

# The Religiosity as Social Value Hypothesis: A Multi-Method Replication and Extension Across 65 Countries and Three Levels of Spatial Aggregation

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Are religious people psychologically better or worse adjusted than their nonreligious counterparts? Hundreds of studies have reported a positive relation between religiosity and psychological adjustment. Recently, however, a comparatively small number of cross-cultural studies has questioned this staple of religiosity research. The latter studies find that religious adjustment benefits are restricted to religious cultures. Gebauer, Sedikides, and Neberich (2012) suggested the religiosity as social value hypothesis (RASV) as one explanation for those cross-cultural differences. RASV states that, in religious cultures, religiosity possesses much social value, and, as such, religious people will feel particularly good about themselves. In secular cultures, however, religiosity possesses limited social value, and, as such, religious people will feel less good about themselves, if at all. Yet, previous evidence has been inconclusive regarding RASV and regarding cross-cultural differences in religious adjustment benefits more generally. To clarify matters, we conducted 3 replication studies. We examined the relation between religiosity and self-esteem (the most direct and appropriate adjustment indicator, according to RASV) in a self-report study across 65 countries ( $N = 2,195,301$ ), an informant-report study across 36 countries ( $N = 560,264$ ), and another self-report study across 1,932 urban areas from 243 federal states in 18 countries ( $N = 1,188,536$ ). Moreover, we scrutinized our results against 7, previously untested, alternative explanations. Our results fully and firmly replicated and extended prior evidence for cross-cultural differences in religious adjustment benefits. These cross-cultural differences were best explained by RASV.

*Keywords:* culture, psychological adjustment, religiosity

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According to one recent estimate, 68% of people worldwide consider religion to be “an important part of their daily lives” (Diener, Tay, & Myers, 2011, p. 1280). Estimates like this suggest that religiosity plays a key role in the way people carry themselves in their social environment and are influenced by it (Baumeister, 2002). Thus, it is not surprising that religiosity has

become a major research topic in personality and social psychology (Saroglou, 2014; Sedikides, 2010). By far, the most widely studied research question concerns the *religiosity-adjustment relation*, with several hundred studies concluding that religiosity is related to better psychological adjustment (for reviews see: Koenig, King, & Carson, 2012; Smith, Mc-

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Cullough, & Poll, 2003). Yet, this staple of religiosity research has been challenged by a small literature suggesting that religious adjustment benefits may be limited to religious cultures (Diener et al., 2011; Stavrova, Fetchenhauer, & Schlösser, 2013; see below for a full review).

The religiosity as social value hypothesis (RASV; Gebauer, Sedikides, & Neberich, 2012) provides one explanation for cross-cultural differences in religious adjustment benefits.<sup>1</sup> According to RASV, religiosity is *the* defining social value in religious cultures, and so those who meet that social value (i.e., religious persons) will feel particularly good about themselves. Religiosity, however, is an inconsequential social value in secular cultures, and so religious persons will feel less good about themselves, if at all. Conclusive evidence for RASV, and for cross-cultural differences in the religiosity-adjustment relation more generally, would be a key step in understanding the origin and nature of religious adjustment benefits. However, the existing evidence is inconclusive in regards to both RASV and cross-cultural differences in the religiosity-adjustment relation. In particular, the evidence is (a) rather *indirect*, (b) partly *inconsistent*, and (c) liable to *alternative explanations*.

In this article, we seek to address all three issues. In brief, we reexamine cross-cultural differences in the religiosity-adjustment relation from a RASV perspective. According to RASV, global self-esteem is the most direct and appropriate indicator of psychological adjustment (Judge, Erez, Bono, & Thoresen, 2002; Taylor & Brown, 1988; Watson, Suls, & Haig, 2002), and so it is the one we use. Moreover, we draw on three very large samples in an effort to clarify previous inconsistencies ( $560,264 \leq Ns \leq 2,195,301$ ). Finally, we address seven alternative explanations that challenged past research (described in detail in the *Seven Alternative Explanations* section). In brief, those alternatives are as follows: (a) the sociocultural motives perspective on personality, (b) country-level covariates, (c) spatial dependence, (d) masked curvilinearity, (e) self-presentation, (f) self-report bias, and (g) interpersonal contact.

In the remainder of this Introduction, we elaborate on RASV, review prior cross-cultural research on the religiosity-adjustment relation, and provide more detail on the seven untested alternative explanations. In the empirical part of the article, we examine the relation between religiosity and global self-esteem in a self-report study across 65 countries ( $N = 2,195,301$ ), an informant-report study across 36 countries ( $N = 560,264$ ), and another self-report study across 1,932 urban areas from 243 federal states in 18 countries ( $N = 1,313,474$ ).

### Religiosity as Social Value

RASV states that personal religiosity makes people feel good about themselves to the extent that religiosity is culturally valued. More precisely, if culture embraces religiosity as a social value, religious people will take pride in living up to this value, resulting in adjustment benefits. If, on the other hand, culture considers religiosity a peripheral value, religious people will derive little pride from it, resulting in minimal adjustment benefits (at best). Overall, religious people will derive considerable adjustment benefits in religious cultures, but they will derive little (if any) adjustment benefits in secular cultures. One key point to note is that religiosity is rarely devalued in secular cultures; even the

world's least religious countries institutionally support religious liberty (Alwall, 2000; Gill, 2008). For that reason, RASV predicts an asymmetry in religious adjustment benefits: Those benefits will be plentiful in religious cultures, but diminished or null (but not negative) in secular cultures.

RASV is tightly grounded in the psychological and sociological literatures on the self-concept. Both literatures advocate that psychological adjustment—and in particular global self-esteem—originates to a great degree from living up to social values. William James (1907) was the first to recognize, or at least formalize, this principle. Morris Rosenberg (1965; Rosenberg & Pearlman, 1978) elaborated on it and called it the “psychological centrality principle.” He reasoned that global self-esteem derives from living up to values that are psychologically central to the individual. He further assumed that people typically regard culturally prominent values as psychologically central (Rosenberg, 1979). Similarly, Rokeach (1973, p. 15) maintained that values are “in the final analysis the conceptual tools and weapons that we all employ in order to maintain and enhance self-esteem.”

Contemporary self-concept theories, too, endorse the psychological centrality principle. For example, the Self-Concept Enhancing Tactician Model (Sedikides & Strube, 1997) posits that “people are highly skilled in recognizing culturally sanctioned roles and strive to fulfill these roles. . . [in an effort to] evaluate themselves positively” (Sedikides, Gaertner, & Toguchi, 2003, p. 63). Terror Management Theory (Pyszczynski, Greenberg, Solomon, Arndt, & Schimel, 2004) defines global self-esteem as “a culturally based construction that consists of viewing oneself as living up to specific contingencies of value . . . that are derived from the culture at large” (p. 437). Finally, the Contingencies of Self-Worth Model (Crocker & Wolfe, 2001) postulates that “the impact of events and circumstances on self-esteem depends on the perceived relevance of those events to one’s contingencies of self-worth” and “contingencies of self-worth develop over the course of time in response to many forms of socialization and social influence” (pp. 594–595).

In all, RASV can be regarded a religiosity-specific instantiation of the psychological centrality principle. Outside of the religiosity domain there is plenty of evidence for this principle (Becker et al., 2014; Fulmer et al., 2010; Gebauer, Wagner, Sedikides, & Neberich, 2013; Goodwin et al., 2012; Lönnqvist et al., 2009; Sedikides, Gaertner, & Vevea, 2005). From a self-concept perspective, that evidence attests a priori to the validity of RASV. In fact, a self-concept perspective would predict particularly strong effects of the psychological centrality principle in the religiosity domain, because long lists of religious values, norms, and commandments are an inherent part of religiosity (Schwartz & Huisman, 1995). Hence, a religious person in a religious culture should not only enjoy adjustment benefits from living up to the social value of religious belief itself, but that person should also enjoy adjustment benefits from living up to all those religiosity-specific values, norms, and commandments (e.g., religious dietary

<sup>1</sup> The term “religiosity as social value hypothesis” is not meant to imply that religiosity is equivalent with social value. Religiosity has many functions (Sedikides & Gebauer, 2013), and so the hypothesis simply states that one function of religiosity is to provide social value. Similar terminology has been used to characterize other aspects of religiosity (e.g., religion-as-prosocial; Batson, 1976).

rules). From a self-concept perspective, then, RASV should account for much of the relation between religiosity and psychological adjustment—and, in particular, for one key aspect of psychological adjustment: global self-esteem.

### The Cross-Cultural Literature on the Religiosity-Adjustment Relation

Twelve studies have examined cross-cultural differences in the religiosity-adjustment relation as a function of religiosity at the sociocultural level. Those studies can be sorted into three categories, based on their data-source. Six studies rely on data from the World Values Survey (WVS; Eichhorn, 2012; Lun & Bond, 2013; Okulicz-Kozaryn, 2010; Snoep, 2008; Stavrova, 2015—Study 1; Stavrova et al., 2013). Those studies found a positive relation between religiosity and psychological adjustment in religious countries, but a null-relation in secular countries. Additionally, two studies are based on data from the European Social Survey (ESS; Clark & Lelkes, 2009; Pirutinsky, 2013). In sharp contrast to the WVS studies, the ESS studies found no moderating effect of sociocultural religiosity on the relation between personal religiosity and better psychological adjustment.

Finally, four studies rely on datasets that are not publically available. Lavrič and Flere (2008) collected student data from universities in five countries and found that religious adjustment benefits were restricted to religious countries. In contrast, Leurent et al. (2013) collected patient data from general practices in seven countries and found no moderating effect of sociocultural religiosity on the religiosity-adjustment relation. Finally, Diener et al. (2011) and Gebauer, Sedikides, and Neberich (2012) used datasets that were comparable in size with the WVS and the ESS. In particular, Diener et al. used data from the Gallup World Poll and Gebauer et al. used data from a European online-dating platform. In both investigations, religious adjustment benefits were restricted to religious countries.

Together, most of the evidence is consistent with RASV, but there are also some noteworthy inconsistencies—especially the ESS results. From a RASV perspective, there are several reasons for those inconsistencies. For one, global self-esteem is the most direct and appropriate adjustment indicator in the present context, but surprisingly, global self-esteem has not been implicated in relevant studies. Gebauer, Sedikides, and Neberich (2012) assessed social self-esteem and found support for RASV. It is possible that prior research would have found more consistent cross-cultural differences in religious adjustment benefits, if it had used self-esteem as an adjustment indicator. Furthermore, most previous data (WVS, ESS, and Gallup) were collected via interviewers, a method that has benefits but also costs, such as interviewer-effects (Hox, de Leeuw, & Kreft, 1991). Hence, one goal of our research was to test again for cross-cultural differences in religious adjustment benefits, but this time using global self-esteem as our adjustment indicator and ruling out interviewer-effects as confounds. Another goal was to test seven alternative explanations to RASV and, more generally, for cross-cultural differences in religious adjustment benefits.

### Seven Alternative Explanations

#### 1. Sociocultural Motives Perspective

According to the sociocultural motives perspective on personality, personality effects vary across sociocultural contexts as a function of

ambient sociocultural norms (Gebauer, Leary, & Neberich, 2012; Gebauer, Paulhus, & Neberich 2013). For example, agreeableness and conscientiousness are associated with a tendency to swim with the sociocultural tide. Hence, these Big Five traits predict religiosity strongly in religious countries and weakly in secular countries (Gebauer, Bleidorn, et al., 2014). Stated another way, the relations between religiosity and those two Big Five traits vary across countries in the same way that the religiosity-adjustment relation varies. At the same time, agreeableness and conscientiousness both correlate with psychological adjustment, including self-esteem (Gebauer et al., 2015; Robins et al., 2001).<sup>2</sup> Hence, cross-cultural differences in the religiosity-adjustment relation may be spurious, accounted for by the sociocultural motives perspective.

#### 2. Country-Level Covariates

Correlates of sociocultural religiosity may drive cross-cultural differences in the religiosity-adjustment relation. One such correlate is collectivism (Gebauer, Paulhus, et al., 2013). Collectivist countries place premium value on group membership (Sedikides, Gaertner, & Cai, 2015). Religiosity generally is a social phenomenon, practiced within groups (Ysseldyk, Matheson, & Anisman, 2010), and so religious group membership should be particularly rewarding in collectivist countries. Another correlate of sociocultural religiosity is GDP per capita (Oishi & Diener, 2014). Personal religiosity may be psychologically most beneficial in poor countries, because it buffers against financial hardship (Gebauer, Nehrlich, Sedikides, & Neberich, 2013). A final correlate of sociocultural religiosity is pathogen prevalence (Fincher & Thornhill, 2012). Religiosity protects believers from pathogens (e.g., via restrictive food norms; Fincher & Thornhill, 2012). In pathogen-rich countries, religious believers should be physically healthier than nonbelievers (cf. Stavrova, 2015), and these physical health benefits may translate into psychological adjustment benefits.

#### 3. Spatial Dependence

Cross-cultural research on the religiosity-adjustment relation has typically used mixed-effects modeling (Snijders & Bosker, 2012). Mixed-effects models account for the statistical dependence of level-1 units (here: participants) when they share the same level 2 units (here: cultures). One assumption of mixed-effects modeling is that level-2 residuals are independent (Snijders & Bosker, 2012). Strictly speaking, however, this assumption is violated when spatial/geographic units are used at level 2 (here: cultures; Ward & Gleditsch, 2008). All literature on cross-cultural differences in the religiosity-adjustment relation has overlooked this issue of spatial dependence. Thus, prior results may be partly attributable to spatial dependence (Webster & Duffy, 2016). Fortunately, it is possible to statistically control for spatial dependence between level-2 units. Hence, we directly test whether controlling for spatial dependence diminishes RASV evidence.

#### 4. Masked Curvilinearity

RASV makes linear predictions regarding the religiosity-adjustment relation and the effect of sociocultural religiosity on

<sup>2</sup> Conscientiousness is a stronger correlate of self-esteem than is agreeableness (Gebauer et al., 2015; Robins et al., 2001).

that relation. Nonetheless, linear analyses may mask, or even ride on, curvilinear relations (e.g., reverse-U-shaped relations) that are not predicted by the model (Cronbach, 1958; Ganzach, 1997). Therefore, it is important to test whether inclusion of those curvilinear effects leads to results that are inconsistent with RASV.

## 5. Self-Presentation

High self-presenters are particularly keen to impress others (Sedikides, Gregg, & Hart, 2007; Sedikides, Hoorens, & Dufner, 2015). Hence, they exaggerate their desirable attributes when others are present. As described earlier, almost all data on the cross-cultural benefits of religiosity have been collected by interviewers (WVS, ESS, Gallup World Poll). This renders self-presentation a plausible alternative explanation. Specifically, religiosity and psychological adjustment may be linked in religious cultures only, because claiming high religiosity conveys a good impression only in those cultures (and claiming high levels of adjustment conveys a good impression in all cultures; Okulicz-Kozaryn, 2010; Pirutinsky, 2013).

## 6. Self-Report Bias

All prior cross-cultural research on the religiosity-adjustment relation used self-report data. As such, prior research is subject to self-report bias (Paulhus & Vazire, 2007). The value of that research will increase, if replicated using informant-reports.

## 7. Interpersonal Contact

The final alternative is a competing model for cross-cultural differences in religious adjustment benefits. Specifically, some researchers have drawn on an *interpersonal contact* explanation to account for those differences (Diener et al., 2011; Lavrič & Flere, 2008; Snoep, 2008; Stavrova et al., 2013). According to this explanation, religious people enjoy more supportive interpersonal contact with fellow believers in religious, compared to secular, cultures. Such contact, then, would account for the stronger relation between religiosity and psychological adjustment in religious cultures.<sup>3</sup> The interpersonal contact explanation has received empirical support, but that explanation alone is not sufficient to account for all cross-cultural differences in the religiosity-adjustment relation. This is so because measures of interpersonal contact have only partially explained cross-cultural differences in the religiosity-adjustment relation (Diener et al., 2011; Stavrova et al., 2013). Thus, it is important to test whether RASV can account for additional cross-cultural benefits of religiosity after controlling for the potential impact of interpersonal contact.

All seven alternatives raise questions about the validity of previous RASV evidence and the role of sociocultural religiosity for religious adjustment benefits more generally. To address these questions, we conducted the three studies described below. These studies examined the replicability of previous evidence for RASV and for cross-cultural differences in the religiosity-adjustment relation. The studies also examined the robustness of our results against the backdrop of the seven alternative explanations.

## Overview

Study 1 reexamined the religiosity-adjustment relation using the same assessment method as all previous studies—the self-report

method (Paulhus & Vazire, 2007). In doing so, the study capitalized on the most appropriate adjustment indicator in the RASV context, global self-esteem (Gebauer, Sedikides, & Neberich, 2012; Rosenberg, 1965; Sedikides et al., 2015). We expected a positive relation between personal religiosity and self-esteem in religious cultures, but we also expected this relation to diminish with decreasing sociocultural religiosity and cease to exist in the most secular cultures. The study relied on 2,195,301 respondents across 65 countries and, thus, constitutes the largest study on religious adjustment benefits to date. Moreover, our study tested five of the alternative explanations described above: sociocultural motives perspective, country-level covariates, spatial dependence, masked curvilinearity, and self-presentation.

Study 2 also tested for cross-cultural differences in the relation between personal religiosity and global self-esteem. However, Study 2 capitalized on informant-reports, allowing us to test self-report bias as an alternative explanation of the results. Informant-reports have never been used in prior research on cross-cultural differences in the religiosity-adjustment relation (including our Study 1). As such, Study 2 is an important complement to the literature. Our study relied on 560,264 respondents across 36 countries. In addition to testing self-report bias as an alternative, the study addressed three other alternatives: Sociocultural motives perspective, masked curvilinearity, and self-presentation.

Study 3 moved beyond country-level religiosity and examined the religiosity-esteem relation among 1,188,536 respondents from 1,932 urban areas (usually cities including their metropolitan regions). The urban areas were nested in 243 federal states, which were nested in 18 countries. The ensuing four-level hierarchical model allowed us to examine the unique influences of area-level religiosity, state-level religiosity, and country-level religiosity on the religiosity-esteem relation. Sedikides and Gebauer (2010) found in a meta-analysis that within-country differences in sociocultural religiosity (i.e., religious vs. secular universities) moderated the relation between religiosity and self-enhancement (a close correlate of psychological adjustment—and of self-esteem in particular; Alicke & Sedikides, 2009; Sedikides, Rudich, Gregg, Kumashiro, & Rusbult, 2004). On that basis, we predicted that the religiosity-esteem relation would be concurrently moderated by sociocultural religiosity at the area-level, state-level, and country-level. Evidence for this prediction would strongly suggest that the literature on cross-cultural differences in the religiosity-adjustment relation has underestimated the importance of culture, given that this literature focused on a single sociocultural level. Moreover, Study 3 tested four alternative explanations: Sociocultural motives perspective, masked curvilinearity, self-presentation, and interpersonal contact.

<sup>3</sup> There is reason to question the interpersonal contact explanation. In-group ties are typically stronger in minority, compared to majority, groups (Brewer, Manzi, & Shaw, 1993). Accordingly, interpersonal contact among religious believers should be particularly supportive in *secular* countries, where religious in-groups are minority groups. Consequently, interpersonal contact among religious believers should engender adjustment benefits in secular, not in religious, countries. In line with this reasoning, Bond, Lun, and Li (2012) found a stronger relation between religious participation and psychological adjustment when the sociocultural context was hostile toward religious group members. They suggested that external threat may have strengthened social support among religious group-members, thus boosting their psychological adjustment.

## Study 1: Self-Reports Across 65 Countries

In religious countries, personal religiosity correlates with psychological adjustment in the range of .10-.20 (Diener et al., 2011; Gebauer, Sedikides, & Neberich, 2012; Lavrič & Flere, 2008; Snoep, 2008). Based on that evidence, we predicted that personal religiosity will correlate with self-esteem at a similar range in the current sample's religious countries. Crucially, on the basis of RASV, we predicted that the religiosity-esteem relation will wane with decreasing sociocultural religiosity and will cease to exist in the most secular countries. We further predicted that the evidence for RASV holds even after accounting for five of the above-described alternative explanations: sociocultural motives perspective, country-level covariates, spatial dependence, masked curvilinearity, and self-presentation.

## Method

**Respondents.** The study used data from 2,195,301 respondents across 65 countries (62.4% female, 37.6% male;  $M_{\text{age}} = 25.39$  years,  $SD_{\text{age}} = 10.67$ ). Data were collected online from March 2001 to December 2009 at [www.outofservice.com](http://www.outofservice.com) (OOS), an Internet website hosting online studies (Gosling, Vazire, Srivastava, & John, 2004; for a complete list of previously published OOS research, see <http://www.thebigfiveproject.com/published-papers/>). Thus, none of the original RASV authors were involved in the data collection process (or the questionnaire design). This is one reason why the present replication effort should be considered independent of the original RASV research; another reason is that Felix Schönbrodt joined the research team to provide independent expert advice on the appropriate statistical tests.

Respondents learned about the study via Internet search engines, newspaper articles on previous studies, or word of mouth. As such, participants were not representatively sampled. Importantly, the ensuing sampling bias does not provide a plausible alternative explanation for our expected results. If anything, such a sampling bias should work against RASV, because online-study participants in highly religious countries typically affiliate with secular subcultures (Diener et al., 2011). Hence, online-studies underestimate cross-cultural differences in religiosity. Such underestimation, in turn, should attenuate cross-cultural differences in the religiosity-esteem relation, impeding the expression of evidence for RASV and resulting in underestimates of the influence of RASV.

We derived the sample by applying three selection criteria to the multistudy OOS dataset. We decided a priori on those criteria. In fact, those exact criteria have been used on the OOS dataset before (Gebauer, Bleidorn, et al., 2014). The (re-)use of those selection criteria is another reason why the present replication effort should be considered independent of the original RASV research. First, we excluded respondents who reported residing concurrently in a U.S. state and a country outside the U.S. Second, we excluded respondents who completed an irrelevant OOS study (i.e., one that did not feature our focal constructs, religiosity and self-esteem) or failed to complete any of our focal measures. Finally, we excluded respondents from countries with fewer than 1,000 cases to ensure measurement precision within each country. A minimum  $n$  of 1,000 per country is a conservative criterion (Bleidorn et al., 2016; Schönbrodt & Perugini, 2013), but it is frequently used in large-scale, cross-cultural research (Diener et al., 2011; Gebauer, Blei-

dorn, et al., 2014). Table 1 lists all 65 countries and their demographic composition.

**Procedure.** Language options for the study were English (used by 75.7% of respondents), Spanish (16.8%), German (4.3%), and Dutch (3.2%). Respondents provided informed consent and completed measures of Big Five personality, self-esteem, personal religiosity, and demographics (in that order). Finally, they received customized personality feedback and general information on personality psychology.

**Measures.** All measures involved rating scales ranging from 1 (*strongly disagree*) to 5 (*strongly agree*).

**Big Five personality.** Big Five personality was assessed with the Big Five Inventory (BFI; English version: John, Donahue, & Kentle, 1991; Spanish: Benet-Martínez & John, 1998; German: Rammstedt, 1997; Dutch: Denissen, Geenen, van Aken, Gosling, & Potter, 2008). All five BFI scales have adequate psychometric properties within the OOS dataset, including appropriate alpha coefficients and satisfactory levels of measurement invariance across countries (see Table 2 in Gebauer et al., 2015).<sup>4</sup>

**Self-esteem.** Self-esteem was assessed with a variant of the Single-Item Self-Esteem Scale (SISE; Robins, Hendin, & Trzesniewski, 2001): "I see myself as someone who has high self-esteem." The SISE possesses high test-retest reliability ( $r = .75$ ) and high correlations with Rosenberg's (1965) Self-Esteem Scale ( $.72 < r < .76$ ; Robins et al., 2001). Correcting those correlations for attenuation due to unreliability yields true score correlations of  $.89 < r < .94$ . The size of these correlations indicates that the two scales assess the same construct (Kline, 1998). The Self-Esteem Scale is the gold standard of global self-esteem assessment, and so these correlations support the validity of the SISE.

**Personal religiosity.** Personal religiosity was assessed with a variant of the Single-Item Religiosity Scale (SIRS; Norenzayan & Hansen, 2006): "I see myself as someone who is very religious." Single-item measures are suitable for the assessment of global religiosity, as they have adequate reliability and validity (Gebauer & Maio, 2012). In large-scale studies, religiosity is usually assessed with single-item measures (Hill & Pargament, 2003). The SIRS loads strongly (.88) on the same factor as established multi-item measures of global religiosity (Gebauer, Paulhus, et al., 2013).

**Country-level religiosity.** Country-level religiosity was assessed by averaging respondents' answers to the personal religiosity measure within each country. This is the standard approach to assess country-level religiosity (Diener et al., 2011). Table 1 presents our country-level index. The validity of this index was supported by its strong correlations with parallel indices from the Gallup World Poll ( $r = .86, p < .001$ ; Diener et al., 2011) and the WVS ( $r = .80, p < .001$ ; Fincher & Thornhill, 2012).

**Country-level covariates.** *Collectivism* was assessed with a meta-analytic update of Hofstede's (1991) individualism index (reverse-coded; Taras, Steel, & Kirkman, 2012; see their Table 1 "Mean Individualism"). *GDP per capita* was assessed with the International Monetary Fund's index (World Economic Outlook

<sup>4</sup> By a "satisfactory" level of measurement invariance, we refer to metric invariance. We compared Big Five relations with self-esteem across countries, and metric invariance is necessary and sufficient for that type of cross-cultural analysis (Horn & McArdle, 1992).

Table 1

*Study 1's Countries (Sorted by Country-Level Religiosity; High to Low), Within-Country Descriptive Statistics, and Within-Country Zero-Order Correlations Between Personal Religiosity and Self-Esteem*

Country	<i>N</i>	Age (years)	% women	% men	Country-level religiosity	Correlation: Personal religiosity and self-esteem
Pakistan	4,024	23.16	53.40	46.60	3.33	.17***
Philippines	18,605	21.38	75.00	25.00	3.27	.20***
Egypt	2,205	23.19	67.90	32.10	3.24	.18***
Saudi Arabia	1,179	25.72	53.30	46.70	3.20	.17***
Indonesia	2,855	24.21	58.30	41.70	3.19	.21***
India	20,836	24.80	48.80	51.20	3.18	.15***
Dominican Republic	4,036	23.04	75.80	24.20	3.15	.15***
Panama	1,571	24.70	70.80	29.20	3.10	.18***
El Salvador	2,222	23.58	68.30	31.70	3.07	.19***
Nicaragua	1,280	24.56	74.40	25.60	3.03	.14***
Malaysia	8,788	23.29	66.10	33.90	3.02	.20***
Honduras	1,450	24.40	73.00	27.00	3.02	.13***
United Arab Emirates	3,748	26.84	57.60	42.40	3.00	.20***
South Africa	5,380	28.23	63.00	37.00	3.00	.14***
Paraguay	1,849	23.75	69.90	30.10	2.99	.11***
Lebanon	1,141	23.50	59.30	40.70	2.96	.12***
Guatemala	3,340	23.81	67.50	32.50	2.95	.16***
Venezuela	13,297	22.66	74.30	25.70	2.93	.16***
Bolivia	3,732	23.12	66.10	33.90	2.88	.13***
Peru	13,493	23.44	68.40	31.60	2.83	.15***
Ecuador	4,051	23.99	68.00	32.00	2.82	.14***
Colombia	21,478	22.56	71.10	28.90	2.82	.15***
Costa Rica	3,663	23.90	68.70	31.30	2.76	.14***
Thailand	1,940	25.79	60.10	39.90	2.74	.14***
ABC-Islands	1,080	28.08	72.70	27.30	2.71	.21***
United States	1,162,493	25.64	62.10	37.90	2.70	.15***
Singapore	10,237	22.37	62.30	37.70	2.66	.13***
Chile	32,737	23.33	73.00	27.00	2.62	.11***
Brazil	3,461	29.44	40.30	59.70	2.57	.19***
Taiwan	1,230	26.42	61.10	38.90	2.54	.11***
Romania	3,107	23.42	64.00	36.00	2.50	.11***
Mexico	82,190	22.80	66.20	33.80	2.50	.11***
Iran	1,017	25.58	57.00	43.00	2.47	.11***
South Korea	2,329	27.38	43.00	57.00	2.44	.08***
Turkey	1,489	25.72	53.90	46.10	2.41	.11***
Croatia	1,726	23.53	62.00	38.00	2.41	.07**
Hong Kong	4,220	25.99	66.40	33.60	2.38	.09***
Argentina	69,404	23.39	73.30	26.70	2.38	.07***
China	6,454	27.63	61.50	38.50	2.37	.07***
Serbia-Montenegro	1,392	24.59	58.00	42.00	2.33	.07*
Russia	1,197	25.32	63.40	36.60	2.27	.07*
Italy	4,343	29.70	55.20	44.80	2.25	.07***
Greece	2,910	25.86	63.50	36.50	2.24	.09***
Japan	3,818	26.85	56.40	43.60	2.24	.12***
Uruguay	4,460	24.15	73.50	26.50	2.19	.07***
Canada	108,693	24.64	60.40	39.60	2.19	.10***
Ireland	10,728	24.36	58.60	41.40	2.18	.11***
Poland	2,535	23.99	53.10	46.90	2.17	.03
New Zealand	14,298	26.64	63.20	36.80	2.13	.09***
Australia	51,017	25.47	59.70	40.30	2.12	.09***
Austria	9,070	26.86	59.70	40.30	2.11	.07***
Hungary	1,206	26.17	58.00	42.00	2.10	.01
Switzerland	13,278	29.08	56.10	43.90	2.08	.07***
Germany	80,115	28.15	57.40	42.60	2.02	.06***
Portugal	1,940	25.37	50.40	49.60	1.97	.10***
Israel	2,479	27.30	56.60	43.40	1.97	.05*
Netherlands	72,735	29.85	62.40	37.60	1.95	.03***
Finland	7,757	24.45	60.50	39.50	1.95	.06***
France	5,116	27.72	55.60	44.40	1.94	.11***
United Kingdom	118,779	25.02	55.30	44.70	1.91	.09***
Spain	104,524	23.57	70.20	29.80	1.90	.06***
Denmark	4,909	27.49	47.00	53.00	1.76	.02
Belgium	14,230	26.54	59.60	40.40	1.76	.09***
Norway	12,509	27.49	57.30	42.70	1.69	.06***
Sweden	11,926	27.51	55.60	44.40	1.67	.05***

\*  $p < .05$ . \*\*  $p < .01$ . \*\*\*  $p < .001$ .

Table 2  
Study 1's Results

Model	Linear mixed-effects analyses									Simple slope analyses					
	Personal religiosity			Country-level religiosity			Cross-level interaction			High county-level religiosity			Low county-level religiosity		
	PE	↓ CI	↑ CI	PE	↓ CI	↑ CI	PE	↓ CI	↑ CI	(1.77 SD above M)			(1.83 SD below M)		
Basic	.12	.11	.13	.12	.09	.15	.04	.03	.05	.20	.18	.21	.04	.03	.06
Basic + A & C	.08	.07	.09	.12	.09	.15	.02	.02	.03	.12	.11	.13	.04	.03	.05
Basic + Spatial lag	.12	.11	.13	.12	.08	.16	.04	.03	.05	.20	.17	.22	.04	.02	.06
Basic + Collectivism	.12	.11	.13	.12	.08	.17	.04	.03	.05	.19	.17	.21	.05	.03	.07
Basic + GDP	.12	.11	.13	.12	.08	.16	.05	.04	.05	.20	.18	.22	.04	.02	.06
Basic + Pathogens	.12	.11	.13	.11	.07	.15	.04	.03	.05	.19	.17	.21	.05	.03	.07
Basic + Polynomials	.12	.11	.12	.12	.09	.15	.05	.04	.06	.20	.19	.22	.03	.01	.04

Note. PE = point estimate of standardized coefficient; ↓ CI = lower bound of 95% confidence interval; ↑ CI = upper bound of 95% confidence interval; A = agreeableness; C = conscientiousness.

Database, 2014). *Pathogen prevalence* was assessed with Fincher and Thornhill's (2012) Nonzoonotic Parasite Prevalence index.

**Statistical modeling.** We used linear mixed-effects models to account for the nested data structure (respondents nested in countries). We computed the models using the statistical software *R* (R Development Core Team, 2014) with its mixed-effects models package *lme4* (Bates, Maechler, Bolker, & Walker, 2014). We *z*-standardized all variables to obtain standardized coefficients (Snijders & Bosker, 2012, p. 53) and group-mean centered all level-1 predictors to interpret unambiguously cross-level interactions (Enders & Tofghi, 2007). Our models included random intercepts and random slopes for all level-1 predictors (Barr, Levy, Scheepers, & Tily, 2013).

As an example of our modeling choices, our *basic model* (i.e., without covariates) was specified as follows: We regressed self-esteem (level 1, *z*-standardized) on personal religiosity (level 1, *z*-standardized, group-mean centered, random slope included), country-level religiosity (level 2, *z*-standardized and, hence, grand-mean centered), and their cross-level interaction.

The Supplemental Materials include tables with Pearson correlations between all Study 1 variables at the participant level (Table S1) and between all Study 1 variables at the country level (Table S2).

## Results

Our basic model rests on the assumption that the religiosity-esteem relation varies significantly across countries. We obtained strong support for this assumption: A "main-effects-only" model (personal religiosity and country-level religiosity on self-esteem) fitted the data much better when the religiosity-esteem relation was allowed to vary rather than remained fixed across countries ( $\Delta AIC = 2,142.23$ ;  $\Delta\chi^2 = 2,146.23$ ,  $p < .001$ ). We proceeded with basic model testing.<sup>5</sup>

**Basic model.** Conceptually, the basic model examined the RASV prediction that personal religiosity is strongly related to self-esteem in religious countries, but that this relation wanes with decreasing country-level religiosity and ceases to exist in the most secular countries. Table 2's first data-row includes the basic model results. The left-hand panel shows a significant main effect of personal religiosity on self-esteem. The point estimate (PE) of the

coefficient was .12 with the following 95% confidence interval: [.11, .13]. Given that we *z*-standardized all variables in the model, this point estimate indicates a small (Cohen, 1988) positive relation between personal religiosity and self-esteem. Table 2's left-hand panel further shows a significant main effect of country-level religiosity on self-esteem, PE = .12 [.09, .15].<sup>6</sup> More important, however, Table 2's left-hand panel shows a significant cross-level interaction between personal religiosity and country-level religiosity, PE = .04 [.03, .05]. As predicted, the relation between personal religiosity and self-esteem was highest in religious coun-

<sup>5</sup> The country-level accounted for little variance in self-esteem; the intraclass correlation (ICC) was .03. Such low ICCs are often used to justify omission of mixed-effects analyses. As Nezlek (2008, p. 857) argued, however, "even if there is no between-group variance for all of the measures of interest, it cannot be assumed that relationships between or among these measures do not vary across groups." Nezlek advocated the use of mixed-effects analyses whenever the data are nested. Additionally, mixed-effects analyses are never disadvantageous (even when ICCs are zero; Hayes, 2006), and small ICCs can still bias results when mixed-effects analyses are omitted (Kreft & de Leeuw, 1998, pp. 9–10). Thus, we used mixed-effects analyses in Study 1, Study 2 (ICC = .02), and Study 3 (ICC<sub>country</sub> = .04, ICC<sub>state</sub> = .002, ICC<sub>area</sub> = .005). The small self-esteem ICCs raise the question of whether religiosity ICCs are similarly small. If the religiosity ICCs were substantially smaller than .01, the variability of sociocultural religiosity may not be meaningful. Hence, we examined all religiosity ICCs in Studies 1–3 and the results eliminated those concerns. Specifically, the religiosity ICCs were always considerably larger than .01: Study 1 (ICC = .10), Study 2 (ICC = .10), and in Study 3 (ICC<sub>country</sub> = .13, ICC<sub>state</sub> = .02, ICC<sub>area</sub> = .02).

<sup>6</sup> In previous research, people from religious (vs. secular) countries reported lower subjective well-being (Diener et al., 2011; Stavrova et al., 2013). That negative effect of country-level religiosity on well-being is driven by poorer living conditions in religious countries (e.g., lower GDP per capita; Stavrova et al., 2013). In contrast, we found a positive effect of country-level religiosity on self-esteem. The nature of global self-esteem can explain that difference. As described in the Introduction, self-esteem originates from living up to ambient social values *within* one's social group (here: the country at large), but it originates much less from the standing of one's social group *relative to other social groups* (here: the relative standing of one's country on GDP per capita). To illustrate, Blacks in the U.S. are disadvantaged compared with Whites, but Blacks possess higher self-esteem (Twenge & Crocker, 2002). Further supporting this reasoning, country-level religiosity also predicted higher social self-esteem in Gebauer, Sedikides, and Neberich's (2012) original RASV data.

tries and lowest in secular countries. But how high and how low? To answer this question we decomposed the cross-level interaction, conducting simple slope analyses (Aiken & West, 1991; Preacher, Curran, & Bauer, 2006).

**Simple slope analyses.** RASV calls for comparing the religiosity-esteem relation in the most and least religious sociocultural contexts. We first recentered country-level religiosity, so that its null-point lined up with the most religious country (1.77 *SD* above *M*). Next, we repeated our basic analysis.<sup>7</sup> Table 2's right-hand panel (first data-row) shows that the *PE* of the religiosity-esteem relation was .20 [.18, .21] at the highest point of country-level religiosity.<sup>8</sup> We tested for the same relation at the lowest point of country-level religiosity (1.83 *SD* below *M*). After recentering, we repeated the basic analysis once more. Table 2's right-hand panel (data-row 1) shows that the *PE* of the religiosity-esteem relation was .04 [.03, .06] at the lowest point of country-level religiosity. Figure 1 depicts the cross-level interaction, including the simple slopes reported here. The shape of Figure 1 fits well with RASV.<sup>9</sup> Figure 2 provides a complementary display of the same cross-level interaction (Gebauer, Bleidorn, et al., 2014), depicting each country's religiosity-esteem relation as a function of its country-level religiosity. This figure shows that our results are not merely driven by the religiosity-esteem relations within a few extreme countries. Instead, the religiosity-esteem relation in all 65 countries fits well with RASV predictions. A  $\Delta R^2$ -test (Snijders & Bosker, 2012) revealed that country-level

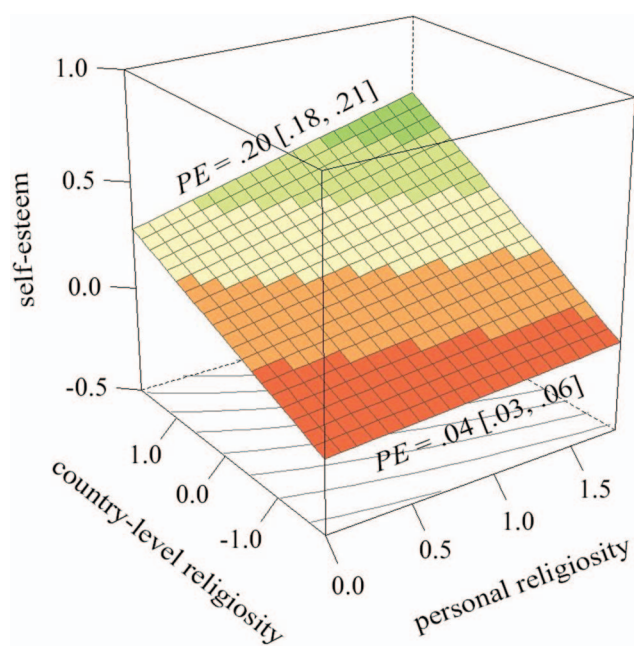


Figure 1. Study 1's basic model, depicting the relation between personal religiosity and self-esteem as a function of country-level religiosity. The most religious countries in the sample are displayed at the left endpoint of the country-level religiosity axis (1.77 *SD* above *M*). The least religious countries in the sample are displayed at the right endpoint of the country-level religiosity axis (1.83 *SD* below *M*). *PE* = point estimate of standardized coefficient, including its 95% confidence interval. See the online article for the color version of this figure.

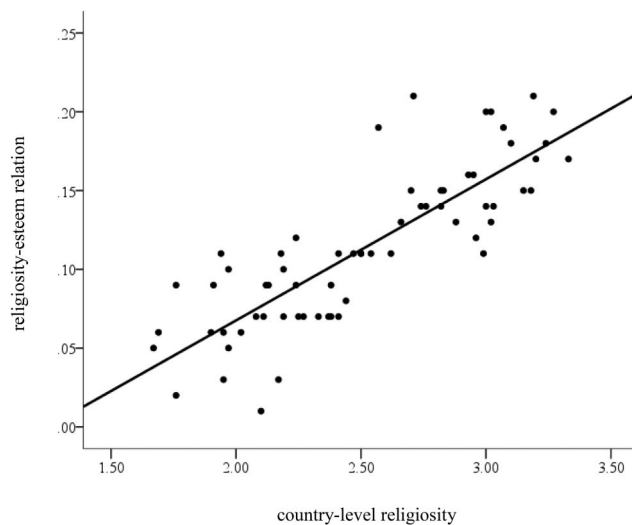


Figure 2. Zero-order correlations between personal religiosity and self-esteem for each country in Study 1 as a function of country-level religiosity.

religiosity explained 76.15% of the cross-cultural variation in the religiosity-esteem relation.

#### Alternative explanations.

**Sociocultural motives perspective.** Our results could be spuriously caused by cross-cultural differences in the agreeableness-religiosity relation and the conscientiousness-religiosity relation. Hence, we repeated our basic analysis, but included agreeableness, conscientiousness, and their cross-level interactions with country-level religiosity. Table 2's second data-row shows that the cross-level interaction between personal religiosity and country-level religiosity remained intact: The religiosity-esteem relation was *three* times larger at the highest point, *PE* = .12 [.11, .13], compared with the lowest

<sup>7</sup> In single-level regression, it is sometimes cautioned to refrain from testing simple slopes at values more extreme than  $M \pm 1$  *SD* because the researcher runs the risk of testing the slopes for a very small number of "outliers." Another view states that simple slopes can be tested at any value, as long as this value lies within the theoretically possible scale range (Cohen & Cohen, 1983; Preacher et al., 2006). Our decision to test simple slopes at the points of the most religious country and the most secular country (i.e., the most extreme countries) is independent of this controversy. We have no reason to expect anything special or undesirable among respondents from those countries. To the contrary, the high rank-order similarity between our country-level religiosity index and representative indices (Diener et al., 2011; Fincher & Thornhill, 2012) indicates that our respondents' religiosity is representative of their countries.

<sup>8</sup> Snijders and Bosker (2012) argued that *z*-standardizing variables in multilevel analysis produces standardized coefficients that are conceptually comparable with beta coefficients in single-level regression. However, given that the field has not reached consensus on this issue, we compared the results of our simple slope analyses with the zero-order correlations between religiosity and self-esteem in very religious and very secular countries. Table 1 presents these correlations within each country. We calculated the weighted mean religiosity-esteem correlations for the five most religious countries,  $r(28,868) = .19$  [.18, .21], and the five most secular countries,  $r(148,098) = .06$  [.06, .07]. These results are consistent with our simple slope analyses.

<sup>9</sup> The figure was generated with the *R* package *RSA* (Schönbrodt, 2015). The surface of the figure captures the full range of observed responses (no extrapolation to theoretically possible, but empirically unobserved, responses).



point,  $PE = .04$  [.04, .05], of country-level religiosity. Still, the control variables reduced our effects (without controls the religiosity-esteem relation was five times larger at the highest vs. lowest point of country-level religiosity). The reduction, however, is unsurprising. Agreeableness and conscientiousness are highly conservative controls: They partly reflect self-enhancement (Gebauer, Sedikides, Verplanken, & Maio, 2012), and self-enhancement is a vital part of self-esteem (Sedikides & Gregg, 2008; Sedikides et al., 2004). Hence, controlling for those traits effectively controls for valid variance in self-esteem.

**Country-level covariates.** Replicating prior findings, country-level religiosity was strongly related to country-level collectivism,  $r(61) = .75$  [.49, 1.00], GDP per capita,  $r(64) = -.66$  [-.91, -.41], and pathogen prevalence,  $r(64) = .71$  [.46, .96]. Thus, the moderating effect of country-level religiosity on the religiosity-esteem relation could be due to these factors. We repeated our basic analysis three times. Each time, we added another country-level covariate to the model, modeling their main effect and their cross-level interactions with personal religiosity. Table 2 shows that the results of our basic model held when controlling for collectivism (third data-row), GDP per capita (fourth data-row), and pathogen prevalence (fifth data-row). In contrast, the three alternative cross-level interactions on self-esteem were all nonsignificant (Personal Religiosity  $\times$  Collectivism:  $PE = .004$  [-.007, .01]; Personal Religiosity  $\times$  GDP per capita:  $PE = .006$  [-.004, .01]; Personal Religiosity  $\times$  Pathogen Prevalence:  $PE = .005$  [-.004, .02]).<sup>10</sup>

**Spatial dependence.** Multiple approaches can be taken to account for spatial dependence between geographic units (Ward & Gleditsch, 2008). One widely used approach corrects for spatial dependence by adding a covariate, which de-biases the spatially dependent predictor (here: country-level religiosity). This covariate is typically called “spatial lag.” Following Webster and Duffy (2016), we calculated a spatial lag score for a given country by averaging the religiosity of all countries in our study that share a land-border with that country. For example, Belgium shares a land-border with France, Germany, Luxembourg, and The Netherlands (<http://country-facts.findthedata.com>). France, Germany, and The Netherlands are also part of this study (see Table 1). Thus, we averaged the religiosity of those three countries (i.e.,  $[1.94 + 2.02 + 1.95]/3 = 1.97$ ). The resultant value became the spatial lag score for Belgium. We were able to calculate spatial lag scores for 55 of our 65 countries. The remaining 10 countries were either islands and, thus, had no land-borders (ABC Islands, Australia, Japan, New Zealand, Singapore, Taiwan, The Philippines), or there were no neighboring countries in our dataset (Dominican Republic, South Africa, South Korea). The spatial lag variable was related to country-level religiosity,  $r(55) = .67$  [.40, .94]. Thus, the moderating effect of country-level religiosity on the religiosity-esteem relation may be attributable to spatial lag. Hence, we repeated our basic analysis, but included the spatial lag variable and its cross-level interaction with personal religiosity. Table 2's sixth data-row shows that the results of this analysis were virtually identical to the results of the basic analysis. Thus, spatial dependence cannot account for our results.

**Masked curvilinearity.** Do the conclusions of the basic model change when we allow its relations to be curvilinear? We repeated our basic analysis once more, including the polynomials (i.e., quadratic terms) of personal religiosity and country-level religiosity (Cronbach, 1958). The joint contribution of the polynomials

was miniscule ( $\Delta R^2_{\text{marginal}} = 0.02\%$ ; Nakagawa & Schielzeth, 2013), and inclusion of them did not alter our results (Table 2's final data-row).

**Self-presentation.** Our participants completed an anonymous online-questionnaire. No interviewers were involved. Thus, self-presentation cannot account for our results, because the presence of other people (in previous research: interviewers) is necessary for self-presentation effects to occur.

## Discussion

Study 1 was a direct replication of previous cross-cultural research on the religiosity-adjustment relation. Yet, this study differed from previous research in three important ways. First, previous research operationalized psychological adjustment as life satisfaction (Stavrova et al., 2013), subjective well-being (Diener et al., 2011), depression (Leurent et al., 2013), or social self-esteem (Gebauer, Sedikides, & Neberich, 2012). From an RASV perspective, however, *global self-esteem* is the most appropriate adjustment indicator. Thus, we were fortunate that the OOS dataset contained global self-esteem, which we duly used. Second, the present study is the largest study of cross-cultural differences in the religiosity-adjustment relation to date; it includes data from over 2 million people across 65 countries. Thus, we were able to estimate all relations with high precision. Finally, we examined RASV predictions against the backdrop of five alternative explanations: Sociocultural motives perspective, country-level covariates, spatial dependence, masked curvilinearity, and self-presentation. Together, Study 1 offered a highly diagnostic test of RASV and, more generally, of cross-cultural differences in the religiosity-adjustment relation.

The results of this test were consistent with RASV and cross-cultural differences in religious adjustment benefits. Specifically, we obtained a comparatively strong relation between personal religiosity and self-esteem in religious countries. The size of this relation (.20) was very similar to the size of the average relation in personality and social psychology (.21; Richard, Bond, & Stokes-Zoota, 2003). Moreover, the religiosity-esteem relation weakened as a function of decreasing country-level religiosity. In the least religious countries the relation was reduced by a factor of five, and in absolute terms it was very small (.04; Cohen, 1988).<sup>11</sup>

<sup>10</sup> We checked whether our results replicate when replacing our country-level religiosity index with the Gallup World Poll index. The interaction between personal religiosity and country-level religiosity held, despite controlling for collectivism, GDP, and pathogen prevalence (including their interactions with personal religiosity).

<sup>11</sup> In this study, 49 countries (75%;  $N = 2,060,405$ ) had a Judeo-Christian background and 16 countries (25%;  $N = 134,896$ ) had a non-Judeo-Christian background (i.e., another religion was primary in those 16 countries). To test for RASV's generalizability, we repeated our basic analysis separately for the 49 Judeo-Christian countries and the 16 non-Judeo-Christian countries. We found evidence for RASV in both analyses. In the Judeo-Christian countries, country-level religiosity moderated the religiosity-esteem relation,  $PE = .04$  [.04, .05]. Simple slope analyses revealed that this relation was comparatively strong at the highest point of country-level religiosity,  $PE = .20$  [.18, .21], and four times weaker at the lowest point of country-level religiosity,  $PE = .05$  [.03, .06]. In the non-Judeo-Christian countries, country-level religiosity also moderated the religiosity-esteem relation,  $PE = .04$  [.02, .05], and this relation was once more stronger at the highest point of country-level religiosity,  $PE = .17$  [.15, .20], compared to the lowest point of country-level religiosity,  $PE = .07$  [.04, .09].

## Study 2: Informant-Reports Across 36 Countries

Study 1 used self-report data as did *all* prior research on cross-cultural differences in religious adjustment benefits. Self-report data are valuable, but amenable to self-report biases (Paulhus & Vazire, 2007). As such, their value increases when they are replicated by informant-reports. In Study 2, we used informant-reports to Test RASV. Yet, not all biases associated with self-reports should be controlled for. Self-deceptive enhancement (Paulhus & Reid, 1991), for example, is one such bias that contributes valid variance to psychological adjustment (Taylor & Brown, 1988). This is one reason why informant-reports, which bypass self-deceptive enhancement, can be too conservative (Paulhus & Reid, 1991). Another reason pertains to the inherent subjectivity of self-esteem (Baumeister, Campbell, Krueger, & Vohs, 2003). Respondents typically have better insight into inherently subjective attributes than do informants (Vazire, 2010), and this insight may render self-reported self-esteem more valid than informant-reported self-esteem. In all, self-reports and informant-reports have different strengths and weaknesses, and thus complement each other.

To complicate matters, informant-reports can also be biased. Therefore, it is helpful to control for informants' self-ratings on the same dimensions on which informants rate the target persons (Gebauer et al., 2015; Gebauer, Bleidorn, et al., 2014). Doing so can combat three sources of bias. The first is self-projection (Wood, Harms, & Vazire, 2010): informants may project their own religiosity and self-esteem onto the target person. The second source is in-group bias: religious informants may overestimate desirable traits in religious targets, including self-esteem (Galen, 2012). Finally, controlling for informants' self-reports can help to adjust for biases in general scale use, such as acquiescence (Zuckerman, Knee, Hodgins, & Miyake, 1995) and extreme responding (Hui & Triandis, 1989). Therefore, in Study 2, we controlled for informants' own self-reported religiosity and for their own self-esteem. Controlling for informants' traits is a conservative practice, because there is also valid covariation between informants' and targets' traits as a result of assortative pairing (Luo & Klohnen, 2005), genetic overlap (Bouchard, 2004), and shared environments (Caspi, Herbener, & Ozer, 1992). Finally, Study 2 sought to replicate RASV evidence against the backdrop of three alternative explanations: Sociocultural motives perspective, masked curvilinearity, and self-presentation.

## Method

**Respondents.** The study used data from 560,264 respondents across 36 countries (65.2% female, 34.8% male;  $M_{\text{age}} = 25.56$  years,  $SD_{\text{age}} = 10.69$ ). As in Study 1, we drew from the OOS dataset (from March, 2001 to December 2009). To derive our sample, we applied three selection-criteria to the full OOS dataset, which paralleled those of Study 1. We excluded respondents who (a) reported residing concurrently in a U.S. state and a country outside the U.S., (b) completed an irrelevant OOS study or did not fill out our measures, and (c) were from countries with  $N < 1,000$ . Table 3 lists all 36 countries along with demographic information.

**Procedure and measures.** Procedure and measures were identical to those of Study 1. However, respondents provided informant-reports in addition to their self-reports. Each item was accompanied by two rating scales (1 = *strongly disagree*, 5 = *strongly agree*). Respondents supplied self-reports on the first

rating-scale (labeled "myself") and informant-reports on the second rating-scale (labeled "other"). Informant-report instructions were: "Try to rate someone whom you know well, such as a close friend, coworker, or family member." Prior research has supported the validity of informant-reports from close friends (Funder & Colvin, 1988), coworkers (Hogan, Hogan, & Roberts, 1996), and family members (Vazire & Mehl, 2008). Of respondents, 45.7% completed the study in English, 39.1% in Spanish, 7.4% in German, and 7.8% in Dutch.

**Country-level religiosity.** Parallel to Study 1, country-level religiosity was assessed by averaging respondents' informant-reports of the personal religiosity measure within each country. Table 3 includes the resultant index. Its validity was supported by its strong associations with the indices from Study 1,  $r = .99$ ,  $p < .001$ , the Gallup World Poll,  $r = .95$ ,  $p < .001$ , and the WVS,  $r = .86$ ,  $p < .001$ .

**Statistical modeling.** Our modeling strategy was similar to that of Study 1, except for the use of informant-reports. We decided a priori not to control for country-level covariates (collectivism, GDP per capita, pathogen prevalence, spatial lag) because the number of countries ( $n = 36$ ) was not sufficiently large to control for covariates at that level (Farrar & Glauber, 1967).

The Supplemental Materials include tables with Pearson correlations between all Study 2 variables at the participant level (Table S3) and between all Study 2 variables at the country level (Table S4).

## Results

As in Study 1, we first tested our basic model's assumption that the religiosity-esteem relation varies significantly across countries. In contrast to Study 1, our tests used informant-reports of religiosity and self-esteem. Despite that difference, we again found significant variation in the religiosity-esteem relation across countries ( $\Delta\text{AIC} = 500.13$ ;  $\Delta\chi^2 = 504.13$ ,  $p < .001$ ).

**Basic model.** We further followed Study 1's analysis strategy, but this time we used informant-reports. We engaged in a conceptual replication of RASV's prediction that personal religiosity is relatively strongly related to self-esteem in religious countries, but that this relation wanes with decreasing country-level religiosity and becomes attenuated, even nonexistent, in highly secularized countries. As Table 4 (first data-row) indicates, we replicated Study 1's results with informant-reports.

**Simple slope analyses.** We examined the religiosity-esteem relation at the highest point (1.69 *SD* above *M*) and at the lowest point (1.67 *SD* below *M*) of country-level religiosity. Given that informant-reports of self-esteem have somewhat compromised validity, the simple slopes between religiosity and self-esteem may well be lower than in Study 1. Table 4's right-hand panel (first data-row) shows that, at the highest point of country-level religiosity, the *PE* of the religiosity-esteem relation was .14 [.12, .15]. Table 4's right-hand panel (first data-row) shows that, at the lowest point of country-level religiosity, the *PE* of the same relation was  $-.01$  [ $-.03$ , .004]. Figure 3 depicts the cross-level interaction, including the simple slopes. Figure 4 provides a complementary display of the same cross-level interaction, depicting each country's religiosity-esteem relation as a function of its country-level religiosity. The religiosity-esteem relation in all 36 countries was consistent with RASV. As a  $\Delta R^2$ -test indicated, country-level

**Table 3**  
*Study 2's Countries (Sorted by Country-Level Religiosity), Within-Country Descriptive Statistics, and Within-Country Zero-Order Correlations Between Personal Religiosity and Self-Esteem*

Country	N	Age (years)	% women	% men	Country-level religiosity	Correlation: Personal religiosity and self-esteem
Philippines	3,295	21.68	73.80	26.20	3.24	.14***
India	3,878	24.57	49.60	50.40	3.11	.09***
Dominican Republic	2,438	22.66	76.40	23.60	3.11	.13***
El Salvador	1,412	23.45	69.20	30.80	3.07	.13***
Paraguay	1,145	23.34	69.60	30.40	3.00	.02
Malaysia	1,547	23.20	66.10	33.90	2.97	.08***
Guatemala	2,037	23.68	68.20	31.80	2.95	.10***
Venezuela	7,648	22.35	74.90	25.10	2.94	.11***
Peru	8,077	23.13	68.70	31.30	2.91	.14***
Colombia	13,735	22.20	71.30	28.70	2.90	.10***
Ecuador	2,410	23.49	69.40	30.60	2.90	.11***
Bolivia	2,421	22.74	67.40	32.60	2.88	.10***
Costa Rica	2,204	23.77	69.50	30.50	2.82	.12***
Singapore	1,969	22.33	63.90	36.10	2.74	.09***
Chile	19,252	22.83	72.90	27.10	2.70	.08***
United States	189,060	26.47	63.40	36.60	2.64	.08***
Mexico	52,575	22.74	66.00	34.00	2.63	.07***
Argentina	42,569	23.19	73.20	26.80	2.43	.04***
China	1,317	27.63	63.20	36.80	2.41	.07*
Italy	1,115	29.22	59.10	40.90	2.35	.06*
Uruguay	2,685	23.72	73.60	26.40	2.25	.03
Canada	17,157	25.89	62.20	37.80	2.23	.04***
Ireland	1,646	24.84	61.70	38.30	2.22	.01
Australia	7,620	26.84	60.40	39.60	2.18	.03*
Switzerland	5,266	29.58	56.90	43.10	2.13	.01
Austria	3,699	27.28	61.60	38.40	2.13	.01
France	1,074	28.45	61.60	38.40	2.08	.05
New Zealand	3,087	26.57	65.10	34.90	2.08	.02
Finland	1,429	24.52	65.80	34.20	2.07	.00
Germany	33,295	28.65	59.90	40.10	2.04	.00
The Netherlands	40,357	31.03	64.20	35.80	2.01	-.01**
Spain	54,305	23.45	69.50	30.50	2.00	.03***
United Kingdom	18,990	25.69	55.50	44.50	1.95	.05***
Norway	1,255	28.30	52.50	47.50	1.87	-.05
Belgium	6,442	27.53	63.80	36.20	1.83	.04**
Sweden	1,853	28.56	54.70	45.30	1.74	-.05*

\*  $p < .05$ . \*\*  $p < .01$ . \*\*\*  $p < .001$ .

religiosity explained 84.55% of the cross-cultural variation in the religiosity-esteem relation.

**Alternative explanations.**

**Sociocultural motives perspective.** We tested whether our results held after controlling for informant-reported agreeable-

ness, informant-reported conscientiousness, and the cross-level interactions of these two Big Five traits with country-level religiosity. That test is even more conservative than the corresponding test in Study 1, because it relied on informant-reports. The results revealed that the cross-level interaction between

**Table 4**  
*Study 2's Results*

Model	Linear mixed-effects analyses									Simple slope analyses					
	Personal religiosity			Country-level religiosity			Cross-level interaction			High country-level religiosity			Low country-level religiosity		
	PE	↓ CI	↑ CI	PE	↓ CI	↑ CI	PE	↓ CI	↑ CI	(1.69 SD above M)			(1.67 SD below M)		
Basic	.06	.05	.07	.10	.07	.13	.04	.04	.05	.14	.12	.15	-.01	-.03	.004
Basic + A & C	.04	.03	.04	.10	.06	.13	.03	.02	.04	.09	.08	.10	-.02	-.03	-.004
Basic + Polynomials	.05	.04	.06	.10	.07	.13	.06	.05	.07	.15	.13	.17	-.05	-.06	-.03
Basic + Self-reports	.02	.01	.03	.09	.06	.12	.04	.03	.05	.08	.07	.09	-.05	-.06	-.03

*Note.* PE = point estimate of standardized coefficient; ↓ CI = lower bound of 95% confidence interval; ↑ CI = upper bound of 95% confidence interval; A = informant-reported agreeableness; C = informant-reported conscientiousness.

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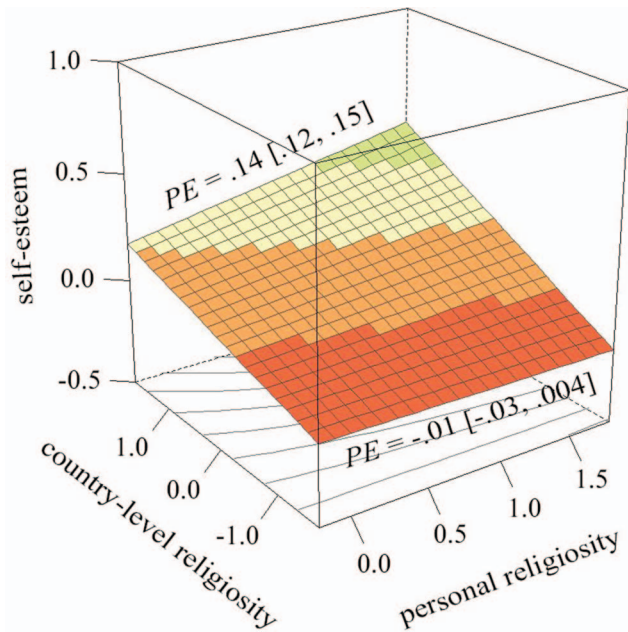


Figure 3. Study 2's basic informant-report model, depicting the relation between personal religiosity and self-esteem as a function of country-level religiosity. The most religious countries in the sample are displayed at the left endpoint of the country-level religiosity axis (1.69 *SD* above *M*). The least religious countries in the sample are displayed at the right endpoint of the country-level religiosity axis (1.67 *SD* below *M*). *PE* = point estimate of standardized coefficient, including its 95% confidence interval. See the online article for the color version of this figure.

personal religiosity and country-level religiosity was weakened, but remained significant (Table 4's second data-row). RASV was upheld.

**Masked curvilinearity.** We tested whether our results changed following inclusion of the main effects' polynomials. Table 4 (third data-row) indicates that the joint contribution of the polynomials was very small ( $\Delta R^2_{\text{marginal}} = 0.14\%$ ). Inclusion of the polynomials did not change our results.

**Self-presentation.** On first sight, informant-report studies may generally appear robust against self-presentation. However, this is not necessarily the case. Specifically, informants, too, may be motivated to impress audiences, including interviewers. For example, informants may describe target persons in flattering ways to avoid the impression that one is overly critical about close others. Our study, however, is not amenable to self-presentation effects, because informants responded anonymously and interviewers were absent.

**Biases in informant-reports.** To account for potential informant-report biases, we controlled for informants' self-reported self-esteem, their self-reported personal religiosity, and the cross-level interaction between informants' personal religiosity and country-level religiosity. The resultant model provides a highly conservative test, because these controls partly restrict valid covariation between informants' self-reports and informant-reports. Table 4 (final data-row) indicates that the basic model's

effects were reduced but remained significant, further bolstering RASV.

## Discussion

The literature on cross-cultural differences in the religiosity-adjustment relation has relied exclusively on self-reports. In Study 2, we capitalized on informant-reports. Further, we used a large sample and rigorous controls (agreeableness and conscientiousness, polynomial relations, informant reporters' own religiosity and their own self-esteem). The results replicated and fortified previous RASV evidence as well as previous evidence for cross-cultural differences in religious adjustment benefits more generally.

The absolute size of the religiosity-esteem relation was smaller in Study 2 than in Study 1. This was the case in the most religious countries (Study 1: .20; Study 2: .14) and in the least religious countries (Study 1: .04; Study 2:  $-.01$ ). The weaker relations may be attributable to validity deficits that characterize informant-reported self-esteem (Baumeister et al., 2003; Paulhus & Reid, 1991). Hence, it may not be particularly useful to compare the absolute size of the religiosity-esteem relation between the two assessment methods. Another comparison may be more relevant. The *difference* between the religiosity-esteem relation in Study 2's most religious countries and its least religious countries was .15 (.14  $-$   $[-.01]$ ). That difference is very similar to the corresponding difference in Study 1: .16 (.20  $-$  .04).

## Study 3: Self-Reports Across 1,932 Urban Areas, 243 Federal States, and 18 Countries

Studies 1 and 2 affirmed the relevance of culture for the religiosity-adjustment relation. These findings, however, might underestimate the contribution of culture. According to RASV, the country-level is not the only sociocultural level relevant for the religiosity-adjustment relation (Sedikides & Gebauer,

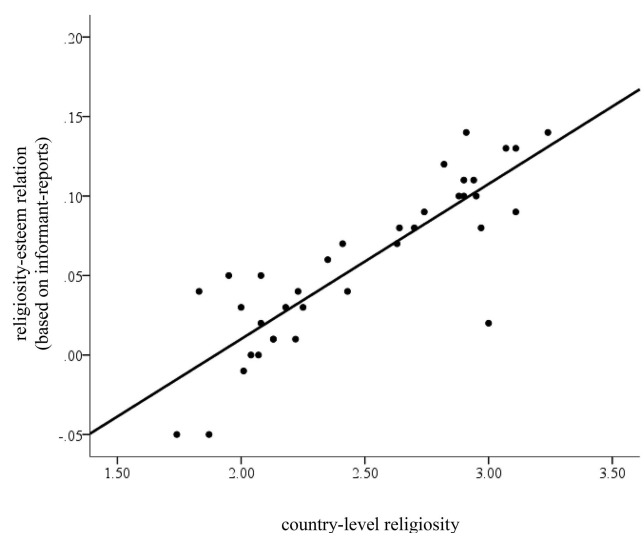


Figure 4. Zero-order correlations between informant-reported personal religiosity and informant-reported self-esteem for each country in Study 2 as a function of country-level religiosity.

2010). Study 3 focused on the urban area and federal state levels in addition to the country level. RASV predicts that the religiosity-esteem relation will be concurrently moderated by all three sociocultural levels. We should then find a particularly strong religiosity-esteem relation in the most religious urban areas from the most religious federal states of the most religious countries. Conversely, we should find a particularly weak religiosity-esteem relation in the least religious urban areas from the least religious federal states of the least religious countries.

As in Studies 1 and 2, we tested RASV against the backdrop of the sociocultural motives perspective, masked curvilinearity, and self-presentation. Additionally and for the first time, we tested RASV against another alternative: Religious people may enjoy more supportive interpersonal contact with fellow believers in religious, compared with secular, countries. Such contact, in turn, may account for the stronger relation between religiosity and psychological adjustment in religious countries (Diener et al., 2011; Stavrova et al., 2013). Study 3's four-level hierarchical model allowed us to test RASV, controlling for possible effects of interpersonal contact. Specifically, the interpersonal benefits of religiosity should be largely a function of urban area-level religiosity, because most of the supportive interpersonal contact among religious believers likely takes place within their religious congregations and those congregations are typically situated at the urban-area level (i.e., one's city, including its metropolitan regions). However, if state- and country-level religiosity moderated the religiosity-esteem relation after controlling for urban area-level religiosity, the results would suggest an independent contribution of RASV.

## Method

**Respondents.** The study used data from 1,188,536 respondents across 1,932 urban areas, which were located in 243 federal states, which were part of 18 countries (63.8% female, 36.2% male;  $M_{\text{age}} = 25.77$  years,  $SD_{\text{age}} = 10.94$ ). As in Studies 1 and 2, we drew from the OOS dataset (from March, 2001 to December 2009). We derived our sample by applying five selection-criteria to the full OOS dataset.

First, to sort respondents into urban areas and federal states, we relied on their zip-codes; so we excluded all respondents who did not report their zip-code. Second, for each country, we needed to assure a sufficiently large number of respondents per federal state and urban area. Therefore, we only coded the zip-codes of respondents from countries with at least 8,000 cases. Twenty-two countries met that criterion. We used the worldwide GeoPostcodes database (version 1.1) to sort respondents into their federal states and urban areas. The GeoPostcodes database is the most complete database of worldwide postcodes, allowing us to determine respondents' federal states and urban areas from 18 of the 22 initial countries. Third, we excluded respondents who reported residing concurrently in a U.S. state and a country outside the U.S. Fourth, we excluded respondents who completed an irrelevant OOS study or did not fill out our measures. Finally, we excluded respondents from urban areas with less than 100 cases. We chose this cut-off point to assure reasonably accurate estimation of urban area-

level religiosity (Snijders & Bosker, 2012). Table 5 lists all 18 countries along with demographic information.

**Procedure and measures.** Procedure and measures were identical those of Study 1. The only addition was the use of state-level and urban area-level religiosity. Of respondents, 83.2% completed the measures in English, 9.7% in Spanish, 3.6% in German, and 3.6% in Dutch.

**Sociocultural religiosity.** Parallel to Study 1, sociocultural religiosity was assessed by averaging respondents' personal religiosity within each country (country-level index), each state (state-level index), and each urban area (area-level index). We present the country-level index in Table 5. As in Studies 1 and 2, that index was strongly related to indices from the Gallup World Poll,  $r = .96$ ,  $p < .001$  and the WVS,  $r = .92$ ,  $p < .001$ . There are no external state- and area-level indices available for the 18 countries.

**Statistical modeling.** We extended Study 1's linear mixed-effects models to account for the four-level data structure (respondents nested in urban areas, in federal states, in countries). Specifically, we  $z$ -standardized all variables, centered all level-1, level-2, and level-3 predictors around their mean at the next higher level (e.g., we centered participants' personal religiosity around their urban-area mean), and included random intercepts and random slopes for all level-1, level-2, and level-3 predictors. The resultant four-level models were too complex to converge. To reduce model complexity, we followed recommendations by Bates, Kliegl, Vasishth, and Baayen (2015) and specified all random effects as uncorrelated.

The Supplemental Materials include tables with Pearson correlations between all Study 2 variables at the participant level (Table S5) and between all Study 2 variables at the three sociocultural levels (area: Table S6, federal state: Table S7, country: Table S8).

## Results

We tested whether the religiosity-esteem relation varies significantly across all three sociocultural contexts. This was the case at the country level ( $\Delta\text{AIC} = 116.76$ ;  $\Delta\chi^2[1] = 118.76$ ,  $p < .001$ ), the federal state level ( $\Delta\text{AIC} = 120.35$ ;  $\Delta\chi^2[1] = 122.35$ ,  $p < .001$ ), and the urban area level ( $\Delta\text{AIC} = 49.36$ ;  $\Delta\chi^2[2] = 53.36$ ,  $p < .001$ ). There was considerably more variance in the religiosity-esteem relation at the country level (.002), compared with the federal state level (.0005) and the urban area level (.0006).

**Basic model.** As in Studies 1 and 2, we began by testing the basic model. We focused not only on country-level religiosity (as in Studies 1 and 2), but also on state-level religiosity within the countries and on area-level religiosity within the states. Crucially, we examined the role of country-level, state-level, and area-level religiosity simultaneously within a single, four-level mixed-effects model. Therefore, the effect of each sociocultural level is independent of the other two sociocultural levels. Table 6's data-rows 1 to 3 present the results of the basic model. The first data-row shows that country-level religiosity moderated the religiosity-esteem relation, and that the precise pattern of the moderation effect followed RASV. We replicated

once more the findings from Studies 1 and 2.<sup>12</sup> This was a conservative replication, given that the analysis controlled for state-level and area-level religiosity.

The second data-row of Table 6 shows that state-level religiosity also moderated the religiosity-esteem relation. This interaction followed RASV, offering another replication at a more refined sociocultural level. Importantly, the effects emerged independent of the country-level effects described above. Finally, the third data-row of Table 6 shows that area-level religiosity also moderated the religiosity-esteem relation. Once more, that interaction followed RASV, providing the fourth replication of Study 1's results. As before, that interaction emerged independent of country-level effects and of state-level effects.<sup>13</sup>

**Simple slope analyses.** Similar to Studies 1 and 2, we focused on the religiosity-esteem relation at the highest and lowest points of sociocultural religiosity. However, unlike the previous studies, we examined not only the simple slopes at (a) the point of highest country-level religiosity and (b) the point of lowest country-level religiosity, but also at (c) the point of highest state-level religiosity within the most religious country, (d) the point of lowest state-level religiosity within the least religious country, (e) the point of highest area-level religiosity within the most religious state of the most religious country, and (f) the point of lowest area-level religiosity within the least religious state of the least religious country. What are the standardized coefficients for those six simple slopes (a–f)?

The first three data-rows of Table 6's right-hand panel show simple slopes a–f. In line with RASV, slope f ( $PE = -.02 [-.05, .01]$ ; lowest country-, state-, and area-level religiosity) was smaller than slope d ( $PE = .02 [-.01, .05]$ ; lowest country- and state-level religiosity, average area-level religiosity), which was smaller than slope b ( $PE = .06 [.03, .09]$ ; lowest country-level religiosity, average state- and area-level religiosity). Furthermore, slope e ( $PE = .31 [.27, .36]$ ; highest country-, state-, and area-level religiosity) was larger than slope c ( $PE = .23 [.19, .27]$ ; highest country- and state-level religiosity, average area-level religiosity), which was larger than slope a ( $PE = .19 [.16, .23]$ ; highest country-level religiosity, average state- and area-level religiosity). Figure 5 depicts the three cross-level interactions, including the simple slopes a–f.  $\Delta R^2$ -tests revealed that sociocultural religiosity explained a substantial amount of the cross-cultural variation in the religiosity-esteem relation: 23.12% of the urban area-level variation, 64.34% of the federal state-level variation, and 64.22% of the country-level variation.

#### Alternative explanations.

**Sociocultural motives perspective.** As in Studies 1 and 2, we tested whether our results held after controlling for agreeableness, conscientiousness, and the interactions of those two Big Five traits with country-, state-, and area-level religiosity. In Study 1, we described how conservative that test is, given that it partly controls for valid variance in self-esteem. The same argument applies to Study 3 and even more so, because the test involved fitting nine cross-level interactions (personal religiosity, agreeableness, and conscientiousness  $\times$  area-, state-, and country-level religiosity). Table 6's data-rows 4 through 6 include those results. Similar to Studies 1 and 2, the cross-level interactions between personal and sociocultural religiosity were weakened when controlling for agreeableness and conscientiousness. Importantly, however, all those cross-level interactions remained intact.

**Masked curvilinearity.** As in Studies 1 and 2, we tested whether our results change after inclusion of the main effects' polynomials (at all four levels).<sup>14</sup> Table 6's data rows 7 through 9 present the new results. The four polynomials did not explain any additional variance in self-esteem. In fact, the reverse was the case. Our basic model explained somewhat more variance than the model with the polynomials ( $\Delta R^2_{\text{marginal}} = .07\%$ ). As in Studies 1 and 2, inclusion of the polynomials did not change our results.

**Self-presentation.** As in Studies 1 and 2 respondents completed an anonymous online-questionnaire; no interviewers were involved. Thus, self-presentation cannot account for our results.

**Interpersonal contact.** Study 3's basic results offer good reasons to endorse RASV over and above the interpersonal contact explanation. The results yielded cross-level interactions including country-level religiosity and state-level religiosity even after accounting for urban area-level religiosity (i.e., the sociocultural context at which direct interpersonal contact typically takes place). Furthermore, the cross-level interaction involving urban area-level religiosity is consistent with both RASV and the interpersonal

<sup>12</sup> These results involve a comparatively small number of countries ( $n = 18$ ). Some simulation studies have suggested that results based on data with less than  $n = 30$  higher-level units should be treated with caution (Maas & Hox, 2004). We have confidence in our findings for three reasons. *First*, the number of respondents within countries was very large, resulting in precise estimates of within-country relations between personal religiosity and self-esteem. Such estimates increase the precision of cross-level interactions (Gebauer, Sedikides, Lüdtke, & Neberich, 2014). *Second*, we complemented our mixed effects analysis with a meta-analytic analysis. We treated each country as a separate sample, resulting in a "meta-analysis" with 18 samples. A homogeneity test (Hedges & Olkin, 1985) yielded significant heterogeneity in the religiosity-esteem relation between those samples,  $Q(17) = 55.06, p < .0001$ . A metaregression analysis (FIML estimation; Lipsey & Wilson, 2001) further revealed that country-level religiosity partly explained that heterogeneity: the religiosity-esteem relation was significantly larger in religious countries, compared to non-religious countries,  $B = .08, SE = .01, p < .0001$ . Thus, the meta-analytic results replicated the mixed-effects results. *Finally*, the present study's mixed-effects results are credible, because they replicated conceptually the findings from Studies 1 and 2.

<sup>13</sup> As described in this study's Statistical Modeling section, we had to reduce model complexity of our four-level model in order to achieve convergence. Hence, we specified all random effects as uncorrelated (Bates et al., 2015). In reality, however, our random effects are probably correlated. Hence, this note describes the results of a complementary strategy to reduce model complexity without having to specify our random effects as uncorrelated. Specifically, we computed two additional *three-level* models and both models allowed their random effects to correlate. In the "states-ignored model," participants were nested in areas and areas were nested in countries. In the "areas-ignored model," participants were nested in federal states and federal states were nested in countries. The results of both models were fully in line with RASV predictions. In the states-ignored model, there was a positive relation between personal religiosity and self-esteem and this relation was concurrently exacerbated with increasing area-level religiosity,  $PE = .02 [.01, .03]$ , and with increasing country-level religiosity,  $PE = .04 [.03, .06]$ . In the areas-ignored model, there was also a positive relation between personal religiosity and self-esteem and this relation was concurrently exacerbated with increasing state-level religiosity,  $PE = .03 [.02, .04]$ , and with increasing country-level religiosity,  $PE = .04 [.03, .05]$ . These findings suggest that the results from Study 3 are not artificially caused by forcing random slopes to be uncorrelated.

<sup>14</sup> The model did not converge when we specified the polynomials as random effects. Thus, we specified them as fixed effects. This is not a problem in our case, because the point estimates are unaffected by this specification decision and the confidence intervals (which become too narrow) are not relevant for our  $\Delta R^2_{\text{marginal}}$  tests.

**Table 5**  
*Study 3's Countries (Sorted by Country-Level Religiosity), Within-Country Descriptive Statistics, and Within-Country Zero-Order Correlations Between Personal Religiosity and Self-Esteem*

Country	<i>N</i> respondents	<i>N</i> urban areas	<i>N</i> states	Age (years)	% women	% Men	Country-level religiosity	Correlation: Personal religiosity & self-esteem
Philippines	9,699	19	12	21.34	75.60	24.40	3.28	.20***
India	7,270	24	13	24.82	48.50	51.50	3.19	.14***
Malaysia	2,092	7	3	23.08	69.10	30.90	2.92	.20***
Venezuela	4,606	10	7	23.28	72.40	27.60	2.90	.17***
Singapore	1,838	13	4	21.32	63.80	36.20	2.71	.12***
United States	898,471	1,163	53	25.85	63.40	36.60	2.67	.15***
Chile	881	5	5	21.46	74.00	26.00	2.61	.12***
Mexico	35,096	98	32	23.24	66.60	33.40	2.48	.11***
Canada	28,453	41	2	24.62	62.50	37.50	2.20	.11***
Australia	18,047	87	7	25.53	62.00	38.00	2.13	.09***
Switzerland	6,175	27	11	29.62	56.20	43.80	2.05	.07***
Germany	38,019	141	15	28.74	59.20	40.80	2.04	.06***
The Netherlands	44,876	145	12	29.76	64.10	35.90	1.95	.03***
United Kingdom	14,213	84	31	24.26	61.70	38.30	1.93	.12***
Spain	72,288	43	18	23.38	70.90	29.10	1.89	.06***
Belgium	3,358	11	5	27.16	61.20	38.80	1.77	.11***
Norway	1,459	7	7	25.92	59.90	40.10	1.69	.09***
Sweden	1,695	7	6	27.24	60.40	39.60	1.62	.03

*Note.* There are 53 “states” in the U.S., because, in addition to the 50 U.S. states, the GeoPostcodes database also places Washington DC, Puerto Rico, and Guam at that sociocultural level.

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

contact explanation. Moreover, people typically overrely on their immediate sociocultural context (here: the urban area level) to form subjective norms about broader contexts (here: country- and state-level religiosity; Fiedler, 2000; Galesic, Olsson, & Rieskamp, 2012). That is, people may derive self-esteem from living up to the urban area-level religiosity norm in part because they believe that this norm reflects the religiosity norms of the country- or state-levels.

**Discussion**

The literature on the cross-cultural benefits of religiosity has relied on a single sociocultural level. In contrast, Study 3 focused concurrently on three sociocultural levels: urban area, federal state, and country. Consistent with RASV, sociocultural religiosity at all three levels proved uniquely relevant for the religiosity-esteem relation. Hence, past research has underestimated the importance

**Table 6**  
*Study 3's Results*

Model	Linear mixed-effects analyses									Simple slope analyses					
	Personal religiosity			Sociocultural religiosity			Cross-level interaction			High sociocultural religiosity			Low sociocultural religiosity		
	<i>PE</i>	↓ <i>CI</i>	↑ <i>CI</i>	<i>PE</i>	↓ <i>CI</i>	↑ <i>CI</i>	<i>PE</i>	↓ <i>CI</i>	↑ <i>CI</i>	<i>PE</i>	↓ <i>CI</i>	↑ <i>CI</i>	<i>PE</i>	↓ <i>CI</i>	↑ <i>CI</i>
Basic (fl.: 1 & 4)	.12	.10	.13	.13	.07	.20	.04	.02	.06	.19	.16	.23	.06	.03	.09
Basic (fl.: 1 & 3)	.12	.10	.13	.05	.004	.11	.04	.03	.05	.23	.19	.27	.02	-.01	.05
Basic (fl.: 1 & 2)	.12	.10	.13	.04	-.01	.10	.02	.02	.03	.31	.27	.36	-.02	-.05	.01
A, C (fl.: 1 & 4)	.08	.07	.09	.14	.07	.21	.02	.005	.03	.11	.08	.13	.05	.03	.07
A, C (fl.: 1 & 3)	.08	.07	.09	.05	.003	.11	.02	.01	.03	.13	.10	.16	.03	.006	.05
A, C (fl.: 1 & 2)	.08	.07	.09	.04	-.01	.10	.02	.01	.02	.19	.16	.23	.001	-.02	.02
Poly (fl.: 1 & 4)	.11	.10	.13	.12	.04	.20	.04	.03	.06	.19	.16	.23	.06	.03	.08
Poly (fl.: 1 & 3)	.11	.10	.13	.05	.001	.11	.04	.03	.05	.23	.20	.27	.01	-.02	.04
Poly (fl.: 1 & 2)	.11	.10	.13	.04	-.02	.10	.03	.02	.03	.32	.28	.36	-.03	-.06	.004

*Note.* *PE* = point estimate of standardized coefficient; ↓ *CI* = lower bound of 95% confidence interval; ↑ *CI* = upper bound of 95% confidence interval; basic = basic model; “A, C” = basic model + agreeableness and conscientiousness; poly = basic model + polynomials; fl = focal level; l. 1 = respondent level; l. 2 = urban area level; l. 3 = state level; l. 4 = country level.

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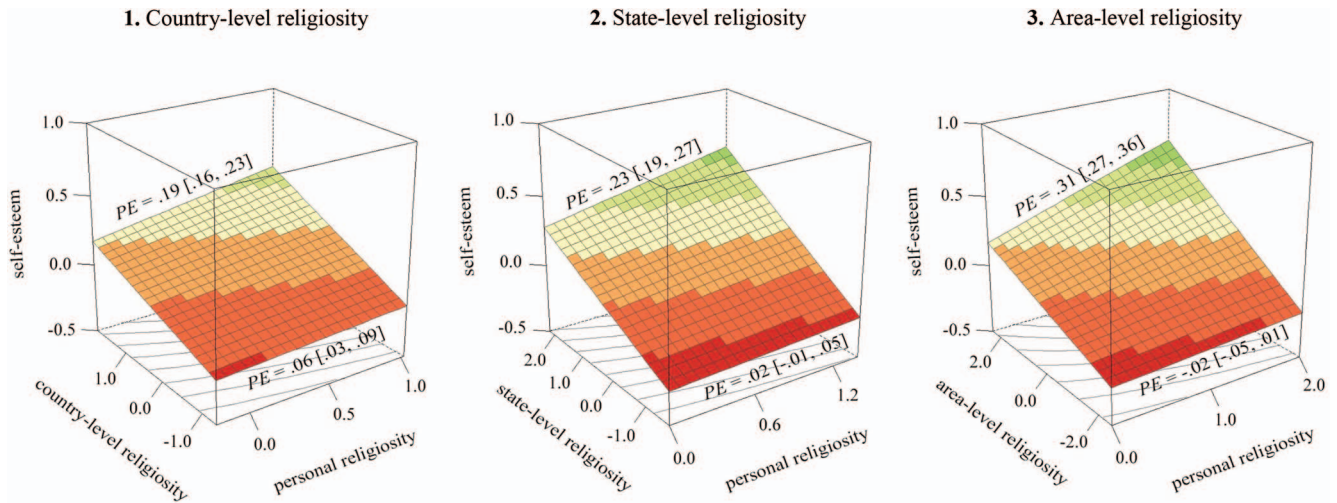


Figure 5. Study 3's basic model, depicting the relation between personal religiosity and self-esteem as a function of sociocultural religiosity at the country level (Figure 5.1), at the federal state level (Figure 5.2), and at the urban area level (Figure 5.3). Figure 5.1 is based on a two-level model, in which respondents are nested in countries. Figure 5.2 is based on a two-level model, in which respondents are nested in federal states. Figure 5.3 is based on a two-level model, in which respondents are nested in urban areas. The simple slopes are from the four-level model described in the text. *PE* = point estimate of standardized coefficient, including its 95% confidence interval. See the online article for the color version of this figure.

of sociocultural religiosity. This conclusion is underscored by a comparison of the religiosity-esteem relation in (a) the most religious urban area of the most religious federal state from the most religious country with (b) the least religious urban area of the least religious federal state from the least religious country. In the former, the most religious place, the religiosity-esteem relation (.31) clearly exceeded the size of the average relation in personality and social psychology (.21; Richard et al., 2003). In the latter, the least religious place, however, the same relation was miniscule and not significant (−.02). Finally, state- and country-level religiosity moderated the religiosity-esteem relation independently of the moderating effect of area-level religiosity. Thus, in all likelihood, the evidence for RASV is not reducible to direct interpersonal benefits of religiosity.

### General Discussion

The relevance of religiosity was long overlooked in personality and social psychology (Baumeister, 2002; Emmons, 1999), but in recent years this omission has begun to be rectified; in fact, religiosity is rapidly becoming a mainstream topic (Saroglou, 2014; Sedikides, 2010). By far, the most frequently studied question in this topic concerns the relation between religiosity and psychological adjustment. Hundreds of studies have shown that religious people are psychologically better off than their nonreligious counterparts (Koenig et al., 2012; Smith et al., 2003). Recently, however, a handful of studies questioned that staple of religiosity research, suggesting that religious adjustment benefits may be limited to religious cultures (Diener et al., 2011; Stavrova et al., 2013).

RASV (Gebauer, Sedikides, & Neberich, 2012) offered one theoretical explanation for those cross-cultural differences in the religiosity-adjustment relation. Essentially, RASV is a

religiosity-specific instantiation of the psychological centrality principle (James, 1907; Rosenberg, 1965), a cornerstone in the self-concept literature (Crocker & Wolfe, 2001; Fulmer et al., 2010; Gebauer, Wagner, et al., 2013; Pyszczynski et al., 2004; Sedikides & Strube, 1997). RASV states that religious people will take particular pride in their religiosity, if ambient culture cherishes religiosity as a social value. In effect, religious people will feel particularly good about themselves, if they live in religious cultures. It further follows from RASV that religious people will not take particular pride in their religiosity, if ambient culture does not cherish religiosity as a social value. Thus, religious people will enjoy little (or no) self-esteem benefits, if they live in secular cultures.

Yet, previous evidence has not been conclusive regarding RASV and regarding cross-cultural differences in religious adjustment benefits more generally. More precisely, the pertinent evidence has been indirect, inconsistent, and vulnerable to alternative explanations. Our research sought to clarify matters.

### Summary of Results

Study 1 focused on self-reports to examine cross-cultural differences in the religiosity-esteem relation. The study used a very large dataset ( $N = 2,195,301$  from 65 countries). The results were fully consistent with RASV: In the most religious countries, the size of the religiosity-esteem relation (.20) was similar to the average effect size in personality and social psychology (.21; Richard et al., 2003). Moreover, this relation weakened with decreasing country-level religiosity. In the least religious countries, the size of the relation was reduced by a factor of five (.04; Cohen, 1988).

Study 2 ( $N = 560,264$  from 36 countries) was the first informant-report investigation into cross-cultural differences in



religious adjustment benefits. Self-report findings are most informative when supported by informant-reports, because the latter can circumvent biases inherent in the former (Paulhus & Vazire, 2007). As such, Study 2 is a vital complement to the literature on cross-cultural differences in religious adjustment benefits, including our Study 1. Again, the results were perfectly in line with RASV.

Study 3 extended research on cross-cultural differences in religious adjustment benefits to three cultural levels: urban area, federal state, and country. Study 3 also relied on a large sample ( $N = 1,188,536$  across 1,932 urban areas from 243 federal states in 18 countries). Sociocultural religiosity at all three levels independently moderated the religiosity-esteem relation, suggesting that the literature had underestimated the contribution of the sociocultural context for the religiosity-adjustment relation. We estimated a strong religiosity-esteem relation (.31) in the most religious urban area of the most religious federal state from the most religious country, but a nonsignificant religiosity-esteem relation ( $-.02$ ) in the least religious urban area of the least religious federal state from the least religious country. The *difference* between those two relations ( $\Delta = .33$ ) exceeded the average effect size in personality and social psychology. The cumulative results provide strong support for RASV and for cross-cultural differences in the religiosity-adjustment relation.

### Alternative Explanations

The literature on cross-cultural differences in the religiosity-adjustment relation is subject to alternative explanations. We describe seven alternatives and how we addressed them. We also discuss three alternatives that future research might address.

#### Seven Addressed Alternative Explanations

**Sociocultural motives perspective.** Religiosity's relations with agreeableness and conscientiousness differ across sociocultural contexts in much the same way as religiosity's relation with self-esteem does (Gebauer, Bleidorn, et al., 2014). Agreeableness and conscientiousness are zero-order correlates of self-esteem (Gebauer et al., 2015; Robins et al., 2001). Thus, we examined whether our results held after controlling for agreeableness, conscientiousness, and their interactions with sociocultural religiosity. Given that those controls are highly conservative, they reduced the effect sizes. Nonetheless, all results remained significant. The sociocultural motives perspective cannot account for the current findings.

**Country-level covariates.** At the country level, collectivism, GDP per capita, and pathogen prevalence are correlates of religiosity. Thus, the moderating effect of country-level religiosity on the religiosity-esteem relation could be accounted for by country-level collectivism, GDP per capita, or pathogen prevalence. Hence, we tested whether the results held after controlling for each of these country-level covariates and their interactions with personal religiosity. They did.

**Spatial dependence.** Geographical units (e.g., countries) are spatially ordered and, thus, they are not totally independent from each other (Ward & Gleditsch, 2008). Strictly speaking, then, all prior mixed-effects models on cross-cultural differences in the religiosity-adjustment relation violated the assump-

tion of independence between level-2 units (e.g., countries). We statistically controlled for this dependence, using the spatial lag method. Controlling for spatial lag did not change our results at all. Thus, we conclude that spatial dependence does not threaten the validity of RASV and—in all likelihood—of previous evidence for cross-cultural differences in the religiosity-adjustment relation.

**Masked curvilinearity.** We predicted a linear relation between personal religiosity and self-esteem, and a linear change of this relation as a function of sociocultural religiosity. However, our linear tests may have masked some curvilinear relations, and the latter may have been responsible for our findings (Cronbach, 1958). This alternative explanation did not apply either: adding curvilinear effects to our models did not undermine support for RASV.

**Self-presentation.** High self-presenters are keen to impress other people and, thus, exaggerate their desirable attributes in the presence of others (Sedikides et al., 2007, 2015). Most cross-cultural data on the religiosity-adjustment relation have been collected by interviewers (WVS, ESS, Gallup World Poll), rendering self-presentation a plausible alternative explanation. In our studies, however, self-presentation is not a valid alternative explanation, because participants responded to an anonymous online questionnaire.

**Self-report biases.** All prior research on cross-cultural differences in the religiosity-adjustment relation relied exclusively on self-reports. Hence, self-report biases may have driven prior results (Paulhus & Vazire, 2007). We complemented our self-report data with informant-report data, and we obtained highly similar results. The consistency across reporting methods buttresses RASV.

Informant-reports too can be biased (Vazire, 2010). An effective way to correct for such biases is to control for informants' self-reports on the same dimensions on which the informants judge the targets (Gebauer, Bleidorn, et al., 2014; Gebauer et al., 2015). Our informant-report study controlled for informants' religiosity, their self-esteem, and the interaction between informants' religiosity and country-level religiosity. RASV evidence held despite these highly conservative controls (Bouchard, 2004; Caspi et al., 1992; Luo & Klohnen, 2005).

**Interpersonal contact.** Religious contexts may confer *interpersonal* benefits to religious individuals, and those benefits, in turn, may lead to better psychological adjustment (Diener et al., 2011; Stavrova et al., 2013). Study 3's four-level hierarchical model afforded us the opportunity to control for this interpersonal contact explanation. RASV evidence would be strong, if state- and country-level religiosity moderated the religiosity-esteem relation even after controlling for the most "interpersonal level"—that is, the urban area level (cities, including their metropolitan regions). Indeed, we found precisely that pattern of results, obtaining strong RASV evidence over and above potential interpersonal effects.

#### Three Unaddressed Alternative Explanations

**Causality.** Almost all large-scale, cross-cultural research in the social sciences is correlational. The same is true for our research. Consequently, RASV's causal assumptions remain untested. This calls for experiments that heighten (vs. not)

believers' perception of the prevalence of religiosity in their culture. RASV would predict self-esteem benefits for believers who learn that religiosity is culturally common compared to those who learn that religiosity is culturally uncommon. However, newly acquired beliefs may become sufficiently effective only once they have had the time to "sink in" and get integrated in one's broader belief network (Batson, Schoenrade, & Ventis, 1993). Hence, experiments may require long delays (perhaps days or weeks) between the commonness manipulation and the self-esteem assessment. Such experiments may not be feasible for ethical reasons.

**Religious denominations.** We had no knowledge of respondents' religious denomination. Hence, our RASV evidence may have been in part driven by specific religious denominations. Diener et al. (2011) and Stavrova et al. (2013) examined cross-cultural differences in religious adjustment benefits across various religious denominations and found no sizable differences among different religions. What has not yet been examined, however, are religious adjustment benefits for believers who live in a country where a different religion is dominant. RASV would predict that personal religiosity is only beneficial, if it matches the predominant religion in the sociocultural context (see also Rosenberg, 1965). This would also mean that our research has underestimated the relevance of sociocultural religiosity for the religiosity-esteem relation, because we were unable to account for religious persons living in a religious country where the majority identifies with a different faith.

**Subtypes of religiosity.** Evidence indicates that religious cultures value intrinsic religiosity (e.g., "If I were to join a church group I would prefer to join a Bible study group rather than a social fellowship"; Allport & Ross, 1967), but devalue extrinsic religiosity (e.g., "The church is most important as a place to formulate good social relations"; Allport & Ross, 1967; Sedikides & Gebauer, 2010). Hence, RASV predicts that higher sociocultural religiosity is associated with steep increases in intrinsic religiosity's benefits, but with decreases in extrinsic religiosity's benefits. We were unable to examine those predictions, because our studies only included a measure of global religiosity. Arguably, however, support for RASV would have been even stronger had we disentangled the opposing effects of intrinsic and extrinsic religiosity.<sup>15</sup> Future research would do well to address this issue.

## Conclusion

Does the religiosity-adjustment relation vary across cultures? If so, does RASV offer a viable explanation for those cross-cultural differences? Previous research on cross-cultural differences in the religiosity-adjustment relation has been comparatively sparse, and the few cross-cultural studies that do exist have been far from conclusive. From a RASV perspective, previous studies have been indirect (i.e., global self-esteem has not been assessed). Past research has also been inconsistent (e.g., sociocultural religiosity moderated the religiosity-adjustment relation in the WVS, but not in the ESS) and liable to alternative explanations.

Our three studies sought to address many of those issues. Among other things, we used global self-esteem as our adjustment indicator. We drew on the largest samples to date ( $560,264 \leq Ns \leq 2,195,301$ ). We included many relevant covariates at the individual level (agreeableness, conscientiousness) and the socio-

cultural level (collectivism, GDP per capita, and pathogen prevalence, spatial dependence), thereby ruling out alternative explanations. We conducted the first informant-report study in this research area. Finally, we were the first to examine the relevance of sociocultural religiosity at multiple levels (i.e., urban area level, federal state level, and country level).

Our confidence in RASV grew as a result of this undertaking. Study 3's key result is perhaps most telling in this regard. We compared the religiosity-esteem relation in the most religious place (i.e., highest country-, state-, and area-level religiosity) with the same relation in the least religious place (i.e., lowest country-, state-, and area-level religiosity). We found a medium-sized religiosity-esteem relation in the most religious place (.31 [.27, .36]), but no relation whatsoever in the least religious place ( $-.02 [-.05, .01]$ ). Evidently, then, the power of sociocultural religiosity for the religiosity-esteem relation exceeds the average effect size in personality and social psychology by clear margin (.21; Richard et al., 2003). The psychological benefits of religiosity are contingent on sociocultural religiosity, and RASV provides a compelling theoretical explanation for that contingency.

<sup>15</sup> One might wonder why we obtained evidence for RASV at all, given that global religiosity includes intrinsic as well as extrinsic religiosity and given that these two religiosity facets are presumed to have opposing influences. The answer is straightforward and meta-analytically supported. Intrinsic (compared to extrinsic) religiosity is a much more focal and dominant facet of global religiosity (Donahue, 1985).

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