolescent and adult alcohol expectancies. *Journal of Studies on Alcohol*, *48*, 483–491.
- Brown, S. A., Goldman, M. S., Inn, A., & Anderson, L. R. (1980). Expectations of reinforcement from alcohol: Their domain and relation to drinking patterns. *Journal of Consulting and Clinical Psychology*, *48*, 419–426.
- Brown, S. A., McGue, M., Maggs, J., Schulenberg, J. E., Hingson, R., Swartzwelder, S., et al. (2008). A developmental perspective on alcohol and youths 16 to 20 years of age. *Pediatrics*, *121*, S290–S310.

- Burris, J. L., Smith, G. T., & Carlson, C. R. (2009). Relations among religiousness, spirituality, and sexual practices. *Journal of Sex Research, 46*, 282–289.
- Ciarrocchi, J., & Brelsford, G. (2009). Spirituality, religion, and substance coping as regulators of emotion and meaning making: Different effects on pain and joy. *Journal of Addiction and Offender Counseling, 30*, 24–26.
- Courtney, K. E., & Polich, J. (2009). Binge drinking in young adults: Data, definitions, and determinants. *Psychological Bulletin, 135*, 142–156.
- Darkes, J., & Goldman, M. (1998). Expectancy challenge and drinking reduction: Process and structure in the alcohol expectancy network. *Experimental and Clinical Psychopharmacology, 6*, 64–76.
- Goldman, M., Brown, S., Christiansen, B., & Smith, G. (1991). Alcoholism and memory: Broadening the scope of alcohol expectancy research. *Psychological Bulletin, 110*, 137–146.
- Gorsuch, R. (1984). Measurement: The boon and bane of investigating religion. *American Psychologist, 39*, 228–236.
- Halpern-Felsher, B. L., Millstein, S. G., & Ellen, J. M. (1996). Relationship of alcohol use and risky sexual behavior: A review and analysis of findings. *Journal of Adolescent Health, 19*, 331–336.
- Ham, L. S., & Hope, D. A. (2003). College students and problematic drinking: A review of the literature. *Clinical Psychology Review, 23*, 719–759.
- Hingson, R., Heeren, T., Jamanka, A., & Howland, J. (2000). Age of drinking onset and unintentional injury involvement after drinking. *Journal of the American Medical Association, 284*, 1527–1533.
- Hittner, J. B. (1997). Alcohol-related outcome expectancies: Construct overview and implications for primary and secondary prevention. *Journal of Primary Prevention, 17*, 297–314.
- Hodge, D., Andereck, K., & Montoya, H. (2007). The protective influence of spiritual-religious lifestyles on tobacco use, alcohol use, and gambling. *Social Work Research, 31*, 211–219.
- Idler, E., Musick, M., Ellison, C., George, L., Krause, N., Ory, M., et al. (2003). Measuring multiple dimensions of religion and spirituality for health research: Conceptual background and findings from the 1998 General Social Survey. *Research on Aging, 25*, 327–365.
- Johnson, T., Sheets, V., & Kristeller, J. (2008). Identifying mediators of the relationship between religiosity/spirituality and alcohol use. *Journal of the Study of Alcohol and Drugs, 69*, 160–170.
- Langer, L. M., Warheit, G. J., & McDonald, L. P. (2001). Correlates and predictors of risky sexual practices among a multi-racial/ethnic sample of university students. *Social Behavior and Personality, 29*, 133–144.
- Leigh, J., Bowen, S., & Marlatt, G. A. (2005). Spirituality, mindfulness and substance abuse. *Addictive Behaviors, 30*, 1335–1341.
- Lewis, B. A., & O'Neill, H. K. (2000). Alcohol expectancies and social deficits relating to problem drinking among college students. *Addictive Behaviors, 25*, 295–299.
- MacKinnon, D., Krull, J., & Lockwood, C. (2000). Equivalence of mediation, confounding and suppression effect. *Prevention Science, 14*, 173–181.
- Mahoney, A. (2010). Religion in families 1999–2009: A relational spirituality framework. *Journal of Marriage and Family, 72*, 805–827.
- Mason, W. A., & Windle, M. (2002). A longitudinal study of the effects of religiosity on adolescent alcohol use and alcohol-related problems. *Journal of Adolescent Research, 17*, 346–363.
- McCullough, M., Enders, C., Brion, S., & Jain, A. (2005). The varieties of religious development in adulthood: A longitudinal investigation of religion and rational choice. *Journal of Personality and Social Psychology, 89*, 78–89.
- Miller, P., Smith, G., & Goldman, M. (1990). Emergence of alcohol expectancies in childhood: A possible critical period. *Journal of Studies on Alcohol, 51*, 343–349.
- Nonnemaker, J. M., McNeely, C. A., & Blum, R. W. (2003). Public and private domains of religiosity and adolescent health risk behaviors: Evidence from the National Longitudinal Study of Adolescent Health. *Social Science and Medicine, 57*, 2049–2054.
- O'Neill, S. E., Parra, G. R., & Sher, K. J. (2001). Clinical relevance of heavy drinking during college years: Cross-sectional and prospective perspectives. *Psychology of Addictive Behaviors, 15*, 350–359.
- Piedmont, R. L. (1999). Does spirituality represent the sixth factory of personality? Spiritual transcendence and the five-factor model. *Journal of Personality, 67*, 985–1013.
- Poulson, R. L., Eppler, M. A., Satterwhite, T. N., Wuensch, K. L., & Bass, L. A. (1998). Alcohol consumption, strength of religious beliefs and risky sexual behavior in college students in the Bible Belt. *Journal of American College Health, 46*, 227–232.
- Regnerus, M. D. (2003). Linked lives, faith, and behavior: Intergenerational religious influence on adolescent delinquency. *Journal for the Scientific Study of Religion, 42*, 189–203.
- Rew, L., & Wong, Y. J. (2006). A systematic review of associations among religiosity/spirituality and adolescent health attitudes and behaviors. *Journal of Adolescent Health, 38*, 433–442.

- Rostosky, S. S., Danner, F., & Riggle, E. D. B. (2007). Is religiosity a protective factor against substance use in young adulthood? Only if you're straight! *Journal of Adolescent Health, 40*, 440–447.
- Saucier, G., & Skrypinska, K. (2006). Spiritual but not religious? Evidence for two independent dispositions. *Journal of Personality, 14*, 1257–1292.
- Smith, G., Goldman, M., Greenbaum, P., & Christiansen, B. (1995a). Expectancy for social facilitation from drinking: The divergent paths of high expectancy and low expectancy adolescents. *Journal of Abnormal Psychology, 104*, 32–40.
- Smith, G. T., McCarthy, D. M., & Goldman, M. S. (1995b). Self-reported drinking and alcohol-related problems among early adolescents: Dimensionality and validity over 24 months. *Journal of Studies on Alcohol, 56*, 383–394.
- Sobel, M. E. (1982). Asymptotic confidence intervals for indirect effects in structural equation models. In S. Leinhardt (Ed.), *Sociological methodology* (pp. 290–312). Washington, DC: American Sociological Society.
- Stewart, C. (2001). The influence of spirituality on substance use of college students. *Journal of Drug Education, 31*(4), 343–351.
- Substance Abuse and Mental Health Services Administration (SAMHSA). (2007). Results from the 2006 National Survey of Drug Use and Health: National Findings. (*Office of Applied Studies, NSDUH series H-32, DHHS Publication No. SMA 07-4293*). Rockville, MD.
- Sussman, S., Skara, S., Rodriguez, Y., & Pokhrel, P. (2006). Non drug use- and drug use-specific spirituality as one-year predictors of drug use among high-risk youth. *Substance Use and Misuse, 41*, 1801–1816.
- Thompson, M. P., Spitzer, H., McCoy, T. P., Marra, L., Sutfin, E. L., Rhodes, S. D., et al. (2009). The moderating role of gender in the prospective associations between expectancies and alcohol-related negative consequences among college students. *Substance Use and Misuse, 44*, 934–942.
- Tolman, E. (1932). *Purposive behavior in animals and men*. Oxford, UK: Appleton-Century.
- Waldren-Perrine, B., Rapport, L., Hanks, R., Lumley, M., Meachen, S., & Hubbarth, P. (2011). Religion and spirituality in rehabilitation outcomes among individuals with traumatic brain injury. *Rehabilitation Psychology, 56*, 107–116.
- Wallace, J. M., Brown, T. N., Bachman, J. G., & Laveist, T. A. (2003). The influence of race and religion on abstinence from alcohol, cigarettes and marijuana among adolescents. *Journal of Studies on Alcohol, 64*, 843–848.
- Werner, M. J., Walker, L. S., & Greene, J. W. (1995). Relation of alcohol expectancies to changes in problem drinking among college students. *Archives of Pediatrics and Adolescent Medicine, 149*, 733–739.
- White, H., Labouvie, E., & Papadaratsakis, V. (2005). Changes in substance use during the transition to adulthood: A comparison of college students to their noncollege age peers. *Journal of Drug Issues, 35*, 281–306.
- Wills, T. A., Yaeger, A. M., & Sandy, J. M. (2003). Buffering effect of religiosity for adolescent substance use. *Psychology of Addictive Behaviors, 17*, 24–31.
- Worthington, E. L. (Ed.). (1993). *Psychotherapy and religious values*. Grand Rapids, MI: Baker.
- Worthington, E., Wade, N., Hight, T., Ripley, J., McCollough, M., Berry, J., et al. (2003). The religious commitment inventory-10: Development, refinement, and validation of a brief scale for research and counseling. *Journal of Counseling Psychology, 50*, 84–96.
- Zeigler, D., Wang, C., Yoast, R., Dickinson, B., McCaffree, M., Robinowitz, C., et al. (2005). The neurocognitive effects of alcohol on adolescents and college students. *Preventive Medicine, 40*, 23–32.
- Zinnbauer, B. T., Pargament, K. I., Cole, B., Rye, M. S., Butter, E. M., Belavich, T. G., et al. (1997). Religion and spirituality: Unfuzzing the fuzzy. *Journal for the Scientific Study of Religion, 36*, 549–564.

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