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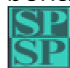

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# Religiosity as Self-Enhancement: A Meta-Analysis of the Relation Between Socially Desirable Responding and Religiosity

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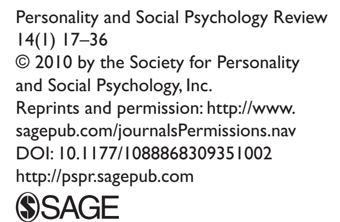

**Constantine Sedikides[1] and Jochen E. Gebauer[1]**

**Abstract**

In a meta-analysis, the authors test the theoretical formulation that religiosity is a means for self-enhancement. The authors operationalized self-enhancement as socially desirable responding (SDR) and focused on three facets of religiosity: intrinsic, extrinsic, and religion-as-quest. Importantly, they assessed two moderators of the relation between SDR and religiosity. Macro-level culture reflected countries that varied in degree of religiosity (from high to low: United States, Canada, United Kingdom). Micro-level culture reflected U.S. universities high (Christian) versus low (secular) on religiosity. The results were generally consistent with the theoretical formulation. Both macro-level and micro-level culture moderated the relation between SDR and religiosity: This relation was more positive in samples that placed higher value on religiosity (United States > Canada > United Kingdom; Christian universities > secular universities). The evidence suggests that religiosity is partly in the service of self-enhancement.

**Keywords**

religiosity, self-enhancement, socially desirable responding, intrinsic religiosity, extrinsic religiosity

People are motivated to see themselves favorably along culturally valued characteristics. Stated otherwise, people are motivated to self-enhance. This motive lies at the heart of many social psychological theories, such as cognitive dissonance theory, terror management theory, self-affirmation theory, social identity theory, the self-enhancement tactician model, and the self-evaluation maintenance model (Sedikides & Gregg, 2003; Sedikides & Strube, 1997; Vail et al., 2010; Ysseldyk, Matheson, & Hymie, 2010). Indeed, self-enhancement strivings are prevalent, potent, and universal (Alicke & Sedikides, 2009; Sedikides, Gaertner, & Toguchi, 2003; Sedikides & Skowronski, 1997; Yamaguchi et al., 2007).

Religiosity is also prevalent, potent, and universal (Emmons, Cheung, & Tehrani, 1998; Graham & Haidt, 2010; Koole, McCullough, Kuhl, & Roelofsma, 2010; Swatos, 1998). For example, in response to Gallup World Poll's question "Is religion an important part of your daily life?" 82% of respondents in representative samples across 143 countries answered "yes" (Crabtree, 2009). In another survey, 95% of the U.S. population expressed a belief in God (Gallup & Castelli, 1989). But how are religiosity and self-enhancement related to each other? This is the question we address in the current meta-analytic review.

## Religiosity in the Service of Self-Enhancement

Religiosity may partly be in the service of self-enhancement. The idea is not new to psychology. It was introduced by William James (1902) and embellished by Gordon Allport (1950, 1959, 1966). Allport drew a distinction between intrinsic and extrinsic religiosity. The former was assumed to be more favored in organized religions (e.g., Christianity) than the latter. Intrinsic religiosity is freely chosen by the believer, is willfully endorsed, and is important to the believer's life as an end in itself. As Allport and Ross (1967, p. 434) put it,

> Persons with [an intrinsic] orientation find their master motive in religion. Other needs . . . are regarded as of

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> less ultimate significance, and they are . . . brought into harmony with the religious beliefs and prescriptions. Having embraced a creed the individual endeavors to internalize it and follow it fully. It is in this sense that he *lives* his religion.

Extrinsic religiosity, on the other hand, is self-centered, self-interested, and adopted as a means to an end. In the words of Allport and Ross (1967, p. 434),

> Persons with [an extrinsic] orientation are disposed to use religion for their own ends. . . . Extrinsic value is always instrumental and utilitarian. Persons with this orientation may find religion useful in a variety of ways—to provide security and solace, sociability and distraction, status and self-justification. . . . The extrinsic type turns to God, but without turning away from self.

Allport and Ross, then, regarded self-enhancement as an influential motive underlying extrinsic, but not intrinsic, religiosity. More generally, Reiss (2004) considered self-enhancement (i.e., self-importance) a primary motive for religious belief. In a similar vein, Batson and Stocks (2004, p. 147) stated, "Feeling good about oneself and seeing oneself as a person of worth and value play a major role in much contemporary religion." Cultural ideals, norms, and mandates are highly relevant in that regard. As the Gallup World Poll attests (e.g., Crabtree, 2009), in most cultures being a person of value and moral standing is defined, in large part, as being religious. And the more religious a given culture is, the more likely it will be that being a person of value and moral standing means being intrinsically (rather than extrinsically) religious. Below, we briefly review the literature linking religiosity to self-enhancement or socially desirable responding (SDR).

## Religiosity and SDR

*SDR as an Operationalization of Self-Enhancement.* SDR has been regarded as an operationalization of self-enhancement. As Paulhus and Holden (in press) stated, "In the context of questionnaire styles, self-enhancement is typically referred to as socially desirable responding and is tapped by measures such as the Marlowe–Crowne scale." Indeed, high scores on this scale are associated with agreeable, approving behavior—what is culturally defined as the behavior of a "good person" (Crowne & Marlowe, 1960; Paulhus, 1991). Also, high scorers on this scale exaggerate claims of friendliness, psychological adjustment, and openness to experience (McCrae & Costa, 1983; Paulhus, 1991). Finally, experimental inductions of socially desirable self-presentation elevate self-esteem (Upshaw & Yates, 1968).

Factor analyses, not only of the Marlowe–Crowne Scale (Crowne & Marlowe, 1960) but also of other SDR scales such as Eysenck's (H. J. Eysenck & Eysenck, 1991), Edwards's (1957), and Wiggins's (1964), have revealed two factors. One is associated with the general anxiety factor (*Alpha*), the other with the agreeableness and traditionalism factor (*Gamma*) of the Minnesota Multiphasic Personality Inventory (Borkenau & Ostendorf, 1989; Edwards & Walsh, 1964; Wiggins, 1964). Paulhus (1984) provided evidence consistent with the idea that these two factors represent self-deceptive positivity (the tendency for an honest but unduly positive self-presentation) and impression management (self-presentation directed at a specific audience). Later, Paulhus (1998) refined these descriptions and labels in the development of his Balanced Inventory of Socially Desirable Responding (BIDR). He labeled the first factor Self-Deceptive Enhancement (reflecting a nonconscious, self-deceptive response style) and the second factor Impression Management (reflecting a conscious, other-deceptive response style).

More recently, Paulhus (2002) questioned the validity of these labels on the basis that the Self-Deceptive Enhancement subscale is susceptible to experimental manipulation (i.e., attempts to make a favorable impression in agentic domains) and the Impression Management subscale reliably measures SDR in the absence of an audience. In turn, Paulhus (2002; Paulhus & Trapnell, 2008) suggested that the Self-Deceptive Enhancement subscale assesses an agentic, whereas the Impression Management subscale assesses a communal, form of SDR. Regardless, both subscales are associated with conventional indices of self-enhancement which refer to intrapsychic processes (Paulhus, 1988, 1991, 2002; Robins & John, 1997; Sedikides, Rudich, Gregg, Kumashiro, & Rusbult, 2004). In sum, although early literature on SDR emphasized public dissimulation, later research showed that SDR also taps private motives as does self-enhancement. Overall, then, it appears that SDR is a valid indicator or operationalization of self-enhancement. But what is the relation between SDR and religiosity?

*The Relation Between SDR and Religiosity.* Batson, Naifeh, and Pate (1978) were the first to report a positive relation between SDR and intrinsic religiosity. This finding was inconsistent with Allport and Ross's (1967) theorizing which, if anything, anticipated a negative relation between these two constructs. The finding sparked empirical interest in this relation and also in the relation between SDR and extrinsic religiosity. Trimble (1997) meta-analyzed the ensuing literature. Intrinsic religiosity was positively related to self-deceptive enhancement ($r = .16$) and impression management ($r = .14$) as well as to overall SDR (i.e., combined average of the two; $r = .17$). This pattern established the validity of the original Batson et al. findings. In addition (and also inconsistent with Allport's theorizing), Trimble's meta-analysis showed that extrinsic religiosity was unrelated to self-deceptive enhancement ($r = .02$), impression management ($r = –.04$), and overall SDR ($r = .01$).

*SDR as substance: Does SDR reflect true religiosity?* In attempting to explain his results, Trimble (1997) argued that measures of SDR capture true religious adherence. The evidence for this

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claim, however, is rather weak. Watson, Morris, Foster, and Hood (1986) operationalized SDR with the Marlowe–Crowne scale. Controlling for content overlap between scale items and religious scriptures (e.g., the Ten Commandments) nullified the correlation between SDR and religiosity. Leak and Fish (1989), though, failed to replicate this finding. They operationalized SDR with the BIDR. Controlling for content overlap between scale items and religious scriptures, they reported a positive relation between SDR and religiosity. In addition, Burris and Navara (2002) found that an experimental induction of self-enhancement increased SDR among intrinsically religious participants. This pattern should not be obtained, if SDR reflected true religiosity. In general, SDR reflects style (i.e., self-enhancing beliefs or claims) to a considerably greater degree than substance (i.e., content; Millham & Jacobson, 1978; Paulhus & Vazire, 2007).

*SDR as style: Does religiosity drive SDR?* Other researchers offered an alternative account of Trimble's (1997) results. They concluded that "religiously devout individuals are concerned with maintaining a positive self-image in their own eyes (self-deception) and in others' (impression management)" (Burris & Navara, 2002, p. 67) or even that "religious people are bigger liars" (Pearson & Francis, 1989, p. 1041). According to this view, religious people self-enhance more than their nonreligious counterparts. Religiosity, then, may drive SDR.

Crandall and Gozah (1969) reported that children from stronger (vs. weaker) religious backgrounds evinced higher levels of SDR. This pattern has been regarded as consistent with the view that religiosity drives SDR, but it is equally likely that SDR underpins religiosity. Religiosity may have been regarded as driving SDR for another reason: Religiosity has traditionally been assessed with self-reports of church attendance (e.g., "Have you been attending religious service during the last 7 days?"—Gallup & Castelli, 1989; "How often have you been attending religious service in the last 12 months"—S. H. Schwartz & Huismans, 1995). Church attendance is a self-report measure of highly concrete behavior; hence, church attendance is often assumed to be heavily grounded in reality and rather immune to motivation (Hout & Greeley, 1998). This assumption, however, is empirically unfounded. Self-reported church attendance is almost twice as high as actual church attendance (Hadaway, Marler, & Chaves, 1993; also see Hadaway, Marler, & Chaves, 1998; T. W. Smith, 1998). And a primary reason for overclaiming church attendance is reputed to be SDR: "If survey respondents view regular church attendance as normative or view infrequent church attendance as deviant, they may be inclined to overreport their attendance" (Hadaway et al., 1993, p. 746).

## Religiosity as Self-Enhancement

In this article, we entertain a different formulation from the one discussed above (i.e., religiosity drives SDR). This is the religiosity as self-enhancement formulation. That is, we revisit the idea that religiosity is a means for self-enhancement (Allport, 1950; Batson, Schoenrade, & Ventis, 1993; Batson & Stocks, 2004; James, 1902; Reiss, 2004). Stated somewhat differently, SDR drives religiosity. We test this formulation in a meta-analysis. To be sure, our meta-analysis relies on correlational data and, as such, it can test conclusively neither our formulation (i.e., SDR drives religiosity) nor its alternative (i.e., religiosity drives SDR). Nevertheless, the meta-analysis is in a position to provide suggestive evidence differentiating between them.

Our formulation that self-enhancement (i.e., SDR) drives religiosity relies on two assumptions. The first one concerns the ingenuity, pluralism, and creativity with which people self-enhance. They use strategically whatever means are available to them to do so. These means include the relevant situation or agents in people's immediate social context (e.g., self-serving attributions, downward social comparisons), aspects of their past (e.g., counterfactual thinking, discounting), aspects of their future (e.g., self-handicapping, redefining moral standards to fit actions), and aspects of their culture (e.g., associations with successful or powerful others, elevating the importance of the in-group; Hepper, Gramzow, & Sedikides, in press; also see Alicke & Sedikides, 2009; Campbell & Sedikides, 1999). It follows that people will be likely also to use religiosity, when readily available in the cultural context, to elevate the positivity of their self-views. This parsimonious derivation is not easily matched from the alternative formulation.

The second assumption concerns the basicity of self-enhancement versus religiosity. Generally, we posit that if A is a more basic structure than B, then A is a more likely candidate for driving the relation with B than vice versa. Self-enhancement is a disposition (Sedikides & Gregg, 2008; Sedikides & Skowronski, 2000), and in this meta-analysis we define and operationalize it as a disposition (i.e., SDR). Longitudinal evidence indicates that trait dispositions (e.g., conscientiousness, low psychoticism, agreeableness) determine individual differences in religiosity rather than vice versa (Heaven & Ciarrochi, 2007; McCullough, Enders, Brion, & Jain, 2005; McCullough, Tsang, & Brion, 2003; Wink, Ciciolla, Dillon, & Tracy, 2007). Traits have chronological priority and influence religiosity, which is an adaptation to cultural characteristics (Saroglou, 2010). Relatedly, religious conversion has no influence on personality traits (although it influences values, goals, and perceptions of meaning in life; Paloutzian, Richardson, & Rambo, 1999).

Note that our meta-analytic search yielded predominantly Christian samples, given that the vast majority of the relevant research has been conducted on such samples. We begin by discussing the constructs of interest and building our rationale before we formalize our hypotheses.

*Constructs of Interest and Rationale.* We are predominantly concerned with three facets of religiosity: intrinsic,

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extrinsic, and religion-as-quest. As we have already stated, intrinsic religiosity is freely chosen and endorsed by the believers and is central to their lives as an end in itself (Allport & Ross, 1967). Examples of scale items that assess intrinsic religiosity are, "I try hard to live all my life according to my religious beliefs" and "My whole approach to life is based on religion." Such statements square with the ideals, norms, and mandates of religious cultures. Such cultures command that religion ought to be at the center of one's life. Intrinsic religiosity represents a positive identity (cf. Ysseldyk et al., 2010). Thus, being a good citizen and a person of value means being intrinsically religious. Members of religious cultures, then, derive self-worth (i.e., satisfy the self-enhancement motive) by sanctioning intrinsic religiosity (i.e., scoring relatively higher on the relevant scale than members of nonreligious cultures).

Extrinsic religiosity, as a reminder, reflects a somewhat cynical (i.e., self-serving, utilitarian, or instrumental) orientation (Allport & Ross, 1967). Examples of scale items that assess this facet of religiosity are, "What religion offers me most is comfort in times of trouble and sorrow" and "I go to church because it helps me make friends." Such statements are in opposition to the ideals, norms, and mandates of religious (at least Christian) cultures. The statements reflect the notion that religion is used for self-centered means. This notion is in direct contradiction to religious doctrine. Both the Bible and key apologetic works enjoin Christians to love God unreservedly (Bernard of Clairvaux, 1996; Mark 12:30) and to resist the sin of self-love (Luke 18:14; O'Donovan, 1980). Thus, being a good citizen and a person of value means rejecting extrinsic religiosity. Members of religious cultures, then, derive a sense of self-worth (i.e., satisfy the self-enhancement motive) by disaffiliating from extrinsic religiosity (i.e., scoring lower on the relevant scale than members of nonreligious cultures).

The construct of religion-as-quest was proposed by Batson (1976; Batson & Ventis, 1982). This is a facet of religiosity that is also disfavored in organized religions (e.g., Christianity). According to Batson and Schoenrade (1991, p. 417),

> Religion-as-quest involves honestly facing existential questions in their complexity, while at the same time resisting clearcut, pat answers. An individual who approaches religion in this way recognizes that he or she does not know, and probably never will know, the final truth about such matters. Still, the questions are deemed important, and, however tentative and subject to change, answers are sought.

The religion-as-quest scale (Batson & Schoenrade, 1991) contains such items as "God wasn't very important to me until I began to ask questions about the meaning of my own life," "For me, doubting is an important part of what it means to be religious," and "I am constantly questioning my religious beliefs." Such statements stand in direct opposition to the ideals, norms, and mandates of religious (at least Christian) cultures. The statements imply that religion is *not* always the unalterable guiding force in one's life. Therefore, being a good citizen and a person of value implicates a rejection of religion-as-quest. Members of religious cultures, then, derive a sense of self-worth (i.e., satisfy the self-enhancement motive) by disenfranchising from this facet of religiosity (i.e., scoring lower on the religion-as-quest scale than members of nonreligious cultures).

*Hypotheses.* Note that our primary concern was with overall SDR, given that the two-factor solution on SDR scales (e.g., BIDR) is somewhat controversial and that self-enhancement indices are associated with both factors. Indeed, our hypotheses are tested on the relation between overall SDR and facets of religiosity. Nevertheless, we included in our meta-analysis all articles that assessed SDR, and we exploratorily present relevant findings.

We tested the replicability of Trimble's (1997) results that SDR is positively related to intrinsic religiosity but is unrelated to extrinsic religiosity. We also exploratorily assessed the correlation between SDR and religion-as-quest. We expected this relation to be generally similar to that between SDR and extrinsic religiosity.

Importantly, we formulated concrete hypotheses based on a distinction between two cultural levels: macro level and micro level. Macro level, a continuous moderator, refers to the degree to which *countries* vary in religiosity. We used samples from higher to lower religiosity countries (e.g., United States, Canada, United Kingdom). Micro level, a dichotomous moderator, refers to *U.S. universities* imbued in high versus low religious climate. We used samples from either Christian or secular universities.

We assumed that higher religiosity countries place more positive value on intrinsic religiosity and place more negative value on both extrinsic religiosity and religion-as-quest. Being intrinsically religious entails relatively high self-enhancement potential (i.e., signifying a "good person"), whereas being extrinsically religious or adopting a religion-as-quest orientation entails relatively low self-enhancement potential, the more religious the country is. We hypothesized, then, that the positive relation between SDR and intrinsic religiosity would be stronger (i.e., more positive) the higher in religiosity a country is. Analogously, we hypothesized that the low or negative relation between SDR and extrinsic religiosity, and between SDR and religion-as-quest, would be stronger (i.e., more negative) the higher in religiosity the country is.

We assumed that Christian (vs. secular) universities place more positive value on intrinsic religiosity and place more negative value on both extrinsic religiosity and religion-as-quest. Being intrinsically religious has relatively high self-enhancement potential (i.e., it means being a "good person"), whereas being extrinsically religious or adopting a religion-as-quest orientation has relatively low self-enhancement

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potential in Christian than secular universities. We hypothesized, then, that the positive relation between SDR and intrinsic religiosity would be stronger (i.e., more positive) in Christian than in secular universities. Analogously, we hypothesized that the low or negative relation between SDR and extrinsic religiosity, and between SDR and religion-as-quest, would be stronger (i.e., more negative) in Christian than in secular universities.

*Uniqueness of Contribution.* Our meta-analysis updates and extends Trimble's (1997) meta-analysis. In particular, our meta-analysis provides a more thorough assessment of SDR, as it used a higher number of SDR measures than did Trimble's. Also, Trimble's meta-analysis was concerned with only two types of religiosity: intrinsic and extrinsic. Our meta-analysis is concerned not only with intrinsic and extrinsic religiosity but also with religion-as-quest (and global religiosity). Furthermore, Trimble's meta-analysis covered the literature until 1994 and included 2,162 participants from 14 samples. The current meta-analysis covers the literature until early 2009 and includes 15,396 participants from 75 samples. Finally and importantly, our meta-analysis provides the first test for sample-level moderators (i.e., macro- and micro-level culture), a development critical to the evaluation of the religiosity as self-enhancement formulation.

**Table 1.** Sample Characteristics

| | | |
|---|---|---|
| *N* | Articles | 57 |
| | Samples | 75 |
| | Participants total | 15,396 |
| Sample size | *M* | 205.28 |
| | *SD* | 217.28 |
| | $N < 100$ | 20 |
| | $100 < N < 200$ | 32 |
| | $200 < N < 450$ | 20 |
| | $1,000 < N < 1,300$ | 3 |
| Country (%) | United States | 56.2 |
| | United Kingdom | 22.7 |
| | Belgium | 6.8 |
| | Canada | 5.5 |
| | Greece | 2.7 |
| | Iran | 2.7 |
| | Israel | 1.4 |
| | Taiwan | 1.4 |
| U.S. university | Christian | 12 |
| | Secular | 20 |
| Participant age[a] | *M* | 23.78 |
| | *SD* | 9.12 |
| Sex (%)[b] | Female | 61.06 |
| Religious denomination (%)[c] | Any (total) | 87.61 |
| | Christian—Protestant | 31.83 |
| | Christian—Catholic | 16.06 |
| | Christian—unspecified | 25.25 |

a. Based on 53 samples with available information.
b. Based on 65 samples with available information
c. Based on 39 samples with available information.

## Method

*Literature Search and Sample Selection.* We searched PsycINFO and SCOPUS for articles published until February 2009. For self-enhancement, we entered the terms *desirab, bias, presentation, impression, self-decept, self-enhance, self enhance, fake, faking, lie, lying, defence, defensiv, approv, repress, narc, self-favo*, and *overclaim*. For religiosity, we entered the terms *relig, church, mosque, synagogue, temple, worship*, and *pray* (after T. B. Smith, McCullough, & Poll, 2003). We included studies that met the following criteria: being written in English, featuring both a self-report measure of SDR and a self-report measure of religiosity, and assessing SDR and religiosity as continuous measures.

The search produced 45 articles. Subsequent backward and forward searches on them produced another 35 articles. We approached authors for missing correlations of interest or effect sizes. Data from 23 articles were inaccessible by authors. The resulting 57 articles, which are indicated by an asterisk in the references section, include 75 samples. Table 1 provides an overview, and Table 2 a detailed exposition, of sample characteristics. Note that all studies were conducted in confidential and private settings (i.e., no audience was present).

*Data.* We included the following sample characteristics: number of participants, age, percentage of female participants, ethnicity, religious affiliation, country from which the data originated, and type of U.S. university (Christian vs. secular). For each sample, we also included country-level (i.e., macro-culture) religiosity, operationalized in terms of the Gallup Religiosity Index (Pelham & Nyiri, 2008). This index reflects whether respondents regard religion an important part of their daily lives, whether they attended a place of worship in the week prior to polling, and whether they have confidence in religious organizations. The United States emerged as a highly religious country, Canada as a moderately religious country, and the United Kingdom as a country low in religiosity. The assessment took place in 2005–2006. Given that we have only country-level religiosity scores for a single year, we controlled for year of publication in the meta-analysis.

We included the correlation between each measure of SDR and each measure of religiosity; that is, we used "shifting units of analysis" (Cooper, 1998). Thus, in cases where a study assessed SDR and/or religiosity with multiple measures, we report the mean correlation across all these measures when examining the overall relation between SDR and religiosity (Mullen, 1989). Before aggregating any correlations, we transformed them into Fisher's stabilizing *z* scores (Shadish & Haddock, 1994), aggregated the *z*-transformed correlations, and finally back transformed the *z*-transformed correlations into Person's correlation coefficients. This procedure avoids a small bias occurring when directly

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**Table 2.** Studies Included in the Meta-Analysis

| Source | Sample | Facet of Religiosity | r | N | Sample Type | Country |
|---|---|---|---|---|---|---|
| Aguilar-Vafaie and Abiari (2007) | Study 1—females | Overall | .130 | 206 | Undergraduate students | Iran |
| Aguilar-Vafaie and Abiari (2007) | Study 1—males | Overall | .300 | 159 | Undergraduate students | Iran |
| Batson, Naifeh, and Pate (1978) | Study 1 | Overall | .194 | 51 | Undergraduate students—U.S. secular university | United States |
| | | Global | .500 | | | |
| | | Intrinsic | .360 | | | |
| | | Extrinsic | –.180 | | | |
| | | Quest | –.100 | | | |
| Brody (1994) | Study 1 | Overall | .125 | 150 | Undergraduate students—U.S. secular university | United States |
| | | Global | .125 | | | |
| Burris and Navara (2002) | Study 1 | Overall | .171 | 74 | Undergraduate students | Canada |
| | | Intrinsic | .171 | | | |
| Byrd, Hageman, and Belle Isle (2007) | Study 1 | Overall | .310 | 161 | Undergraduate students—U.S. secular university | United States |
| | | Intrinsic | .310 | | | |
| Duck and Hunsberger (1999) | Study 2 | Overall | –.020 | 400 | Undergraduate students | Canada |
| | | Intrinsic | .120 | | | |
| | | Extrinsic | –.060 | | | |
| | | Quest | –.120 | | | |
| Duriez (2004) | Study 1 | Overall | .030 | 375 | Undergraduate students | Belgium |
| | | Global | .030 | | | |
| Exline and Geyer (2004) | Study 1 | Overall | .090 | 127 | Undergraduate students—U.S. secular university | United States |
| | | Global | .090 | | | |
| Fisher, Francis, and Johnson (2002) | Study 1 | Overall | –.130 | 311 | Primary school teachers | United Kingdom |
| | | Global | –.130 | | | |
| Francis (1993) | Study 1 | Overall | –.040 | 126 | Undergraduate students and staff | United Kingdom |
| | | Global | –.040 | | | |
| Francis, Katz, Yablon, and Robbins (2004) | Study 1 | Overall | .260 | 203 | Undergraduate students | Israel |
| | | Global | .260 | | | |
| Francis, Pearson, and Kay (1983) | Study 1 | Overall | .290 | 1,088 | Secondary school | United Kingdom |
| | | Global | .290 | | | |
| Francis, Robbins, Santosh, and Bhanot (2007) | Study 1 | Overall | .020 | 330 | | |
| | | Global | .020 | | | |
| Francis, Robbins, Siôn, Lewis, and Barnes (2007) | Study 1—Catholics | Overall | .070 | 1,266 | High school students | United Kingdom |
| | | Global | .070 | | | |
| Francis, Robbins, Siôn, et al. (2007) | Study 1—Protestants | Overall | .030 | 1,093 | High school students | United Kingdom |
| | | Global | .030 | | | |
| Gelfand, Gelfand, and Rardin (1965) | Study 1 | Overall | .560 | 22 | Undergraduate students—U.S. secular university | United States |
| | | Global | .560 | | | |
| Gillings and Joseph (1996) | Study 1 | Overall | .116 | 106 | Undergraduate students | United Kingdom |
| | | Global | .116 | | | |
| Godwin and Crouch (1989) | Study 1 | Overall | .080 | 204 | Undergraduate students—U.S. secular university | United States |
| Hall and Edwards (2002) | Study 1 | Overall | .089 | 438 | Undergraduate students and staff—U.S. Christian university | United States |
| Hall and Edwards (2002) | Study 2 | Overall | .166 | 260 | three religiously diverse subsamples | United States |

(continued)

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**Table 2. (continued)**

| Source | Sample | Facet of Religiosity | *r* | *N* | Sample Type | Country |
|---|---|---|---|---|---|---|
| Hathaway and Pargament (1990) | Study 1 | Overall | .213 | 108 | Christian community sample | United States |
| | | Intrinsic | .155 | | | |
| Heppner et al. (2006) | Study 3 | Overall | .160 | 38 | Undergraduate students | Taiwan |
| Hills, Francis, Argyle, and Jackson (2004) | Study 1 | Overall | .068 | 400 | Undergraduate students | United Kingdom |
| | | Global | .035 | | | |
| | | Intrinsic | .100 | | | |
| | | Extrinsic | .150 | | | |
| | | Quest | .020 | | | |
| Hunsberger and Platonow (1986) | Study 1 | Overall | .121 | 274 | | |
| | | Intrinsic | .020 | | | |
| | | Extrinsic | .220 | | | |
| Johnson et al. (1989) | Study 1—Hawaii | Overall | .097 | 93 | Undergraduate students | United States |
| | | Intrinsic | .230 | | | |
| | | Extrinsic | −.040 | | | |
| Johnson et al. (1989) | Study 1—Missouri | Overall | .095 | 104 | Undergraduate students | United States |
| | | Intrinsic | .150 | | | |
| | | Extrinsic | .040 | | | |
| Joseph, Smith, and Diduca (2002) | Study 1 | Overall | .030 | 180 | General population | United Kingdom |
| | | Quest | −.100 | | | |
| Leak and Fish (1989) | Study 1 | Overall | .105 | 84 | Undergraduate students—U.S. Christian university | United States |
| | | Intrinsic | .250 | | | |
| | | Extrinsic | −.015 | | | |
| | | Quest | .075 | | | |
| Lewis (1999) | Study 1 | Overall | .020 | 150 | Undergraduate students | United Kingdom |
| | | Global | .020 | | | |
| Lewis (1999) | Study 2—control condition | Overall | .140 | 22 | Undergraduate students | United Kingdom |
| | | Global | .140 | | | |
| Lewis (2001) | Study 1 | Overall | .260 | 48 | Undergraduate students | United Kingdom |
| | | Global | .260 | | | |
| Lewis and Joseph (1994) | Study 1 | Overall | .017 | 150 | Undergraduate students | United Kingdom |
| | | Global | .017 | | | |
| Maltby (1999) | Study 1—Sample 1—female | Overall | .080 | 118 | Undergraduate students | United Kingdom |
| | | Intrinsic | .050 | | | |
| | | Extrinsic | .110 | | | |
| Maltby (1999) | Study 1—Sample 1—male | Overall | .160 | 95 | Undergraduate students | United Kingdom |
| | | Intrinsic | .170 | | | |
| | | Extrinsic | .150 | | | |
| Maltby (1999) | Study 1— Sample 2—female | Overall | −.020 | 93 | Undergraduate students | United Kingdom |
| | | Intrinsic | .070 | | | |
| | | Extrinsic | −.110 | | | |
| Maltby (1999) | Study 1—Sample 2 —male | Overall | .120 | 79 | Undergraduate students | United Kingdom |
| | | Intrinsic | .080 | | | |
| | | Extrinsic | .160 | | | |
| Morris, Hood, and Watson (1989) | Study 1—Condition 1 | Overall | .330 | 185 | Undergraduate students—U.S. secular university | United States |
| | | Intrinsic | .330 | | | |
| Morris et al. (1989) | Study 1—Condition 2 | Overall | .070 | 194 | Undergraduate students—U.S. secular university | United States |

(continued)

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**Table 2. (continued)**

| Source | Sample | Facet of Religiosity | *r* | *N* | Sample Type | Country |
|---|---|---|---|---|---|---|
| | | Intrinsic | .070 | | | |
| Morrison, Parriag, and Morrison (1999) | Study 3 | Overall | .120 | 312 | Undergraduate students | Canada |
| | | Global | .120 | | | |
| Pearson and Francis (1989) | Study 1 | Overall | .227 | 191 | Secondary school | United Kingdom |
| | | Global | .227 | | | |
| Plante, Saucedo, and Rice (2001) | Study 1 | Overall | −.030 | 132 | Undergraduate students—U.S. Christian university | United States |
| | | Global | −.030 | | | |
| Plante, Yancey, Sherman, and Guertin (2000) | Study 1—Sample 1 | Overall | −.020 | 199 | Undergraduate students—U.S. Christian university | United States |
| | | Global | −.020 | | | |
| Plante et al. (2000) | Study 1—Sample 3 | Overall | −.060 | 52 | Undergraduate students—U.S. Christian university | United States |
| | | Global | −.060 | | | |
| Plaud, Gaither, and Weller (1998) | Study 1 | Overall | .230 | 200 | Undergraduate students | United States |
| | | Global | .230 | | | |
| Richards (1994) | Study 1 | Overall | .144 | 178 | Undergraduate students—U.S. secular university | United States |
| | | Intrinsic | .194 | | | |
| | | Extrinsic | −.010 | | | |
| Robinson, Gibson-Beverly, and Schwartz (2004) | Study 1 | Overall | .230 | 275 | Undergraduate students—U.S. secular university | United States |
| | | Global | .230 | | | |
| Rowatt and Franklin (2004) | Study 1 | Overall | −.014 | 111 | Undergraduate students—U.S. Christian university | United States |
| | | Intrinsic | .253 | | | |
| | | Extrinsic | −.279 | | | |
| Rowatt, Franklin, and Cotton (2005) | Study 1 | Overall | −.018 | 152 | Undergraduate students—U.S. Christian university | United States |
| | | Intrinsic | .251 | | | |
| | | Extrinsic | −.166 | | | |
| | | Quest | −.140 | | | |
| Rowatt and Kirkpatrick (2002) | Study 1 | Overall | −.029 | 374 | Undergraduate students—U.S. Christian university | United States |
| | | Global | .060 | | | |
| | | Intrinsic | .167 | | | |
| | | Extrinsic | −.146 | | | |
| | | Quest | −.196 | | | |
| Rowatt and Schmitt (2003) | Study 1 | Overall | −.083 | 161 | Undergraduate students—U.S. Christian university | United States |
| | | Intrinsic | .197 | | | |
| | | Extrinsic | −.335 | | | |
| | | Quest | −.100 | | | |
| Rowatt et al. (2006) | Study 1 | Overall | .310 | 124 | Undergraduate students—U.S. Christian university | United States |
| | | Global | .320 | | | |
| Ryan, Rigby, and King (1993) | Study 1—Sample 2 | Overall | −.020 | 151 | Undergraduate students—U.S. Christian university | United States |
| Ryan et al. (1993) | Study 1—Sample 3 | Overall | .005 | 42 | Christian community sample | United States |
| Salsman, Brown, Brechting, and Carlson (2005) | Study 1 | Overall | .075 | 217 | Undergraduate students—U.S. secular university | United States |
| | | Intrinsic | .110 | | | |
| | | Extrinsic | .040 | | | |
| Saroglou and Galand (2004) | Study 1—Sample 1 | Overall | .149 | 81 | High school students | Belgium |
| | | Global | .149 | | | |

(continued)

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**Table 2. (continued)**

| Source | Sample | Facet of Religiosity | *r* | *N* | Sample Type | Country |
|---|---|---|---|---|---|---|
| Saroglou and Galand (2004) | Study 1—Sample 2 | Overall | .025 | 72 | High school students | Belgium |
| | | Global | .025 | | | |
| Saroglou and Galand (2004) | Study 1—Sample 3 | Overall | .103 | 86 | High school students | Belgium |
| | | Global | .103 | | | |
| Saroglou, Pichon, Trompette, Verschueren, and Dernelle (2005) | study 4 | Overall | .193 | 109 | Community sample | Belgium |
| | | Global | .193 | | | |
| Saucier and Skrzypinska (2006) | Study 1 | Overall | .210 | 375 | Community sample | United States |
| | | Global | .210 | | | |
| J. P. Schwartz and Lindley (2005) | Study 1—females | Overall | .180 | 121 | Undergraduate students—U.S. secular university | United States |
| J. P. Schwartz and Lindley (2005) | Study 1—males | Overall | .150 | 76 | Undergraduate students—U.S. secular university | United States |
| Sherman et al. (1999) | Study 2 | Overall | .180 | 104 | Cancer patients | United States |
| | | Global | .180 | | | |
| Sherman et al. (1999) | Study 1 | Overall | .030 | 175 | Gynecology patients | United States |
| | | Global | .030 | | | |
| Spilka, Kojetin, and McIntosh (1985) | Study 1 | Overall | −.071 | 84 | Undergraduate students—U.S. secular university | United States |
| | | Intrinsic | .120 | | | |
| | | Extrinsic | −.136 | | | |
| | | Quest | −.195 | | | |
| Tsang and Rowatt (2007) | Study 1 | Overall | −.004 | 103 | Undergraduate students—U.S. Christian university | United States |
| | | Intrinsic | .520 | | | |
| | | Extrinsic | −.350 | | | |
| | | Quest | −.220 | | | |
| Voracek, Fisher, Loibl, Tan, and Sonneck (2008) | Study 1 | Overall | .030 | 288 | Undergraduate students | Canada |
| | | Global | .030 | | | |
| Watson, Hood, Morris, and Hall (1984) | Study 1 | Overall | .106 | 180 | Undergraduate students—U.S. secular university | United States |
| | | Intrinsic | 210 | | | |
| | | Extrinsic | .000 | | | |
| Watson, Hood, Morris, and Hall (1985) | Study 1 | Overall | .002 | 227 | Undergraduate students—U.S. secular university | United States |
| | | Intrinsic | .120 | | | |
| | | Extrinsic | −.060 | | | |
| | | Quest | −.080 | | | |
| Watson, Hood, Morris, and Hall (1985) | Study 2 | Overall | .035 | 194 | Undergraduate students—U.S. secular university | United States |
| | | Intrinsic | .140 | | | |
| | | Extrinsic | −.070 | | | |
| Watson, Hood, and Morris (1985) | Study 1 | Overall | .032 | 215 | Undergraduate students—U.S. secular university | United States |
| | | Intrinsic | .200 | | | |
| | | Extrinsic | −.030 | | | |
| | | Quest | −.140 | | | |
| Watson, Morris, Foster, and Hood (1986) | Study 1 | Overall | .030 | 167 | Undergraduate students—U.S. secular university | United States |
| | | Intrinsic | .030 | | | |
| Watson et al. (1986) | Study 2 | Overall | .170 | 140 | Undergraduate students—U.S. secular university | United States |
| | | Intrinsic | .170 | | | |
| Youtika, Joseph, and Diduca (1999) | Study 1—females | Overall | .410 | 90 | Undergraduate students | Greece |
| | | Global | .410 | | | |
| Youtika et al. (1999) | Study 1—males | Overall | .290 | 73 | Undergraduate students | Greece |
| | | Global | .030 | | | |

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aggregating Pearson's correlation coefficients (Lipsey & Wilson, 2001).

We included all available measures of SDR, which we classified into four sets. The *first* set (34 samples, 5,721 participants) consisted of the Marlowe–Crowne Scale (Crowne & Marlowe, 1960) and three of its short forms (Barros, 2004; Duriez, 2004; Reynolds, 1982). The *second* set (24 samples, 6,576 participants) consisted of the dissimulation (i.e., lie) factor of three Eysenckian personality profiles (S. B. G. Eysenck, 1965; H. J. Eysenck & Eysenck, 1975). Note that neither the Marlowe–Crowne Scale nor the Eysenckian scales (as they will be referred to) distinguish between self-deceptive and other-deceptive enhancement. The *third* set (11 samples, 1,410 participants) was the Self-Deceptive Enhancement subscale of the BIDR, which appears to assess an agentic form of self-deceptive *and* other-deceptive enhancement (Paulhus, 2002; Paulhus & Holden, in press). The *fourth* and final set (17 samples, 2,613 participants) consisted of the Impression Management subscale of the BIDR, which appears to assess a communal form of other-deceptive *and* self-deceptive enhancement (Paulhus, 2002; Paulhus & Holden, in press).

Our focus was on three facets of religiosity. The first one was *intrinsic religiosity* (30 samples, 5,016 participants). The second facet was *extrinsic religiosity* (23 samples, 3,987 participants). The third facet was *religion-as-quest* (12 samples, 2,431 participants). In addition, and for exploratory purposes, we included a fourth facet, *global religiosity* (38 samples, 9,534 participants), assessed by questions such as, "How religious are you?" and by mean levels of multidimensional religiosity measures.

We proceeded to calculate correlations between a given set of SDR measures and all facets of religiosity, within a particular sample. Specifically, for each set of SDR measures, we averaged its correlation with each available facet of religiosity. For example, for the Marlowe–Crowne scale, we averaged its correlations with each facet of religiosity. For completion, we also calculated the correlations between each of the four sets of SDR measures and each of the four facets of religiosity.

In addition, we calculated correlations between a given facet of religiosity and all SDR measures, within a particular sample. Specifically, for each facet of religiosity, we averaged its correlation with each available SDR measure. For example, for global religiosity, we averaged its correlations with each SDR measure. For exploratory purposes, we computed an omnibus correlation between overall SDR and overall religiosity. To do so, we averaged all correlations between each SDR measure and each measure of religiosity in a particular sample. Thus, each sample contributed only one data point regardless of how many SDR measures and facets of religiosity were available (cf. T. B. Smith et al., 2003).

*Analyses.* We followed Lipsey and Wilson's (2001) recommendations in estimating effect sizes. We conducted a homogeneity test (Hedges & Olkin, 1985) for each effect size aggregate and subsequently corrected for heterogeneity of effect sizes by including a random variance component in our calculations (Lipsey & Wilson, 2001). We tested for moderation using mixed effects models (method of moments estimation) via Lipsey and Wilson's SPSS macros for modified (i.e., error variance adjusted) ANOVAs (for dichotomous moderators) and weighted least square regression analyses (for continuous moderators). We opted for mixed (rather than fixed) effects models because they are more conservative and thus less vulnerable to Type I errors (Overton, 1998; Schmidt, Oh, & Hayes, 2009; Sedikides, Gaertner, & Vevea, 2005).

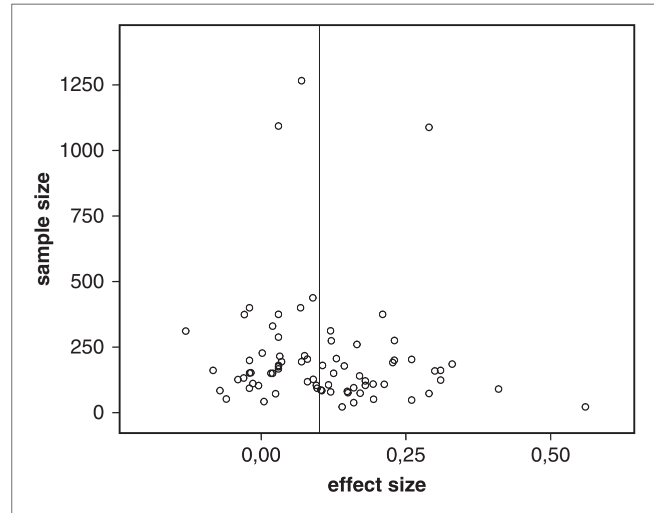


**Figure 1.** Plot of overall effect size of each sample (Pearson's *r*) as a function of its sample size

## Results

*Testing for Publication Bias.* Figure 1 displays the overall effect size of each sample ($x$ axis) by the number of participants per sample ($y$ axis). This scatter plot has a funnel shape. The vertical line marks the mean effect size, which cuts through the vertex of the funnel. The funnel has some "holes," indicating that small-size samples with a high disparity from the mean effect size may be missing because of publication bias (Light & Pillemer, 1984). Furthermore, the funnel is slightly skewed toward higher effect sizes, which may indicate publication bias (Gurevitch & Hedges, 1999).

When testing for publication bias, it would not be advisable to consider the omnibus relation between SDR and religiosity, if effects across facets of religiosity were heterogeneous (cf. Terrin, Schmid, Lau, & Olkin, 2003). This was indeed the case. Specifically, we expected for SDR to be positively related to intrinsic religiosity but unrelated to extrinsic religiosity (Trimble, 1997). Also, the number of studies

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**Table 3.** Results of the Trim and Fill Analyses Involving Overall Socially Desirable Responding and Facets of Religiosity

| | Facets of Religiosity | | | |
|---|---|---|---|---|
| | Global | Intrinsic | Extrinsic | Religion-as-Quest |
| *N* (original samples) | 38 | 30 | 23 | 12 |
| *N* (original participants) | 9,534 | 5,016 | 3,987 | 2,431 |
| *N* (trimmed samples) | 4 | 7 | 5 | 3 |
| *N* (trimmed participants) | 284 | 847 | 578 | 561 |
| *N* (original + fictitious samples) | 42 | 37 | 28 | 15 |
| *N* (original + fictitious participants) | 9,821 | 5,863 | 4,565 | 2,992 |
| *r* (before trim and fill) | .108**** | .163**** | –.035 | –.105**** |
| *r* (after trim and fill) | .100**** | .129**** | .010 | –.076*** |

***$p \leq .001$. ****$p \leq .0001$.

was not equally distributed across facets of religiosity: Most studies used a global measure of religiosity, many more studies were concerned with the relation between SDR and intrinsic religiosity than SDR and extrinsic religiosity, and only a handful of studies addressed the relation between SDR and religion-as-quest. Thus, we tested for publication bias in the relation between overall SDR, on one hand, and (a) global religiosity, (b) intrinsic religiosity, (c) extrinsic religiosity, and (d) religion-as-quest, on the other.

We used the trim and fill method (Duval & Tweedie, 2000a, 2000b). This method identifies the meta-analytic studies that cause the skew of the funnel plot. These studies are trimmed off, and an *interim mean effect size* is computed. Next, the trimmed-off studies are reincluded, and the original skew is eliminated by adding the same number of fictitious studies as the trimmed-off studies. The fictitious studies match the trimmed-off studies in sample size, and they diverge from the *interim* mean effect size to the same degree as the trimmed-off studies; however, they diverge in the *other direction*, thus eliminating the skew. Finally, a new mean effect size is calculated that includes the fictitious studies.

First, we applied the trim and fill method to the 38 samples that included a measure of global religiosity. The correlation between overall SDR and global religiosity before trim and fill was $r(9, 534) = .108$, $p < .0001$. The four studies with the highest effect sizes needed to be trimmed off to cancel out a small skew. When filling the meta-analysis with the four fictitious studies that mirrored the trimmed off studies, we obtained a correlation of $r(9, 821) = .100$, $p < .0001$. Next, we applied the trim and fill method to the other three effect sizes of interest: the relation between overall SDR and (a) intrinsic religiosity, (b) extrinsic religiosity, and (c) religion-as-quest. We display the results in Table 3.

The estimated population effect sizes—that is, *r*(after trim and fill)—were very similar to the mean effect sizes of the meta-analysis. The 95% confidence intervals (CIs) of the mean effect sizes include the estimated population effect size (and vice versa) for global religiosity and religion-as-quest. For intrinsic and extrinsic religiosity, the 99% CIs of the mean effect sizes include the estimated population effect size (and vice versa). As we will see later, this pattern is likely to be because of moderators of the relation between SDR and intrinsic or extrinsic religiosity. Overall, then, publication bias does not present a problem, given that the population estimates yield the same conclusions as the meta-analytic study estimates.

### *Zero-Order Correlations.*

First, we discuss the zero-order random effects weighted average Pearson's correlation coefficients between SDR (overall SDR, Marlowe–Crowne scales, Eysenckian scales, self-deceptive enhancement, other-deceptive enhancement) and religiosity (overall religiosity, global religiosity, intrinsic religiosity, extrinsic religiosity, religion-as-quest). We display the correlations in Table 4. The omnibus correlation between overall SDR and overall religiosity was positive, as was the correlation between overall SDR and global religiosity. Overall religiosity and global religiosity, however, are (by definition) multifaceted, if not amorphous, constructs. Indeed, our focus was on the relation between overall SDR and *each facet of religiosity*. Thus, we only briefly discuss the relation between other measures of SDR and facets of religiosity, where relevant.

*Relation between SDR and intrinsic religiosity.* The third row of Table 4 presents the relation between SDR and intrinsic religiosity. In replication of Trimble's (1997) results, overall SDR, as well as all four sets of SDR measures (self-deceptive enhancement, impression management, Marlowe–Crowne scales, Eysenckian scales), were positively related to intrinsic religiosity.

Somewhat at odds with Trimble's meta-analysis, the relation between impression management and intrinsic religiosity, $r = .310$, $p < .0001$ (lower 95% CI = .257, upper 95% CI = .384), was significantly higher than the relation between self-deceptive enhancement and intrinsic religiosity, $r = .118$, $p < .001$ (lower 95% CI = .056, upper 95% CI = .182): The 95% CIs around the two relations did not overlap. Paulhus (2002) proposed that the Impression Management subscale assesses communal desirability, and this squares with religiosity's presumed reflection of attachment or communal concerns (Granqvist, Mikulincer, & Shaver, 2010; Norenzayan & Shariff, 2008; Ysseldyk et al., 2010). Alternatively,

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**Table 4.** Pearson Product Moment Correlations between Measures of Socially Desirable Responding and Facets of Religiosity

| | SDR Measures | | | | |
|---|---|---|---|---|---|
| Facets of Religiosity | Overall | SDE | IM | M-C | E |
| Overall | .101**** (75/15,396) | −.015 (11/1,410) | .124**** (17/2,613) | .101**** (34/5,721) | .104**** (24/6,576) |
| Global | .108**** (38/9,534) | −.026 (6/828) | .198**** (10/1,890) | .099**** (14/2,209) | .106**** (16/5,647) |
| Intrinsic | .163**** (30/5,016) | .118*** (6/956) | .310**** (7/1,059) | .160**** (15/2,808) | .102*** (8/1,149) |
| Extrinsic | −.035 (23/3,987) | −.099** (5/882) | −.288**** (6/985) | −.009 (10/2,020) | .092** (7/982) |
| Religion-as-quest | −.105**** (12/2,431) | −.081* (4/771) | −.191**** (5/874) | −.119**** (5/977) | −.018 (2/580) |

Note: SDR = socially desirable responding; Overall = mean of all SDR measure or religiosity facets, respectively; SDE = Self-Deceptive Enhancement subscale of the Balanced Inventory of Socially Desirable Responding (BIDR); IM = Impression Management subscale of the BIDR; M-C = Marlowe–Crowne Scales; E = Eysenckian scales; (x/y): x = number of samples; y = number of participants across these samples.
*$p \leq .05$. **$p \leq .01$. ***$p \leq .001$. ****$p \leq .0001$.

the Impression Management subscale has higher religious content than the Self-Deceptive Enhancement subscale. In particular, 8 of the 20 items of the Impression Management subscale have content shared with the Ten Commandments and the Sermon on the Mount (e.g., "I sometimes try to get even rather than forgive and forget"), whereas only 1 of the 20 items of the Self-Deceptive Enhancement subscale has content somewhat related to religiosity ("I have not always been honest with myself") and another item has content that stands in opposition to religiosity ("I am fully in control of my own fate"). In all, the stronger relation between impression management and intrinsic religiosity than self-deceptive enhancement and intrinsic religiosity may reflect a conceptually meaningful pattern but may also reflect a methodological artifact. It is the task of future research to clarify this issue.

*Relation between SDR and extrinsic religiosity*. The fourth row of Table 4 presents the relation between SDR and extrinsic religiosity. In replication of Trimble's (1997) findings, overall SDR was unrelated to extrinsic religiosity. This null correlation, however, may be understood in the context of relations between other SDR measures and extrinsic religiosity. Thus, although the Marlowe–Crowne scales were unrelated to extrinsic religiosity, self-deceptive enhancement and impression management were negatively related to it (in contrast to Trimble's results), whereas, somewhat surprisingly, the Eysenckian scales were positively related to it. The positive relation between the Eysenckian scales and extrinsic religiosity appears puzzling on first sight, given that these scales behave similarly to the impression management subscale (Borkenau & Ostendorf, 1992; Eysenck, 1999; Gillings & Joseph, 1996). However, we show later that this divergence can be explained by the fact that most of the samples (five out of seven) that included the Eysenckian scales were drawn from a low-religiosity country (United Kingdom), with macro-level culture being a crucial moderator of the relation between SDR and extrinsic religiosity.

*Relation between SDR and religion-as-quest*. Religion-as-quest was negatively related to overall SDR as well as all other SDR measures. The exception was the relation between religion-as-quest and the Eysenckian scales. This null relation may be because of insufficient power: Only two samples were involved ($n = 580$).

*Sample Characteristics as Moderators.* We examined four sample characteristics as moderators of the relation between SDR and religiosity. These were participant gender, participant age, macro-level culture, and micro-level culture. We display the results in Table 5 and Figure 2.

The first two sample characteristics, participant age and gender, were exploratory. We obtained null effects for both. This is not surprising. The large majority of samples consisted of psychology undergraduate students, thus restricting age. Also, gender has typically not been found to moderate results in meta-analyses involving religion (e.g., Saroglou, 2010; T. B. Smith et al., 2003; but see Hall, Matz, & Wood, 2010).

*Macro-level culture*. We assumed that the higher the degree of religiosity in a given country, the more positive value on intrinsic religiosity and the more negative value on extrinsic religiosity or religion-as-quest this country will place. Country-level religiosity varied from high to low (United States, Canada, United Kingdom). We offered three hypotheses. First, the positive relation between SDR and intrinsic religiosity would be stronger (i.e., more positive) in the United States, followed by Canada and the United Kingdom. This was indeed the case ($\beta = .410$, $p = .026$). Second, the low or negative relation between SDR and extrinsic religiosity would be stronger (i.e., more negative) in the United States followed by Canada and the United Kingdom. This hypothesis was also supported ($\beta = -.671$, $p = .008$). Finally, the low or negative relation between SDR and religion-as-quest

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**Table 5.** Age, Sex, Macro-Level Culture, and Micro-Level Culture as Moderators of the Relation Between Socially Desirable Responding and Facets of Religiosity

| | Intrinsic Religiosity | Extrinsic Religiosity | Religion-as-Quest |
|---|---|---|---|
| Moderator | | | |
| Mean age (β) | **–.139** | **–.048** | **–.030** |
| | –15 | –13 | –7 |
| Sex (% female; β) | **–.002** | **–.275** | **.094** |
| | –24 | –19 | –11 |
| Macro-level culture (interaction β)a | **.410*** | **–.671******* | **–.871**** |
| | –29 | –22 | –12 |
| United States | ***.192***** | ***–.104***** | ***–.149***** |
| [61] | (21/3,399) | (15/2,444) | (8/1,367) |
| Canada | ***.127*** | ***–.060*** | ***–.12**** |
| [49] | (2/474) | (1/400) | (1/400) |
| United Kingdom | ***.110**** | ***.101*** | ***–.006*** |
| [33] | (6/869) | (6/869) | (3/664) |
| Micro-level culture (Q) | **2.67**ms | **13.88***** | **0.230** |
| | –19 | –14 | –9 |
| U.S. Christian university | ***.243***** | ***–.209***** | ***–.145***** |
| | (6/985) | (6/985) | (5/874) |
| U.S. secular university | ***.173***** | ***–.035*** | ***–.120*** |
| | (13/2,193) | (8/1,346) | (4/577) |

Note: (x/y): x = number of samples; y = number of participants across these samples; *[z]* with z = Gallup country-level religiosity index. Bold numbers indicate the standardized betas of the effect of the moderator on the relation between religiosity and socially desirable responding. Bold and italic numbers indicate the random effects weighted average Pearson's correlation coefficients between the specific religiosity facet and SDR measure for the specific level of culture (e.g., U.S. secular university—micro level, United Kingdom—macro level).
a. We controlled for year of publication.
ms$p \leq .10$ *$p \leq .05$. **$p \leq .01$. ***$p \leq .001$. ****$p \leq .0001$.

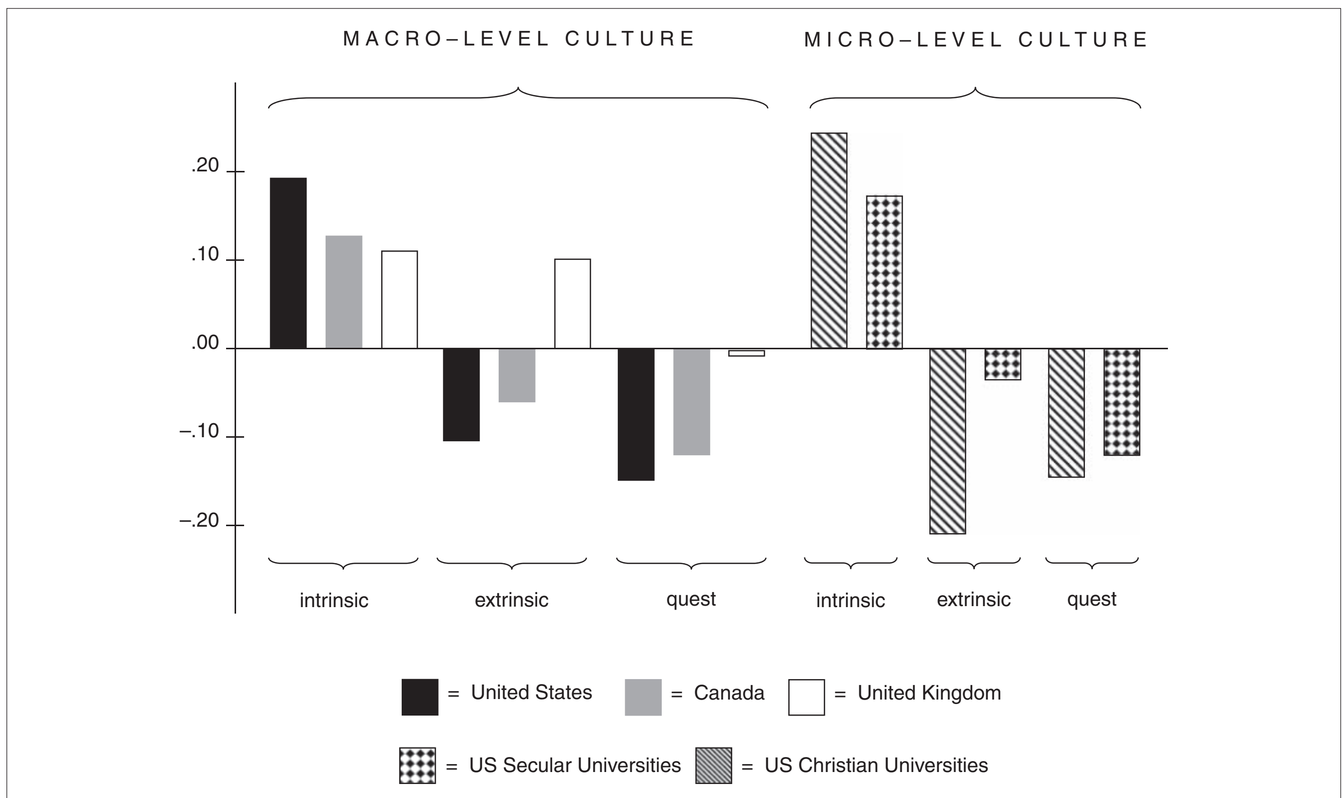


**Figure 2.** Interactions between macro-level culture (United States, Canada, United Kingdom) and religiosity facets and between micro-level culture (U.S. Christian vs. secular universities) and religiosity facets

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would be stronger (i.e., more negative) in the United States, followed by Canada and the United Kingdom. Likewise, this hypothesis was supported ($\beta = -.871$, $p = .002$). Macro-level culture moderated the relation between SDR and religiosity.

*Micro-level culture*. We began with the assumption that U.S. Christian (compared to secular) universities place more positive value on intrinsic religiosity and more negative value on extrinsic religiosity or religion-as-quest. We offered three hypotheses. First, the positive relation between SDR and intrinsic religiosity would be stronger (i.e., more positive) in Christian than secular universities. This was indeed the case, although the relation was marginal ($Q = 2.67$, $p = .100$). Second, the low or negative relation between SDR and extrinsic religiosity would be stronger (i.e., more negative) in Christian than secular universities. This hypothesis was supported ($Q = 13.88$, $p = .0002$). Finally, the low or negative relation between SDR and religion-as-quest would be stronger (i.e., more negative) in Christian than in secular universities. This hypothesis was unsupported ($Q = 0.23$, $p = .631$), although the means were in the expected direction. Micro-level culture appeared to moderate the relation between SDR and religiosity.

## Discussion

In a meta-analysis, we tested the religiosity as self-enhancement formulation. It states that religiosity is a means for self-enhancement: Religiosity satisfies self-enhancement concerns (e.g., perceiving the self favorably; Allport, 1950; Batson et al., 1993; Batson & Stocks, 2004; James, 1902; Reiss, 2004). We capitalized on SDR as an operationalization of self-enhancement (Paulhus & Holden, in press; also see Crowne & Marlowe, 1960; Paulhus & Vazire, 2007; Upshaw & Yates, 1968). All the studies we included in the meta-analysis assessed SDR in confidential or private contexts; thus, SDR tapped predominantly intrapsychic processes.

Our formulation that SDR drives religiosity relied on two assumptions. First, people strategically use an ingenious array of means to satisfy the self-enhancement motive (Alicke & Sedikides, 2009; Hepper et al., in press; Sedikides & Gregg, 2008). These means include aspects of the sociocultural context. Religion is a prevalent and important such aspect. People, then, will be likely to capitalize on it for satisfying the self-enhancement motive. Second, self-enhancement, as a disposition, is a more basic structure than religiosity (Heaven & Ciarrochi, 2007; McCullough et al., 2003; McCullough et al., 2005; Wink et al., 2007), which is regarded as a cultural adaptation (Saroglou, 2010). It is plausible that self-enhancement has chronological priority over religiosity and is thus more likely to drive it than vice versa.

The religiosity as self-enhancement formulation states that self-enhancement (i.e., SDR) will be associated with increases in religiosity. Specifically, the relation between SDR and religiosity will be stronger in cultures that place particularly positive value on religiosity or in which religiosity represents a particularly positive identity. We summarize the hypotheses and findings below.

### Summary of Hypotheses and Findings.

We focused on three facets of religiosity: intrinsic, extrinsic, and religion-as-quest. We also focused on overall SDR (i.e., collapsing across various indices of this construct). In addition, we examined two critical moderators of the relation between SDR and religiosity. The first moderator—a continuous measure—reflected macro-level culture and in particular countries varying in degree of religiosity. Based on a worldwide survey (Pelham & Nyiri, 2008), we were able to classify the United States, Canada, and the United Kingdom as varying from high to low on religiosity. The second moderator—a dichotomous measure—reflected micro-level culture and in particular U.S. universities characterized by either a high (i.e., Christian) or low (i.e., secular) religiosity tradition.

We derived two sets of hypotheses. The first set pertained to the macro-level moderator and comprised three parts: (a) the positive relation between SDR and intrinsic religiosity will be stronger (i.e., more positive) the higher the country is on religiosity (i.e., strongest in the United States, weakest in the United Kingdom), (b) the low or negative relation between SDR and extrinsic religiosity will be stronger (i.e., more negative) the higher the country is on religiosity, and (c) the low or negative relation between SDR and religion-as-quest will be stronger the higher the country is on religiosity. The results were consistent with all three hypotheses. Parenthetically, the relation between extrinsic religiosity and SDR was positive (rather than null or negative) in the United Kingdom. It may be particularly self-enhancing for U.K. undergraduates to believe or claim that they are involved in religious practices for extrinsic reasons (e.g., activities, meeting interesting people) rather than for intrinsic reasons (e.g., true belief), as intrinsic religiosity may be frowned on in U.K. culture.

The second set of hypotheses pertained to the micro-level moderator and also comprised three parts: (a) the positive relation between SDR and intrinsic religiosity will be stronger (i.e., more positive) in Christian than secular U.S. universities, (b) the low or negative relation between SDR and extrinsic religiosity will be stronger (i.e., more negative) in Christian than secular universities, and (c) the low or negative relation between SDR and religion-as-quest will be stronger in Christian than secular universities. Hypothesis 1 received somewhat weak (i.e., marginal) support, Hypothesis 2 received strong support, and Hypothesis 3 received directional backing.

Moreover, our meta-analysis replicated, extended, and qualified findings of an earlier meta-analysis (Trimble, 1997) on the relation between self-enhancement (i.e., SDR) and intrinsic religiosity. As in Trimble (1997), overall SDR,

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self-deceptive enhancement, impression management, the Marlowe–Crowne scales, and the Eysenckian scales were positively related to intrinsic religiosity. Somewhat at odds with Trimble, the relation between impression management and intrinsic religiosity was significantly stronger than the relation between self-deceptive enhancement and intrinsic religiosity. This may be because of the Impression Management subscale assessing a form of communal desirability (Paulhus, 2002) or content overlap between this scale and religious scriptures (e.g., the Ten Commandments, the Sermon on the Mount).

Finally, our meta-analyses replicated, extended, and qualified Trimble's (1997) results on the relation between self-enhancement (i.e., SDR) and extrinsic religiosity. As in Trimble, overall SDR and the Marlowe–Crowne scales were unrelated to extrinsic religiosity. However, in contrast to Trimble, overall self-deceptive enhancement and impression management were negatively related, whereas the Eysenckian scales were positively related, to extrinsic religiosity. This seemingly discrepant pattern is explained in terms of the macro-level moderator: The samples that used the Eysenckian scales stemmed predominantly from a low-religiosity country (i.e., the United Kingdom).

*Implications.* The current meta-analysis provided preliminary evidence that self-enhancement underpins religiosity. Of course, more definitive evidence is required to establish a causal connection between the two constructs. Such evidence would be provided by experimental and time-lagged longitudinal designs, and it would involve a variety of self-enhancement indices (Alicke & Sedikides, 2009; Hepper et al., press; Taylor, Lerner, Sherman, Sage, & McDowell, 2003).

Our empirical research has moved recently into this direction. For example, there is a potential problem with the marker of self-enhancement in our meta-analysis. As described in the introduction, SDR may reflect to some degree "substance" on top of "style" (Paulhus & Vazire, 2007), and the former may partially drive the link with religiosity (Trimble, 1997; Watson et al., 1986). Thus, it would be desirable to test the relation between self-enhancement and religiosity using a self-enhancement measure that is not liable to this alternative explanation. One such measure is overclaiming (Paulhus, Harms, Bruce, & Lysy, 2003). Here, participants rate their knowledge on a given domain by indicating how familiar they are with instances of that domain. Because some instances are nonexistent (i.e., fabricated by the researcher), signal detection formulas yield a self-enhancement index (i.e., overclaiming) separate from a knowledge index. We have constructed two over claiming tasks. One refers to religious topics (e.g., "famous biblical verses"), the other to communal topics (e.g., "charities"). On both tasks, intrinsically religious participants manifested a pattern of overclaiming (Gebauer & Sedikides, 2009b). Moreover, controlling for overclaiming rendered the relation between intrinsic religiosity and several of its well-established correlates (e.g., prosocial behavior; Norenzayan & Shariff, 2008) nonsignificant. These findings are consistent with the religiosity as self-enhancement formulation.

We have also engaged in experimental tests of the religiosity as self-enhancement formulation (Gebauer & Sedikides, 2009a). In one set of studies, Christian participants read a bogus scientific text casting Christianity in a particularly positive (i.e., self-enhancing) light. Reading this text increased participants' level of religiosity. This increase was particularly strong among high self-esteem persons, a pattern consistent with the idea that the increase was driven by the self-enhancement motive. In a second set of studies, Christians believed that they lived up to core Christian imperatives (e.g., the Ten Commandments, the Sermon on the Mount, the Lord's Prayer) more faithfully than their fellow believers—a classic better-than-average effect (Alicke & Sedikides, 2009). Crucially, this effect was particularly strong among participants with (experimentally induced) high self-esteem, once again a pattern that implicates the action of the self-enhancement motive.

Nevertheless, important questions remain unanswered. To begin with, how exactly does religiosity serve self-enhancement? The philosopher Ludwig Feuerbach (1849) maintained that the belief in an omnipotent, omniscient, and omnibenevolent God is the outward projection of a person's own desire to be almighty himself or herself. According to Reiss (2004), "The religious idea that gods created humanity and that they are aware of what happens to us implies that we are so important that we command attention from divine sources" (p. 316). Similarly, God's personal relationship with the believer is a central aspect of religiosity (Batson et al., 1993; Exline, 2002). Indeed, the association with an almighty being might greatly elevate one's self-worth (cf. Tesser, 1988). These possibilities are worthy of future empirical pursuits, as is the possibility of reciprocal causation. For example, religiosity may elevate self-esteem, which, in turn, fosters religiosity for self-enhancement purposes.

Do our findings generalize to other religions beside Christianity? Our reported meta-analysis included two studies that tested Muslim participants (Rowatt, Franklin, & Cotton, 2005; Saroglou & Galand, 2004), and the pattern of results was similar to those studies that tested Christian participants. Future research will do well to provide a more conclusive test of the generalizability of our findings among the world's most influential religions.

*In Closing.* Religiosity is a complex phenomenon that is multiply determined (Sedikides, 2010). In the arena of motives or needs alone, explanations for religiosity include control (Kay, Gaucher, McGregor, & Nash, 2010), uncertainty reduction (Hogg, Adelman, & Blagg, 2010), death anxiety avoidance (Vail et al., 2010), attachment (Granqvist et al., 2010), meaning (Park, 2005), and belongingness (Krause & Wulff, 2005). We added to this literature the self-enhancement motive. We hope that future empirical efforts will not only provide more fine-grained tests of

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motive-based analyses of religiosity but also contribute to a general theory of religiosity.

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