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Cross-Cultural Variations in Big Five Relationships with Religiosity:  
A Socio-Cultural Motives Perspective

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**ABSTRACT**

A socio-cultural motives perspective (SMP) on Big Five relationships is introduced. According to the SMP, Agreeableness and Conscientiousness elicit assimilation to socio-cultural norms, Openness elicits contrast from these norms, and Extraversion and Neuroticism are independent of socio-cultural assimilation and contrast. Due to socio-cultural assimilation, then, relationships of Agreeableness and Conscientiousness with an outcome will wax (become more positive or less negative) with that outcome's increasing socio-cultural normativeness. Due to socio-cultural contrast, relationships of Openness with an outcome will wane (become less positive or more negative) with that outcome's increasing socio-cultural normativeness. We tested the SMP using religiosity as our outcome. Study 1 included four cross-sectional self-report datasets across 66 countries ( $N = 1,129,334$ ), 50 US states ( $N = 1,057,342$ ), 15 German federal states ( $N = 20,885$ ), and 121 British urban areas ( $N = 386,315$ ). Study 2 utilized informant-report data across 37 countries ( $N = 544,512$ ). Study 3 used longitudinal data across 15 German federal states ( $N = 14,858$ ). Results consistently supported the SMP. Relationships of Agreeableness and Conscientiousness with religiosity were more positive in religious socio-cultural contexts, compared to secular contexts. Relationships of Openness with religiosity were more negative in religious socio-cultural contexts, compared to secular contexts. At a more general level, the SMP offers theory-driven explanations for cross-cultural variations in Big Five relationships with their outcomes.

**KEYWORDS:** Big Five Relationships, Socio-Cultural Normativeness, Socio-Cultural Assimilation, Socio-Cultural Contrast, Religiosity.

## **Cross-Cultural Variations in Big Five Relationships with Religiosity:**

### **A Socio-Cultural Motives Perspective**

Some people like to swim with the socio-cultural tide. Others like to swim against it. Put differently, some people enjoy thinking, feeling, and acting much like everyone else, assimilating to socio-cultural norms. Other people enjoy thinking, feeling, and acting unlike everyone else, contrasting from socio-cultural norms (Gebauer, Paulhus, & Neberich, 2013b). For example, Asch's (1956) classic conformity studies revealed substantial individual differences in conformity, ranging from "complete independence of the majority to complete submission to it" (Asch, 1956; p. 24). Similarly, Crowne and Marlowe (1964) found that high scorers on their social desirability scale (Crowne & Marlowe, 1960) actually behaved in desirable ways in public, conforming to the social protocol (for a review see Paulhus, 2002). Snyder and Fromkin (1977) developed the Need for Uniqueness Scale and found clear individual differences in the desire to differentiate oneself from others. High scorers on that scale agree with items such as "I do not always live by the standards and rules of society" and high scorers' personal values differ markedly from the values of their society (Bernard, Gebauer, & Maio, 2006). In sum, much indirect evidence points to the existence of individual differences in socio-cultural assimilation and contrast motivation, and these individual differences form the basis for our socio-cultural motives perspective (SMP).

How might such individual differences in socio-cultural assimilation and contrast be reflected in the predominant personality taxonomy — the Big Five (John, Naumann, & Soto, 2008)? Plenty of research bears on this question. First, Agreeableness and Conscientiousness should encourage people to swim *with* the socio-cultural tide. For example, Agreeableness encourages social consensus (Côté & Moskowitz, 1998) and social harmony (John & Srivastava, 1999). Conscientiousness encourages adherence to the social protocol (John & Srivastava, 1999) and conventional norms (Roberts & Pomerantz, 2004). Also, compliance is a component of Agreeableness, and dutifulness a component of Conscientiousness (Costa & McCrae, 1992). Both Agreeableness and Conscientiousness foster obedience (Bègue, Beauvois, Courbet, Oberlé, Lepage, & Duke, in press). Agreeableness and Conscientiousness also belong to the higher-order Social Propriety factor (Saucier, 2009), which is associated

with social conformity (DeYoung, Peterson, & Higgins, 2002). Both Big Five traits are related to a communal self-concept (Paulhus & John, 1998), which elicits assimilation to socio-cultural norms, including norms for mate preferences (Gebauer, Leary, & Neberich, 2012a), religiosity (Gebauer et al., 2013b), and prosociality (Gebauer, Sedikides, Lüdtke, & Neberich, in press). In sum, Agreeableness and Conscientiousness should partly reflect tendencies to think, feel, and act like everyone else — that is, tendencies to assimilate to socio-cultural norms.

Second, Openness should encourage people to swim *against* the socio-cultural tide. For example, Openness fosters desires for uniqueness (Wood, Gosling, & Potter, 2007), innovation (Buss, 1991), and curiosity (MacDonald, 1995). Also, unconventionality is a component of Openness (Costa & McCrae, 1992). Openness belongs to the higher-order Plasticity factor (DeYoung, 2006), which is associated with social deviance (DeYoung et al., 2002). Openness is related to an agentic self-concept (Paulhus & John, 1998), which elicits contrast from socio-cultural norms (Gebauer et al., 2012a, 2013b, in press). In sum, Openness should partly reflect tendencies to think, feel, and act in opposition to everyone else — that is, tendencies to contrast from socio-cultural norms.

Finally, it is less clear how Extraversion and Neuroticism should relate to socio-cultural assimilation and contrast. Extraversion fosters social approval seeking (MacDonald, Saltzman, & Leary, 2003), suggesting that Extraversion encourages people to swim with the socio-cultural tide. But Extraversion also fosters social dominance seeking (Roberts, Wood, & Smith, 2005), suggesting that Extraversion elicits tendencies to swim against the socio-cultural tide. Extraversion predicts engagement in socio-cultural activities, which elicits socio-cultural assimilation (Ryder, Alden, & Paulhus, 2000). But Extraversion is also part of the higher-order Plasticity factor (DeYoung, 2006) and relates to an agentic self-concept (Paulhus & John, 1998), both of which elicit contrast. Neuroticism is an evaluative trait, largely free of descriptive content (Furr & Funder, 1998). Thus, there is little reason to expect relationships with socio-cultural assimilation and contrast. Neuroticism perhaps encourages the desire to be like others in an effort to feel better (Gebauer, Wagner, Sedikides, &

Neberich, 2013c). However, Neuroticism is also indicative of low Social Propriety (Saucier, 2009) and low Social Propriety is associated with social deviance (DeYoung et al., 2002).

In all, the SMP assumes that Agreeableness and Conscientiousness elicits socio-cultural assimilation. Therefore, relationships of Agreeableness and Conscientiousness with a given outcome will wax (become more positive or less negative) with that outcome's increasing socio-cultural normativeness. At the same time, Openness elicits socio-cultural contrast. Therefore, Openness relationships with a given outcome will wane (become less positive or more negative) with that outcome's increasing socio-cultural normativeness. Extraversion and Neuroticism should be rather independent of socio-cultural assimilation and contrast.<sup>1</sup>

### **Previous Perspectives on Big Five Relationships**

The value of the SMP is that it makes novel predictions about the socio-cultural contexts in which a given relationship between the Big Five and an outcome waxes and wanes. But what determines that Big Five relationship in the first place (independent of the SMP and the socio-cultural context)? In principle, one can distinguish two relevant classes of process. The first class is outcome-general, pertaining to Big Five relationships with *any* outcome (e.g., religiosity, but also political preferences, etc.). The second class is outcome-specific, pertaining to Big Five relationships with specific outcomes (e.g., only religiosity, but not political preferences etc.). We next elaborate on each of these classes of process.

#### **Outcome-General Process**

To the best of our knowledge, only one generally accepted perspective falls into this class: the *expressiveness perspective* (EP). This classic perspective dates back to Gordon Allport (1950). According to the EP people seek activities, life-styles, social relations, and the like, which allow them to express their own particular personality traits (Ickes, Snyder, & Garcia, 1997). And they do so because expressing one's personality—whatever it is—feels good (Emmons, Diener, & Larsen, 1986). Thus, for example, extraverts will seek out activities (e.g., going to parties) that allow them to express their extraversion whereas introverts will seek out activities (e.g., reading a book) that allow them to express their introversion. That is, the expressiveness process is a motivational one, energized by the desire

to reap the affective benefits of personality expression. Presumably, the positive feelings ensuing from personality expression are evolutionarily grounded (Buss, 1991). Hence, expressiveness processes should be pan-cultural universals (Norenzayan & Heine, 2005).

The EP is outcome-general, because expressiveness processes are thought to play some role in personality relationships with any given outcome (e.g., religiosity, but also political preferences, etc.). Nonetheless, Allport (1950) picked one specific outcome to illustrate the EP — namely, *religiosity*. Allport proposed that traits akin to Agreeableness and Conscientiousness should relate to religiosity, because all world religions command life-styles that allow believers to express these personality traits. It also follows from the EP that Openness, Extraversion, and Neuroticism should be unrelated to religiosity because religious teachings and commandments neither encourage nor discourage expression of these traits.

An influential meta-analysis of Big Five relationships with religiosity (49 samples,  $N = 15,246$ ) revealed patterns consistent with EP predictions (Saroglou, 2010). According to that analysis, only Agreeableness ( $r = .19$ ) and Conscientiousness ( $r = .16$ ) were significantly correlated with religiosity. A second influential meta-analysis, this time of 19 samples ( $N = 3,737$ ), provided confirmatory evidence (Lodi-Smith & Roberts, 2007), finding a negative relationship between Eysenck's (1991) Psychoticism factor and religiosity ( $r = -.20$ ). That evidence is relevant, because Psychoticism is a blend of low Agreeableness and low Conscientiousness (Costa & McCrae, 1995).

### **Outcome-Specific Process**

In addition to the outcome-general EP, there are many other processes explaining variance in Big Five relationships with specific outcomes. For example, a process to explain the finding that Neuroticism increases the likelihood of divorce (Roberts, Kuncel, Shiner, Caspi, & Goldberg, 2007), is that neurotic people may unduly suffer under benign relationship setbacks, thus repelling their partners. Another divorce-specific process is that neurotic people may also give up on their marriages overly quickly, because they lack the optimistic view of a happier future with their partners (Rodrigues, Hall, & Fincham, 2006).

Outcome-specific processes are also likely to play a role in Big Five relationships with religiosity. For example, religion is generally practiced in social groups of fellow believers

(Graham & Haidt, 2010). At the same time, Agreeableness contributes towards acceptance in social groups (Leary & Baumeister, 2000). Hence, Agreeableness may facilitate acceptance by religious group members, which in turn increases religiosity (Ysseldyk, Matheson, & Anisman, 2010). Similarly, religion can be replete with rather challenging commandments (Koole, McCullough, Kuhl, & Roelofsma, 2010). At the same time, Conscientiousness is intimately connected with higher self-control capacities (Tangney, Baumeister, & Boone, 2004). Hence, Conscientiousness may facilitate meeting religious commandments, which in turn increases religiosity (Baumeister, Bauer, & Lloyd, 2010).

These examples illustrate that Big Five relationships with their outcomes are often (if not generally) multiply determined. Specifically, in addition to the outcome-general EP processes, outcome-specific processes can contribute to Big Five relationships with their outcomes. Further, several different outcome-specific processes can matter simultaneously in a given relationship between a Big Five trait and an outcome. Adding further complexity, some Big Five outcomes may in turn elicit personality change (Lüdtke, Roberts, Trautwein, & Nagy, 2011). For example, religiosity may foster the prosociality component of Agreeableness (Saroglou, 2012, 2013; Stavrova & Siegers, 2014), contributing to the relationship between Agreeableness and religiosity. Similarly, religiosity may foster the self-control component of Conscientiousness (Geyer & Baumeister, 2005; McCullough & Willoughby, 2009), contributing to the relationship between Conscientiousness and religiosity.

In sum, much past research has established that multiple processes can simultaneously contribute to Big Five relationships with their outcomes. Big Five relationships with religiosity are a prime example that illustrate how this multi-determined relationship can work. In contrast, SMP processes are quite different from all processes just described. This is the case because the starting point for the SMP is a given Big Five relationship with an outcome, as determined by the EP and multiple outcome-specific processes. Building on that Big Five relationship, then, the SMP makes predictions about the socio-cultural contexts where that relationship waxes (becomes more positive or less negative) and wanes (becomes less positive or more negative). Next, we draw on Big Five relationships with religiosity to

illustrate how the SMP works. We chose religiosity to test the SMP because it is a highly consequential and pervasive life outcome (Sedikides, 2010) and because Allport (1950), too, chose religiosity to illustrate his EP.

### **The Case of Religiosity: SMP Predictions, Previous Evidence, & Present Studies**

The EP, outcome-specific processes, and effects on personality change all suggest that Agreeableness and Conscientiousness should be positively related to religiosity. At the same time, Openness, Extraversion, and Neuroticism should be unrelated to religiosity (Saroglou, 2010). Taking these relationships as a starting point, the SMP makes the following predictions.

#### **SMP Predictions**

**Agreeableness and Conscientiousness.** The positive relationships of Agreeableness and Conscientiousness with personal religiosity should wax (become more positive) with increasing socio-cultural religiosity and wane (become less positive or more negative) with decreasing socio-cultural religiosity (Footnote 1). This should be the case, because Agreeableness and Conscientiousness encourages socio-cultural assimilation. And, in the case of religiosity, socio-cultural assimilation means becoming more religious in religious socio-cultural contexts and becoming less religious in secular contexts.

**Openness.** The null-relationship of Openness with personal religiosity should wane (become more negative) with increasing socio-cultural religiosity and wax (become more positive) with decreasing socio-cultural religiosity (Footnote 1). This should be the case, because Openness encourages socio-cultural contrast. And, in the case of religiosity, socio-cultural contrast means becoming less religious in religious socio-cultural contexts and becoming more religious in secular contexts.

**Extraversion and Neuroticism.** The null-relationships of Extraversion and Neuroticism with personal religiosity should not be moderated by socio-cultural religiosity. According to the SMP, this should be the case, because Extraversion and Neuroticism should be independent of socio-cultural assimilation and contrast.

#### **Previous Evidence**



Saroglou's (2010) seminal meta-analysis pioneered the cross-cultural study of the Big Five and religiosity. In line with the EP's pancultural universality predictions, Saroglou (2010) predicted that the "main personality correlates [of religiosity] would be constant across contexts" (p. 112). In the critical test, Saroglou (2010) compared three cultural groups: the US ( $N = 8,472$ ; 64%), the European Union (EU;  $N = 2,936$ ; 22%), and Canada ( $N = 1,757$ ; 14%). Results were not fully in line with the SMP. Saroglou did find a higher relationship between Agreeableness and religiosity in the more religious US, compared to the less religious EU and Canada. But there were no cross-cultural differences in the relationship between Conscientiousness and religiosity, and the relationship between Openness and religiosity was less negative in the US and Canada, compared to the EU.

On first sight, such partial support may be surprising because other past research has yielded evidence consistent with the SMP. To begin with, past research on the relationship between the self-concept and its outcomes has provided evidence for socio-cultural assimilation and contrast (Gebauer et al., 2012a, 2013b, in press). Moreover, as described above, there is much indirect evidence for links between these two socio-cultural motives and the Big Five (Bègue et al., in press; Buss, 1991; Costa & McCrae, 1992; Côté & Moskowitz, 1998; DeYoung, 2006; DeYoung et al., 2002; John & Srivastava, 1999; MacDonald, 1995; Paulhus & John, 1998; Roberts & Pomerantz, 2004; Saucier, 2009; Wood et al., 2007). Perhaps, then, it may be too early to draw firm conclusions from Saroglou's (2010) meta-analytic evidence. Specifically, one general drawback of cross-cultural comparisons in meta-analyses is that different cultural contexts can be confounded with the use of different measures. In Saroglou's meta-analysis, for example, most European participants (54%) used the NEO-FFI (Costa & McCrae, 1992), most Canadian participants (75%) used the NEO-PI-R (Costa & McCrae, 1992), and most US participants (67%) used other Big Five measures, such as adjective lists or the BFI (John et al., 2008). This confound can be problematic, because Saroglou (2010) found that type of Big Five measure is a moderator of the relationship between the Big Five and religiosity.

The meta-analysis also included quite diverse measures of religiosity. Most measures concerned religious belief (53%) and practice (20%). But more than a quarter of the data

(27%) operationalized religiosity via indirect indicators, including orthodoxy, spiritual life integration, inclusion of transcendence, religion as coping, traditional religion, receiving God's forgiveness, and secure attachment with God. The use of those different measures may be problematic for Saroglou's cross-cultural comparisons, because these measures were not equally distributed across cultures (US: 49%—belief, 24%—practice, 27%—indirect; EU: 50%—belief, 13%—practice, 36%—indirect; Canada: 100%—belief, 0%—practice, 0%—indirect). Finally, European data was limited in the meta-analysis, forcing Saroglou to treat Europe as one cultural entity. This is unfortunate, because different European countries vary substantially in their socio-cultural religiosity (Diener, Tay, & Myers, 2011).

In all, the meta-analysis's cross-cultural results provide an important starting point for the present work and point to some critical features that should be included in the present set of studies. First, our studies should use the same Big Five measure and the same religiosity measure, when comparing Big Five relationships with religiosity across different socio-cultural contexts. Second, our studies should examine cross-cultural differences across a much larger array of socio-cultural contexts, and these contexts should vary much more in socio-cultural religiosity. Finally, if our studies are to provide a robust augmentation to the meta-analytic findings, they should include at least as many participants as the meta-analysis ( $N \geq 15,246$ ).

### **Present Studies**

We report three studies, including six large-scale datasets, totaling data from over 3.1 million people. Study 1a draws on self-report data from 1,129,334 online-participants across 66 countries, ranging from the world's least religious countries to its most religious countries. Study 1b draws on self-report data from 1,057,342 online-participants across all 50 US states. Compared to Study 1a's countries, the US states vary less in their socio-cultural religiosity. Hence, the Big Five relationships with personal religiosity should differ less across states than they do across countries. To test the generalizability of the effects across countries and sampling strategies, Study 1c uses self-report data from 20,885 representatively sampled participants across 15 federal states of Germany. Study 1d uses self-report data from 386,315 online-participants across 121 urban areas in the United Kingdom. Compared to Study 1c's

federal states, these urban areas are geographically even more narrowly defined (usually pertaining to single cities and their urban surroundings).

Study 2 tests the generalizability of the effects across assessment methods, drawing on informant-report data from 544,512 informants across 37 countries. Each informant reported on a close acquaintance's Big Five traits and that acquaintance's religiosity. Additionally, the informants provided self-reports on their own Big Five traits and their own religiosity. Hence, we were in the position to control for self-reports in our informant-report analyses.

Finally, Study 3 provides a longitudinal test of the SMP, drawing on representative data from 14,868 German participants across 15 federal states. That study's two measurement waves are 4 years apart. The longitudinal data allowed us to examine one key component of the SMP's causal assumptions — namely, the temporal precedence of the Big Five.

#### **STUDIES 1A-D: CROSS-SECTIONAL SELF-REPORT**

According to the EP and religiosity-specific processes, Agreeableness and Conscientiousness should be the only Big Five predictors of personal religiosity, irrespective of socio-cultural context. In other words, there should be no differences in the relationships of Agreeableness and Conscientiousness with personal religiosity across Study 1a's 66 countries, Study 1b's 50 US states, Study 1c's 15 federal states of Germany, and Study 1d's 121 urban areas.

In contrast, the SMP predicts such differences across socio-cultural contexts. Specifically, the relationships of Agreeableness and Conscientiousness with personal religiosity should wax (become more positive) with increasing socio-cultural religiosity at the country-level (Study 1a), state-level (Studies 1b-1c), and area-level (Study 1d). At the same time, the relationship of Openness with personal religiosity should wane (become more negative) with increasing socio-cultural religiosity. Finally, the relationships of Extraversion and Neuroticism with personal religiosity should not vary as a function of socio-cultural religiosity.

According to the SMP, the moderating role of socio-cultural religiosity should be strongest, if the sample contains data from very religious as well as very secular socio-cultural contexts (in an absolute sense). Study 1a is such a sample, containing data from the world's

most religious countries and from its least religious countries. In contrast, Study 1b's socio-cultural contexts (50 US states) are all quite religious (in an absolute sense). Hence, the moderating role of context-level religiosity should be less pronounced. The same should also be the case for Study 1c's quite secular federal states of Germany and for Study 1d's quite secular British urban areas. Thus, Study 1a is most suitable to gauge the impact of the SMP over and above the EP and religiosity-specific processes. Studies 1b-1d, in contrast, test whether SMP processes operate not only at the country-level (as tested in Study 1a), but additionally operate at the state-level (Study 1b-1c) and urban area-level (Study 1d) within a given country.

## **Method**

### **Study 1a**

**Participants.** Data were collected as part of the Gosling-Potter Internet Personality Project between March 2001 and September 2012 (for details, see Gosling, Vazire, Srivastava, & John, 2004). To select the relevant data we consecutively applied four selection criteria to this multi-study dataset. First, we wanted no missing data at the construct level. Thus, we included only those participants who completed at least one item of each Big Five scale as well as the single-item religiosity measure. Second, we wanted to circumvent any data overlap with Study 1b, which also used data from the Gosling-Potter Internet Personality Project, but Study 1b conceptualized the socio-cultural context at the state-level within the US. Thus, for Study 1a's US subsample, we solely used data from those 95,323 participants, who indicated on the question "In what country do you currently live?" that they currently live in the US but who did not provide an answer to the question "In what state/province do you currently live?" Third, we wanted to ensure precise estimation of Big Five relationships with personal religiosity within each country. Thus, we followed established practice and excluded participants (3%) from small-*N* countries ( $N < 1,000$ ; see Bleidorn, Klimstra, Denissen, Rentfrow, Potter, & Gosling, 2013; Diener, Tay, & Myers, 2011). Finally, we screened for participants, who provided logically impossible responses; thus, we excluded participants (1%) who named a country other than the US as their current country of residence, while also naming a US state as their current state of residence.

The resulting dataset contained data from 1,129,334 participants across 66 countries. Participants' mean age was  $M = 25.34$  years ( $SD = 10.25$ ; range: 8-99 years); 59% were female, 34% male, and 7% did not answer the question. Table 1 reports the demographics separately for each country.

**Procedure.** Language options were English (53% of participants chose that option), Dutch (6%), German (8%), and Spanish (32%). After consenting to participate, participants completed measures of the Big Five, personal religiosity, and demographics (in that order). At the end of the study, participants received computer-generated feedback on their personality, some information on the Big Five more generally, and suggestions for further reading on personality psychology.

**Measures.** *Big Five personality* was assessed with the 44-item Big Five Inventory (BFI; John, Donahue, & Kentle, 1991). Each item starts with "I see myself as someone who..." and uses a 7-point rating scale (1 = *disagree*, 7 = *agree*). The Dutch translation was taken from Denissen, Geenen, van Aken, Gosling, and Potter (2008), the German translation from Rammstedt (1997), and the Spanish translation from Benet-Martínez and John (1998).<sup>2</sup> Tables 2-3 provide further information on each scale, including example items, internal consistencies, and measurement invariance indices. The tables show that all five scales were psychometrically sound.

*Personal religiosity* was assessed with the single-item "I see myself as someone who is very religious" (1 = *disagree*, 7 = *agree*). Single-item religiosity measures are common and effective (Gebauer, et al., 2013b) and the present measure is similar to established single-item measures (e.g., "How religious are you?", Norenzayan & Hansen, 2004). Further, a validation-study ( $N = 347$ ; Gebauer, Sedikides, & Neberich, 2012b) found that the latter item loaded strongly (.88) on a single factor together with the well-established Duke Religion Index (Koenig, Meador, & Parkerson, 1997) and the eDarling Religiosity Measure (Gebauer et al., 2012b).

*Socio-cultural religiosity* was assessed by averaging participants' responses to the study's personal religiosity measure within each country (see Table 1). That method is common for estimating socio-cultural religiosity (Diener et al., 2011; Fincher & Thornhill,

2012; Sedikides & Gebauer, 2010). Our index correlated strongly with Diener et al.'s (2011) representative index based on data from the Gallup World Poll,  $r(64) = .86, p = .001$ , and Fincher and Thornhill's (2012) representative "Religious Participation and Value" index based on data from the World Values Survey,  $r(52) = .81, p = .001$ . These strong correlations support the validity of our socio-cultural religiosity index.<sup>3</sup>

### Study 1b

**Participants.** Data were also collected as part of the Gosling-Potter Internet Personality Project between March 2001 and September 2012. Data selection criteria were parallel to those described for Study 1a. First, we included only those participants who had no missing data at the construct level. Second, we included only those participants who indicated that they were currently living in one of the 50 US states. Third, we excluded participants (1%) who additionally named a country other than the US as their current country of residence. Fourth, we excluded participants (0.4%) who completed the study in a language other than English. As a result of these selection criteria, Study 1b's data are fully independent from Study 1a's data.

The resulting dataset contained data from 1,057,342 participants across 50 US states. Participants' mean age was  $M = 25.44$  years ( $SD = 11.10$ ; range: 8-99 years); 61% were female, 38% male, and 1% did not answer. Table 4 includes the demographics within each state.

**Procedure and measures.** The procedure was identical to Study 1a's procedure and the measures were identical to Study 1a's measures. Tables 2-3 provide information on the internal consistencies and measurement invariance indices of the BFI's five scales. The tables show that all five scales were psychometrically sound.

Following Study 1a, *socio-cultural religiosity* was assessed by averaging participants' responses to the study's personal religiosity measure within each US state (see Table 4). Our index correlated strongly with Diener et al.'s (2011) representative index based on the 2009 Gallup US Poll,  $r(50) = .92, p = .001$ , and Fincher and Thornhill's (2012) representative "Religious Participation and Value" index based on data from the 2008 US Religious Landscape Survey,  $r(48) = .94, p = .001$ .

### Study 1c

**Participants.** Representative data from 20,885 participants across 15 federal states of Germany were used.<sup>4</sup> Participants' mean age was  $M = 47.34$  years ( $SD = 17.54$ ; range: 17-96 years); 52% were female and 48% male. Table 5 lists demographics within each federal state. The data are part of the 2005 wave of the larger German Socio-Economic Panel (GSOEP; for details, see Wagner, Frick, & Schupp, 2007). As in Studies 1a-1b, we included only those participants who had no missing data at the construct level.

**Procedure.** The language of the study was German. The religiosity measure preceded the Big Five measure. The two measures were separated by 24 questionnaire pages. Specifically, after completion of the single-item religiosity measure participants provided up to 200 responses on very different issues (e.g., employment history, income, and health status) before completion of the Big Five measure. This setup renders priming effects of religiosity on the Big Five rather unlikely. Half of the participants completed paper-and-pen versions of the measures, the other half were personally interviewed. These two methods have demonstrated sufficient measurement invariance in past research on the same dataset (Lang, John, Lüdtke, Schupp, & Wagner, 2011).

**Measures.** The *GSOEP-BFI* (Gerlitz & Schupp, 2005) is a 15-item short form of the BFI, with 3-item scales for each Big Five trait. Items were selected in an attempt to retain the conceptual breadth of each personality trait, maximizing correlations between the original scale and this short form (all  $r_s > .86$ ; Donnellan & Lucas, 2008; see also Rammstedt & John, 2007). The logical consequence of combining measurement breadth with a small number of items is modest internal consistency (Cronbach, 1951). Hence, retest correlations are more suitable reliability indicators and the 6-week retest correlations of the GSOEP-BFI scales are acceptable ( $r_s > .75$ ; Lang, 2005). Tables 2-3 provide further information on the GSOEP-BFI's scales (example items, internal consistencies, and measurement invariance indices).

*Personal religiosity* was assessed with the single-item "How often do you attend church, religious events?" (1 = *at least once a week*, 2 = *at least once a month*, 3 = *less often*, 4 = *never*; we applied reverse-scoring so that higher scores reflect more personal religiosity). Church attendance is the most frequently used measure of personal religiosity (Schwartz & Huismans, 1995) and is a central part of global religiosity measures, such as the Duke

Religion Index (Koenig et al., 1997) and the Global Religiosity Measure (Gebauer & Maio, 2012).

As in Studies 1a-1b, *socio-cultural religiosity* was assessed by averaging participants' responses to the study's personal religiosity measure within each federal state of Germany (see Table 5). Our index correlated strongly with the representative Fowid Religiosity Index (Frerk, 2005) based on data from the German ALLBUS,  $r(15) = .93, p = .001$ , and the EKIR Religiosity Index (Evangelische Kirche im Rheinland, 2010) based on the percentage of church members per federal state,  $r(15) = .98, p = .001$ .

### Study 1d

Data were collected as part of the Rentfrow-Lamb Internet-based survey "Big Personality Test" between November 2009 and April 2011 (for details, see Rentfrow, Jokela, & Lamb, 2014). The survey was conducted in collaboration with the British Broadcasting Corporation (BBC). The BBC advertised the survey on its websites, radio programs, and television shows, leading to a fairly representative sample of the United Kingdom (Rentfrow et al., 2014). Data selection criteria were parallel to those described for Studies 1a-1c. First, we included only participants with no missing data at the construct level. Second, we included only participants who reported their current UK postcode, allowing us to sort participants into the 121 UK postcode areas (a postcode area usually pertains to a larger city and its urban surroundings; see Table 6). The resulting dataset contained data from 386,315 participants across 121 British urban areas. Participants' mean age was  $M = 35.69$  years ( $SD = 13.70$ ); 64% were female, 36% male. Table 6 reports the demographics separately for each urban area.

**Procedure.** The language of the survey was English. After consenting to participate, participants completed the demographics and measures of the Big Five and religiosity (in that order). The latter two measures were separated by four other large blocks of questions on intimate relationships, family, childhood, and health and lifestyle. At the end of the study, participants received computer-generated feedback on their personality.

**Measures.** *Big Five personality* was assessed with the 44-item BFI (see Studies 1a-1b). Participants responded to each item using a 5-point rating scale (1 = *disagree strongly*, 5



= *agree strongly*). Tables 2-3 provide further information on the five BFI scales. The tables show that all five scales were psychometrically sound.

*Personal religiosity* was assessed with the importance participants place on “participating in religious activities” (1 = *unimportant*, 5 = *very important*). This single-item measure is part of the Major Life Goals Scale (Roberts & Robins, 2000). It is not uncommon to assess global religiosity with the importance people place on a religious life. For example, Diener et al. (2011) used the Gallup World Poll item “Is religion an important part of your daily life?” as a measure of global religiosity. Similarly, Gebauer et al. (2012b) used the item “My personal religious beliefs are important to me.”

*Socio-cultural religiosity* was assessed by averaging participants’ responses to the study’s personal religiosity measure within each urban area (see Table 6). To our knowledge, there exists no external religiosity index of the UK urban areas. Hence, in contrast to Studies 1a-1c, we were not in the position to validate our index with the help of external indices. However, we computed our socio-cultural religiosity index in exactly the same way than in Studies 1a-1c. Because Studies 1a-1c’s indices were very strongly correlated with external indices, there is good reason to believe in the validity of the present index.

### **Analytic Strategy**

Participant data were nested within socio-cultural contexts (i.e., countries—Study 1a, US states—Study 1b, German federal states—Study 1c, & British urban areas—Study 1d). Therefore, we used multilevel modeling (HLM 7.01; Raudenbush, Bryk, Cheong, Congdon, & du Toit, 2011). Prior to setting up the multilevel models, we *z*-standardized all individual-level variables, allowing us to interpret main effect *bs* as standardized  $\beta$ s (Cohen & Cohen, 1983). SMP predictions concerned cross-level interactions so we centered our individual-level predictors (level 1) around their context-level means (level 2; Edres & Tofighi, 2007).

In each study we examined our hypotheses in a single multi-level regression model. Specifically, we simultaneously regressed personal religiosity (level 1) on all Big Five traits (level 1), socio-cultural religiosity (level 2, grand-mean centered), and the five cross-level interactions between each of the Big Five traits and socio-cultural religiosity.<sup>5</sup> Our single-model approach is superior to separate tests of each Big Five trait’s relationship with personal

religiosity because our approach effectively controls for variance shared by all five traits, such as socially desirable responding (Musek, 2007) and self-enhancement bias (Anusic, Schimmack, Pinkus, & Lookwood, 2009).

## Results

### Omnibus Results

Table 7 shows the Big Five main effects on personal religiosity for each of the four samples (i.e., Studies 1a-1d). Overall, Agreeableness and Conscientiousness emerged as the two strongest predictors of personal religiosity. That pattern is in line with previous meta-analyses (Lodi-Smith & Roberts, 2007; Saroglou, 2010). Yet, we also found SMP-consistent differences in the omnibus results between the four samples. Specifically, the omnibus relationships of Agreeableness and Conscientiousness with personal religiosity were more positive in the more religious samples (Studies 1a-1b), compared to the more secular samples (Studies 1c-1d). Further, the omnibus relationships of Openness and personal religiosity were more negative in the more religious samples (Studies 1a-1b), compared to the more secular samples (Studies 1c-1d). Finally, the omnibus relationships of Extraversion and Neuroticism with personal religiosity differed less across the four samples (although the relationship between Extraversion and religiosity showed some unexpected variation, which we will come back to later). All such differences were statistically significant at the  $p < .001$  level (DeCoster, 2007). However, inspection of Table 7's standardized coefficients is more telling than a significance test, because even extremely small differences between the omnibus results of the four samples are significant due to the very large  $N$ s. It should also be noted that the four samples not only differed with regard to their overall socio-cultural religiosity, but also with regard to many other features (e.g., sampling procedure, measures, language). Hence, differences between these latter features offer alternative explanations for the differences across the four samples' omnibus results. Tests for socio-cultural differences *within* each of the four samples are not vulnerable to these alternative explanations and, therefore, these tests are more telling. We describe such tests next.

### Cross-Level Interactions Within Studies 1a-1d

We examined the cross-level interactions between each of the Big Five and personal religiosity within each of the four samples (i.e., Studies 1a-1d). For each sample, we predicted conceptually similar cross-level interactions. Yet, the size of these cross-level interactions may differ between the four samples. Specifically, compared to Study 1a's 66 countries, there was less variation in socio-cultural religiosity between Study 1b's 50 US states, between Study 1c's 15 German federal states, and especially between Study 1d's 121 British urban areas. Hence, differences in Big Five relationships with personal religiosity should be more pronounced across Study 1a's 66 countries than across Studies 1b-1d's socio-cultural contexts.

**Agreeableness and Conscientiousness.** Following SMP predictions, the relationships of Agreeableness and Conscientiousness with personal religiosity waxed (became more positive) with increasing socio-cultural religiosity. Table 8 shows that these predictions were consistently met across Study 1a's 66 countries, Study 1b's 50 US states, Study 1c's 15 German federal states, and Study 1d's 121 British urban areas. Figures 1-4 display these results. Comparison of Figure 1 with Figures 2-4 show that the moderating role of socio-cultural religiosity was considerably larger in Study 1a than in Studies 1b-1d, coinciding with the considerably larger *variation* in socio-cultural religiosity within Study 1a, compared to Studies 1b-1d.

**Openness.** The relationship of Openness with personal religiosity should wane (become more negative) with increasing socio-cultural religiosity. Table 8 shows that this prediction was consistently met across Study 1a's 66 countries, Study 1b's 50 US states, Study 1c's 15 German federal states, and Study 1d's 121 British urban areas. Figures 1-4 also visualize these results.<sup>6</sup>

**Extraversion and Neuroticism.** The relationships of Extraversion and Neuroticism with religiosity should not change as a function of socio-cultural religiosity. For Extraversion, the results partly departed from expectations (Table 8). The relationship of Extraversion with religiosity become somewhat more positive with increasing socio-cultural religiosity in Studies 1a, 1b, and 1d. The expected null-effect emerged in Study 1c. For Neuroticism, the

results fit expectations (Table 8). The role of socio-cultural religiosity was consistently negligible and only reached significance, if it did at all, because of the large sample sizes.

### **SMP's Added Value**

To gauge the SMP's added value over and above previous accounts (i.e., the EP and religiosity-specific processes), we compared the amount of variance explained by previous accounts alone with the amount of variance explained, when SMP predictions are added. To begin with, we evaluated previous accounts, which make pan-cultural predictions that are limited to Agreeableness and Conscientiousness. Hence, we compared the variance explained by the null-model (only including personal religiosity as the criterion, without inclusion of any predictors) with the variance explained by a model that includes personal religiosity as the criterion and the following simultaneous predictors (all grand-mean centered):

Agreeableness and Conscientiousness. To estimate the amount of variance explained in personal religiosity we followed well-established computation-recommendations (Snijders & Bosker, 2011). Previous accounts alone explained 2.50% in Study 1a, 5.06% in Study 1b, 0.75% in Study 1c, and 1.36% in Study 1d.

Next, we evaluated the added value of the SMP. The SMP calls for differences in the relationships of Agreeableness, Conscientiousness, and Openness with personal religiosity as a function of socio-cultural religiosity. Hence, this time we compared the variance explained by the null-model with the variance explained by a model that includes personal religiosity as the criterion and the following simultaneous predictors (all group-mean centered at level 1 and grand-mean centered at level 2): Agreeableness, Conscientiousness, Openness, socio-cultural religiosity, and the three resultant cross-level interactions. The previous accounts in combination with the SMP explained 14.19% in Study 1a, 9.00% in Study 1b, 8.14% in Study 1c, and 2.56% in Study 1d.

## **Discussion**

Studies 1a-1d provided ample opportunity to examine the SMP. SMP predictions were always supported for Agreeableness, Conscientiousness, Openness, and Neuroticism (but results were mixed for Extraversion; see General Discussion for a fuller treatment).

Specifically, relationships of Agreeableness and Conscientiousness with personal religiosity

consistently waxed (became more positive) with increasing socio-cultural religiosity. Relationships of Openness with personal religiosity consistently waned (became more negative) with increasing socio-cultural religiosity. And relationships of Neuroticism and personal religiosity did not vary as a function of socio-cultural religiosity. These findings support the SMP. But they say little about the SMP's power, compared to the EP and outcome-specific processes.

To gauge the SMP's power, one needs to compare the results from very religious and very secular socio-cultural contexts (in an absolute sense). For that reason, comparison of Study 1a's three most religious countries ( $N = 24,835$ ) with Study 1a's three most secular countries ( $N = 29,349$ ) appears most suitable. In the most religious countries, Agreeableness ( $\beta = .22$ ) and Conscientiousness ( $\beta = .17$ ) emerged as comparatively strong predictors of religiosity, whereas Openness ( $\beta = .02$ ) was a very weak predictor at best. In the least religious countries, however, the Agreeableness ( $\beta = .08$ ) and Conscientiousness ( $\beta = .02$ ) relationships were greatly diminished, whereas Openness ( $\beta = .08$ ) was as strong a predictor as Agreeableness. This extreme-group comparison suggests that the SMP has considerable power. In fact, without acknowledging that SMP processes have modulated EP-based relationships, the results from the most secular countries would raise serious questions about the EP's validity.

Extreme-group comparisons are relatively undiagnostic in Studies 1b (US states), 1c (German federal states) and 1d (British urban areas) because religiosity does not vary greatly within each of these samples. Yet, inspection of the East German federal states may be informative because East Germany still belongs to the least religious places on the planet. Results across Study 1c's six East German federal states ( $N = 5,468$ , representatively sampled) revealed very low relationships of Agreeableness ( $\beta = .04$ ) and Conscientiousness ( $\beta = .001$ ) with religiosity, whereas the relationship of Openness ( $\beta = .09$ ) with religiosity was more substantial. These results further showcase the SMP's power to modulate EP-based and outcome-specific main effects.

It should be noted that Study 1's omnibus results are in line with Saroglou's (2010) meta-analysis. Specifically, modest positive relationships consistently emerged between

Agreeableness and religiosity ( $r = .19$ —meta-analysis;  $\beta = .15$ —Study 1) and between Conscientiousness and religiosity ( $r = .08$ —meta-analysis;  $\beta = .14$ —Study 1). At the same time, much smaller relationships emerged between Openness and religiosity ( $r = -.04$ —meta-analysis;  $\beta = -.001$ —Study 1). According to the SMP, the two omnibus results should be similar, because the overall context-level religiosity in Study 1 and the meta-analysis were also similar. Usually, if the results of individual studies fit meta-analytic results, the individual studies' validity is supported. In the present case, where Study 1's combined sample sizes was about 120 times larger than the meta-analysis's sample size, it is tempting to think that our results may also help to buttress the meta-analytic conclusions. This is especially the case here because our analyses examined each Big Five trait's *unique* relationship with religiosity, controlling for the other four Big Five traits. The meta-analysis exclusively examined zero-order correlations without any controls.

Study 1's findings were all based on self-reports. Self-reports can be subject to several biases (Paulhus & Vazire, 2007). To evaluate the generalizability of the effects across measurement methods, Study 2 examined our hypotheses using informant-report data.

### **STUDY 2: CROSS-SECTIONAL INFORMANT-REPORT**

The present study utilized reports from 544,512 informants across 37 countries. Each informant reported on an acquaintance's Big Five traits and his/her religiosity, allowing an informant-report test of the SMP. Informants also reported on their own Big Five traits and their own religiosity, enabling us to control for informants' self-reports. These controls are important additions to our informant-reports on the Big Five and religiosity for three reasons.

First, the controls combat the possibility that informants' own Big Five traits and their own religiosity are biasing informants' perception of their acquaintances due to self-projection or assumed similarity (i.e., projecting one's own attributes onto one's acquaintance; Kenny & Acitelli, 2001; Wood, Harms, & Vazire, 2010). Second, the controls reduce the possible impact of ingroup bias (here: overly positive perceptions of an acquaintance who shares one's faith; Eriksson & Funcke, 2014; Johnson, Rowatt, & LaBouff, 2012). Finally, controlling for informants' self-reports can effectively control for individual

differences in informants' general scale use (e.g., acquiescence tendency—Zuckerman, Knee, Hodgins, & Miyake, 1995; extreme scoring—Hui & Triandis, 1989).

Over and above controlling for these validity threats, our control variables should also restrict valid variance in informant-reports. For example, co-variation between informants' traits and acquaintances' traits could be legitimately generated by such processes as assortative pairing (Luo & Klohnen, 2005), genetic overlap (Bouchard, 2004), and shared social context (Caspi, Herbener, & Ozer, 1992). Thus, controlling for informants' self-reported Big Five traits and their own religiosity is a conservative approach, providing a particularly stringent test of the SMP.

## Method

### Participants

Past research has validated the use of informant-reports provided by close acquaintances, including close friends (Funder & Colvin, 1988), coworkers (Hogan, Hogan, & Roberts, 1996), and family members (Vazire & Mehl, 2008). In line with that research, our questionnaire instructed informants to “rate someone whom you know well, such as a close friend, coworker, or family member.”

As in Studies 1a-1b, the present data were collected as part of the Gosling-Potter Internet Personality Project between March 2001 and September 2012. To select relevant data, we applied selection criteria parallel to those described in Study 1a. First, we included only informants who completed at least one item of each informant-report Big Five scale and the single-item informant-report religiosity measure. Second, we excluded informants (4%) from small-*N* countries. As a result, almost all informants served as participants in Studies 1a-1b, allowing us to control for their own self-reports in the informant-report analyses.

The resulting dataset contained data from 544,512 informants across 37 countries. Informants' mean age was  $M = 22.41$  years ( $SD = 9.50$ ; range: 8-99 years); 60% were female, 31% male, and 9% did not answer the question. Table 9 lists these demographics separately for each country.

### Procedure and Measures

44% of the participants completed the study in English, 8% in Dutch, 8% in German, and 40% in Spanish. The measures were identical to those of Study 1a, except that each item came with two rating scales. The upper rating scale of each item was labeled “Myself” and the lower rating scale of each item was labeled “Other.” Tables 2-3 provide information on each informant-report Big Five scale, including internal consistencies and measurement invariance indices. The tables show that all five scales were psychometrically sound.

*Socio-cultural religiosity* (i.e., the country-average of informant-reported religiosity; see Table 9) correlated strongly with Diener et al.’s (2011) representative index based on data from the Gallup World Poll,  $r(66) = .95, p = .001$ , and Fincher and Thornhill’s (2012) representative “Religious Participation and Value” index based on data from the World Values Survey,  $r(31) = .86, p = .001$ .

### **Analytic Strategy**

Our analytic strategy was identical to the one used in Studies 1a-1d. In brief, we used multilevel modeling because participants (level 1) were nested within countries (level 2). Prior to setting up the multi-level model, we  $z$ -standardized all individual-level variables in order to interpret main effect  $bs$  as standardized  $\beta$ s. While setting up the multilevel model, level 1 predictors were group-mean centered and level 2 predictors were grand-mean centered. Again, we examined our predictions in a single model, simultaneously regressing informant-reported religiosity on all informant-reported Big Five traits, socio-cultural religiosity, and the five ensuing cross-level interactions.

## **Results**

### **Omnibus Results**

To begin with, we focused on a model that did not control for informants’ own Big Five traits and their religiosity. That model is most comparable to the models used in Studies 1a-1d, providing the best basis for a replication-attempt. Our hypotheses predicted omnibus results similar to those of Study 1a, because the two studies were comparable in their overall level of religiosity. In line with that prediction, Table 7 shows that the present omnibus results were quite comparable to Study 1a’s omnibus results. Next, we focused on the model that



additionally controlled for informants' own Big Five traits and their own religiosity. Table 7 shows that these conservative controls hardly changed our omnibus results.

### **Cross-Level Interactions**

We examined the cross-level interactions between acquaintances' Big Five traits and socio-cultural religiosity. Again, we first focused on the model that does not control for informants' self-reports because this model is most comparable to the models used in Studies 1a-1d.

Table 8 shows that the relationships of Agreeableness and Conscientiousness with personal religiosity waxed (became more positive) with increasing socio-cultural religiosity (socio-cultural assimilation) (see Figure 5). The relationship of Openness with personal religiosity waned (became more negative) with increasing socio-cultural religiosity (socio-cultural contrast). As shown in Figure 5, the size of this effect was rather small. Before drawing strong conclusions based on this one weak finding, we re-visit the role of Openness in Study 3.

The relationships of Extraversion and Neuroticism with personal religiosity should not change as a function of socio-cultural religiosity. For Extraversion, the results departed from expectations. Specifically, the relationship between Extraversion and personal religiosity increased somewhat with increasing socio-cultural religiosity (see Table 8). Study 3 examines this issue further. For Neuroticism, the results fit expectations; the role of socio-cultural religiosity was non-significant despite the huge sample (see Table 8).

Finally, we focused on the model that additionally controlled for informants' own Big Five traits and their own religiosity. We again found that these conservative controls hardly changed our results. Table 8 shows that the cross-level interactions revealed conceptually identical results for all Big Five traits.

### **Discussion**

The results of this informant-report study conceptually replicated Study 1' self-report results. At a general level, this study once more buttressed the usefulness of the SMP to understand cross-cultural variation in Big Five relationships with their outcomes. To further evaluate the SMP's power, we compared Study 2's three most religious countries ( $N = 9,649$ )

with its three most secular countries ( $N = 9,564$ ). In the most religious countries, Agreeableness ( $\beta = .12$ ) and Conscientiousness ( $\beta = .11$ ) were modest predictors of religiosity, whereas Openness ( $\beta = .001$ ) was unrelated to religiosity. In the most secular countries, Agreeableness ( $\beta = .006$ ) and Conscientiousness ( $\beta = .03$ ) were not substantial predictors of religiosity, and the same was the case for Openness ( $\beta = .004$ ). Thus, the informant-report data also suggest that the SMP has considerable power to modulate EP-based main effects (with the exception of Openness in this study).

At the religiosity-specific level, this study responds to Saroglou's (2010) call for non-self-report data on the Big Five and religiosity. The omnibus results of our informant-report data are in line with Saroglou's meta-analytic results. Moreover, our results remained practically unchanged even when controlling for informants' own Big Five traits and their own religiosity. These conservative controls safeguarded against several alternative explanations (e.g., self-projection, ingroup bias, differential scale use).

### STUDY 3: LONGITUDINAL SELF-REPORT

Despite the differences between the SMP and the EP, they share the idea that the Big Five have causal effects on their outcomes (here: religiosity). Specifically, Allport (1950) predicted that the desire to express personality traits akin to Agreeableness and Conscientiousness would *lead* people to pursue a religious lifestyle because religiosity allows the expression of these traits (Saroglou, 2010). Similarly, the SMP predicts that the desire for socio-cultural assimilation is inherent in Agreeableness and Conscientiousness, which *leads* agreeable and conscientious people to pursue a more religious life-style in religious socio-cultural contexts, compared to secular social contexts. At the same time, the SMP predicts that the desire for socio-cultural contrast is inherent in Openness, which *leads* open people to pursue a more religious life-style in secular socio-cultural contexts, compared to religious socio-cultural contexts.

There is some indirect evidence supporting the causal chains predicted by the EP and the SMP. Specifically, the expected causal direction appears theoretically most reasonable because the Big Five are more basic than religiosity (McCrae & Costa, 2008), they are broader than religiosity (Saroglou, 2010), they are evident at an earlier age (McCullough,

Trang, & Brion, 2003), and they possess a stronger genetic component (Bouchard, 2004). Moreover, all published longitudinal studies on the Big Five and religiosity have found longitudinal effects of the Big Five on subsequent religiosity (Heaven & Ciarrocchi, 2007; McCullough et al., 2003; McCullough & Laurenceau, 2005; Wink, Ciciolla, Dillon, & Tracy, 2007). Yet, prior longitudinal studies did not examine the SMP and, thus, did not attend to socio-cultural religiosity. Hence, the present longitudinal study is the first to examine whether socio-cultural religiosity moderates longitudinal effects of the Big Five on personal religiosity.

## **Method**

### **Participants**

The first wave of this two-wave longitudinal study was identical to Study 1c (i.e., GSOEP data from year 2005). As it stands, the GSOEP has assessed the Big Five and personal religiosity in only one additional year (i.e., year 2009). Hence, the second wave of the present study used the relevant data from that year, leading to a four-year lag ( $M_{lag} = 4.01$  years,  $SD = 0.13$ ) between the two waves. 14,858 participants from the first wave also completed the relevant measures in the second wave and, thus, were included in the present study. Participants were representatively sampled for each of 15 German federal states ( $M_{age} = 47.69$  years at the first wave,  $SD = 16.68$ ; sex: 53% female, 47% male).

Attrition is common in longitudinal datasets (Lüdtke et al., 2011). But past research has shown that attrition between these two waves of the GSOEP is small and reflects only modest selectivity (Specht, Egloff, & Schmuckle, 2011). Moreover, such attrition effects do not provide a reasonable alternative explanation for our findings.

### **Procedure and Measures**

The procedure and measures were identical in both waves. They are described in Study 1c. Tables 2-3 provide information on each Big Five scale, including internal consistencies and measurement invariance indices across the 15 federal states. The tables show that all five scales were psychometrically sound in both waves. Past research on the present dataset established sufficient measurement invariance of the Big Five scales across the two measurement waves (Lucas & Donnellan, 2011).

**Socio-cultural religiosity.** Study 1c solely concerned data from the first wave of the present study. For that reason, Study 1c used the state-average of our personal religiosity measure from that first wave (i.e., from year 2005). For the present longitudinal analyses, however, it is more suitable to average Study 1c's state-level religiosity index with a parallel index derived from the second wave (i.e., from year 2009). The resultant index (see Table 10) correlated strongly with the Fowid Religiosity Index (Frerk, 2005),  $r(15) = .90, p = .001$ , and the EKiR Religiosity Index,  $r(15) = .96, p = .001$ .

## Results

We modified the cross-sectional model described in Study 1 to examine longitudinal effects. Specifically, we used participants' Big Five traits at the first wave as predictors of their personal religiosity at the second wave, while additionally controlling for their personal religiosity at the first wave (Fleeson, 2007). As in the cross-sectional analyses, we specified cross-level interactions between all predictors and socio-cultural religiosity.

### Omnibus Results

We inspected the omnibus longitudinal effect of the Big Five on personal religiosity across all 15 federal states of Germany. These longitudinal results are shown in Table 7 and they were consistent with the cross-sectional results reported in Study 1c. Specifically, there was a small and marginally significant longitudinal effect of Agreeableness on higher personal religiosity and a non-significant longitudinal effect of Conscientiousness on personal religiosity. Further consistent with Study 1c's cross-sectional results, there was a significant longitudinal effect of Openness on higher personal religiosity. Finally, the longitudinal effects of Extraversion and Neuroticism on personal religiosity were non-significant (see Table 7).

### Cross-Level Interactions

Most important, we examined whether socio-cultural religiosity moderated the longitudinal Big Five effects on personal religiosity. In technical terms, we tested for longitudinal cross-level interactions between participants' Big Five  $\times$  socio-cultural religiosity on participants' later religiosity (controlling for their earlier religiosity).

Table 8 shows that the longitudinal effects of Agreeableness and Conscientiousness on personal religiosity waxed (became more positive) with increasing socio-cultural religiosity

(socio-cultural assimilation). The longitudinal effects of Agreeableness and Conscientiousness on personal religiosity were significant in the five most religious federal states (Agreeableness:  $\beta = .03$ ,  $p = .003$ , Conscientiousness:  $\beta = .03$ ,  $p = .004$ ), but non-significant in the five most secular federal states (Agreeableness:  $\beta = -.0002$ ,  $p = .80$ , Conscientiousness:  $\beta = -.004$ ,  $p = .44$ ).

Table 8 also shows that the longitudinal effect of Openness on personal religiosity waned (became more negative) with increasing socio-cultural religiosity (socio-cultural contrast). The longitudinal effect of Openness on personal religiosity was non-significant in the five most religious federal states ( $\beta = .01$ ,  $p = .97$ ), but that longitudinal effect was significant in the five most secular federal states ( $\beta = .03$ ,  $p = .03$ ). The non-significant longitudinal effects of Extraversion and Neuroticism on personal religiosity did not change as a function of socio-cultural religiosity (Table 8).

### Discussion

The present results conceptually replicated Study 1-2's cross-sectional results and extended them by adding a longitudinal component. Following SMP predictions, the longitudinal effects of Agreeableness and Conscientiousness on personal religiosity waxed with increasing socio-cultural religiosity, and waned with decreasing socio-cultural religiosity. In fact, in the most secular federal states, these longitudinal effects waned to the degree of non-significance. In other words, longitudinal effects of Agreeableness and Conscientiousness on personal religiosity were restricted to the more religious federal states of Germany, further buttressing the SMP's power. Also following SMP predictions, the longitudinal effect of Openness on personal religiosity waned with increasing socio-cultural religiosity, and waxed with decreasing socio-cultural religiosity. In fact, the longitudinal effect of Openness on personal religiosity were restricted to the most secular federal states of Germany, once again buttressing the SMP's power.

Our longitudinal results fit prior theoretical considerations (Bouchard, 2004; McCrae & Costa, 2008; McCullough & Laurenceau, 2005; Saroglou, 2010) and support previous longitudinal research on personality and religiosity (Heaven & Ciarrocchi, 2007; McCullough et al., 2003; Wink et al., 2007). Yet, our research also extended that previous research on two

fronts. First, our data came from a particularly large and representative sample. Second, and more important, our longitudinal test is the first that attends to socio-cultural religiosity. Following SMP predictions, the socio-cultural level once more proved to be influential.

### **GENERAL DISCUSSION**

Some people tend to swim with the socio-cultural tide, others tend to swim against it. A longstanding literature speaks to such individual differences in socio-cultural assimilation and contrast (Asch, 1956; Bakan, 1966; Bernard et al., 2006; Crowne & Marlowe, 1964; DeYoung, 2006; Gebauer et al., 2012a, 2013a, in press, Snyder & Fromkin, 1977; Wiggins, 1991; Wood et al., 2007). Indirect evidence suggests that these individual differences are reflected by the Big Five (McCrae & Costa, 1997; John et al., 2008). Specifically, socio-cultural assimilation should result from Agreeableness (Bègue et al., in press; Costa & McCrae, 1992; Côté & Moskowitz, 1998; John & Srivastava, 1999; Paulhus & John, 1998; Saucier, 2009) and Conscientiousness (Bègue et al., in press; Costa & McCrae, 1992; John & Srivastava, 1999; Roberts & Pomerantz, 2004; Paulhus & John, 1998; Saucier, 2009). Socio-cultural contrast should result from Openness (Buss, 1991; Costa & McCrae, 1992; DeYoung, 2006; MacDonald, 1995; Paulhus & John, 1998; Wood et al., 2007).

#### **Review of the Socio-Cultural Motives Perspective (SMP)**

The SMP builds on the research described above and makes three focal predictions. First, due to socio-cultural assimilation, the relationship between Agreeableness and an outcome should wax (become more positive or less negative) with that outcome's increasing socio-cultural normativeness. Second, due to socio-cultural assimilation, the relationship between Conscientiousness and an outcome should also wax with that outcome's increasing socio-cultural normativeness. Third, due to socio-cultural contrast, the relationship between Openness and an outcome should wane (become less positive or more negative) with that outcome's increasing socio-cultural normativeness. Additionally, the SMP posits that Extraversion and Neuroticism should be independent of socio-cultural assimilation and contrast.

The present paper provided a first test of the SMP. The Big Five relationships with religiosity served as our testing-ground. In choosing religiosity, we followed Allport (1950),

who chose religiosity as an outcome to illustrate his EP. Our three focal predictions follow. First, the EP-based positive relationship of Agreeableness with personal religiosity should further wax with increasing socio-cultural religiosity and wane with decreasing socio-cultural religiosity. Second, the EP-based positive relationship of Conscientiousness with personal religiosity should further wax with increasing socio-cultural religiosity and wane with decreasing socio-cultural religiosity. Finally, the EP-based null-relationship of Openness with personal religiosity should wane with increasing socio-cultural religiosity and wax with decreasing socio-cultural religiosity.

The three focal predictions were consistently supported in three studies across a total of six datasets. Each dataset's large sample size is a major asset of our research. The samples ranged from  $N = 14,858$  to  $N = 1,129,334$  (total  $N = 3,153,246$ ). Hence, we can be confident that the effect sizes identified are precise estimates of population effect sizes. Another major asset is that the six datasets differed from each other in many fundamental ways. They included cross-sectional and longitudinal designs, defined socio-cultural context at the levels of country, federal states, and urban areas, capitalized on samples that were quite religious and quite secular, used both self-report and informant-report methods, assessed data via questionnaire and via interview, operationalized religiosity as religious belief and religious practice, and recruited participants via self-selection and via representative sampling. Despite all these differences, the results consistently supported the SMP.

Results also suggested that the SMP is quite powerful (similar perhaps to the EP and religiosity-specific processes). Specifically, in religious socio-cultural contexts we found moderate relationships of Agreeableness and Conscientiousness with personal religiosity and negligibly small relationships of Openness with personal religiosity. Following SMP predictions, however, these relationships gradually changed with decreasing socio-cultural religiosity. In the least religious places, then, the size of the Agreeableness and Conscientiousness relationships were at least cut in half, and the positive relationship of Openness with personal religiosity was at least as strong as religiosity's relationship with Agreeableness and Conscientiousness. Consistent with this description, the EP and religiosity-specific processes explained much less variance in personal religiosity than did these previous

accounts in combination with the SMP. Specifically, the latter, compared to the former, explained more variance in personal religiosity by factors of 5.7 (Study 1a), 1.8 (Study 1b), 10.9 (Study 1c), 1.9 (Study 1d), 14.9 (Study 2), and 19.1 (Study 3).

### **Limitations and Future Directions**

The SMP's focal findings are highly consistent across assessment methods, study designs, analysis levels, and sampling procedures. Nonetheless, some patterns showed less consistency than others. The SMP expects a pan-cultural null-relationship between Extraversion and personal religiosity. Instead, Studies 1a, 1b, 1d, and 2 found a small, positive relation, which was restricted to religious contexts. Should we amend the SMP and add Extraversion to the list of Big Five traits reflecting socio-cultural assimilation? We think that doing so would be somewhat premature. Instead, it seems more likely that personal religiosity allows the *expression* of Extraversion in religious cultures. This should be the case because religious celebrations and events are integral parts of religious cultures. And such celebrations and events allow the expression of Extraversion. Hence, it seems possible that EP predictions regarding Extraversion and personal religiosity have to be amended. Future research should attend to that issue.

Following SMP predictions, socio-cultural religiosity consistently mattered for the relationships of Agreeableness, Conscientiousness, and Openness with personal religiosity. However, socio-cultural religiosity did not matter equally strongly for these three relationships. Figures 1-5 show that socio-cultural religiosity mattered most for the relationship between Agreeableness and personal religiosity, closely followed by the relationship between Conscientiousness and personal religiosity. Socio-cultural religiosity mattered least for the relationship between Openness and personal religiosity (but see Figure 3 for an exception). Why was the influence of socio-cultural religiosity comparatively smaller in the case of Openness? One possibility is that only some open people swim against the religious tide by becoming less religious, whereas others may swim against the tide by shifting to non-mainstream religions. This possibility is very much in line with basic SMP processes and it has received some indirect support. Specifically, Saucier and Skrzypińska (2006) found that people high in Openness were rather unlikely to endorse the traditional



religious beliefs of their culture, while being quite likely to endorse more individualized spiritual beliefs (see also Batson & Schoenrade, 1991). Future SMP research should explicitly examine the more general question of whether and when people high in Openness simply swear off a given socio-cultural norm (here: becoming non-religious in religious contexts) versus whether and when open people seek unique variations of that socio-cultural norm (here: individualized spiritual beliefs in religious contexts).

Even in the most religious contexts, the relationships of Agreeableness and Conscientiousness with personal religiosity were only modest. Further, even in the most secular contexts, the relationships of Openness and personal religiosity were only small.<sup>7</sup> One likely reason for this pattern of results is that personal religiosity is a particularly multi-determined phenomenon (Sedikides & Gebauer, 2014). Multi-determinism *a priori* limits the explanatory potential of any one precursor to personal religiosity (Ahadi & Diener, 1989; Strube, 1991). Hence, a focus on relative effect sizes between different correlates of personal religiosity seems more telling than a focus on absolute effect sizes. In this regard, the Big Five fare similarly to other major correlates, including well-being (Diener et al., 2011) and prosociality (Stavrova & Siegers, 2014).

Another potential explanation for the modest effects is that we have probably underestimated the true effect sizes for several reasons. For once, all studies assessed personal religiosity with single-item measures. Although the reliability of single-item religiosity measures is adequate (Gebauer et al., 2012b), multi-item measures have higher reliability and thus lead to stronger relationships (Spearman, 1904). Further, we focused on several types of socio-cultural contexts (i.e., country-level vs. state-level vs. area-level religiosity) in isolation. However, all of these contexts were consequential. Hence, SMP effects will be stronger when considering all these contexts simultaneously. Also, the SMP may not be restricted to geographical contexts. The work context, peer context, or family context may also play a causal role; thus it is possible that the relationship between Agreeableness and religiosity approaches a medium size in religious families from religious cities of religious states in religious countries.

There is another reason to believe that SMP processes can be more impactful than the present results suggest. Specifically, cultures differ in their “tightness” (strong norms, low deviance tolerance) versus “looseness” (weak norms, high deviance tolerance; Gelfand, 2012; Gelfand et al., 2011). In very tight cultures, the pressure to assimilate to socio-cultural norms is very strong. In other words, people should have little freedom to follow their personal preferences for socio-cultural assimilation and contrast. As a result, the relevance of the SMP should wane with increasing cultural tightness. Put differently, the SMP’s power should be strongest in samples containing loose cultures. Future research should examine this prediction and also test for other variables at the socio-cultural level that can help explain cross-cultural variance in Big Five relationships with their outcomes.

Finally, there is reason to believe that our studies provided a rather conservative test of cross-cultural differences in Agreeableness relationships with personal religiosity. Specifically, recent evidence suggests that personal religiosity does not lead to prosocial behavior everywhere (Stavrova & Siegers, 2014). The authors found that religious people followed the religious prosociality commandment particularly strongly when religious people live in secular countries. Agreeableness is a moderately strong predictor of self-reported prosociality (Caprara, Alessandri, & Eisenberg, 2012; Graziano & Tobin, 2013), so Stavrova and Siegers’s findings should spuriously reduce our cross-cultural effect of Agreeableness on personal religiosity. A longitudinal cross-cultural study is needed that simultaneously attends to the effect of Agreeableness on personal religiosity and the effect of personal religiosity on prosociality. According to the SMP, such a study should reveal larger cross-cultural differences in the relationship between Agreeableness and personal religiosity.

Our three studies exclusively capitalized on the BFI (or a short form of it; John & Srivastava, 1999). Future research should examine the generalizability of the SMP across Big Five measures and also examine the applicability of the SMP in the context of the HEXACO model (Ashton & Lee, 2007). This alternative personality taxonomy distinguishes six factors. The HEXACO Conscientiousness, Openness, and Extraversion factors are practically identical to their corresponding Big Five factors. The HEXACO Agreeableness and Emotionality factors can be loosely described as rotated variants of Big Five Agreeableness

and Neuroticism, respectively (Ashton & Lee, 2014). Hence, the Big Five results uncovered in the present studies should generalize to these five HEXACO factors. The HEXACO's additional Honesty-Humility factor, however, has no close Big Five equivalent. There are several reasons to assume that Honesty-Humility encourages socio-cultural assimilation. The first is its conceptual overlap with Big Five Agreeableness. Second, Lee and Ashton (2005) found strong inverse relationships between Honesty-Humility and the "dark triad" (narcissism, machiavellianism, and psychopathy), with the latter being indicative of social deviance (Paulhus & Williams, 2002). Finally, well-acquainted informants report that people high in Honesty-Humility actually behave in accord with socially desirable standards (de Vries, Zettler, & Hilbig, in press). Future research should examine whether the SMP can help to explain cross-cultural differences in Honesty-Humility relationships with life outcomes.

Another unanswered question is whether socio-cultural assimilation and contrast are panculturally universal motives. It is possible that these motives only pertain to westernized people from industrialized cultures (Heinrich, Heine, & Norenzayan, 2010). Study 1a found evidence for the SMP across 66 countries from all over the world. But the data were collected online, limiting the sample to participants with Internet access. Thus, the present research has demonstrated the usefulness of the SMP to explain cross-cultural differences in Big Five relationships with their outcomes across industrialized cultures. The importance of this first step notwithstanding, future research needs to attend to more representative data from less industrialized cultures in order to examine SMP's universality.

So far, we have indirectly inferred the operation of socio-cultural assimilation and contrast motives. Inferences of that sort are quite common in personality psychology. For example, EP processes are also routinely inferred from Big Five relationships with their outcomes (Saroglou, 2010). Yet, future research should directly assess socio-cultural assimilation and contrast and show that they mediate longitudinal effects of the Big Five. Some preliminary work provides a first step towards this goal (Gebauer, Sedikides, Leary, Paulhus, & Abele, 2014). Specifically, these researchers constructed a self-report scale to explicitly assess socio-cultural assimilation and contrast. Agreeableness and Conscientiousness correlated moderately positively with self-reported socio-cultural

assimilation, whereas Openness correlated moderately positively with self-reported socio-cultural contrast (and Extraversion and Neuroticism showed no significant associations).

### **Additional Explanations**

The Introduction noted that Big Five main effects on personal religiosity are almost certainly multi-determined. In other words, the EP as well as several religiosity-specific processes probably contribute simultaneously toward the omnibus results initially uncovered by Saroglou (2010) and replicated in the present research (see Table 7). In much the same way, it also appears likely that SMP processes are not the only processes that drive our cross-cultural variations in Big Five relationships with personal religiosity. In this section, we discuss potential additional contributors to our results.

First, in very secular contexts, Agreeableness and Conscientiousness relationships with religiosity were generally very small or even non-existent. This finding fits with the SMP but it is worth considering whether this pattern may be partly due to severe range restriction in personal religiosity within very secular contexts. At least two reasons suggest that such range restriction does not play a strong role in our studies. First, range restriction should also lead to reduced correlations in very religious countries. Yet, we found a *linear* increase in Agreeableness and Conscientiousness relationships when moving from very secular contexts through modestly religious contexts to very religious contexts (Figure 1). Second, range restriction cannot account for the results from samples that did not include very secular (or very religious) contexts. But we also found SMP consistent results in the latter samples (Studies 1b and 1d).

A second potential alternative explanation for our results is that, compared to moderately and very religious contexts, personal religiosity may have a different meaning in secular contexts, perhaps representing a concept more similar to spirituality. Hence, the results from moderately religious contexts should have more in common with the results from very religious contexts than with the results from secular contexts. As described above, however, we generally found a linear change in Big Five relationships with personal religiosity when moving from very secular contexts through moderately religious contexts to very religious contexts. Moreover, most cultural psychologists agree that the meaning of a

cultural concept is rather invariant within a single country (Ingelhart & Baker, 2000; Parker, 1997; Smith, 2004). As such, that meaning-change account cannot easily explain the SMP consistent results within the US (Study 1b), within Germany (Study 1c and 3), and within the UK (Study 1d). Furthermore, Studies 1c and 3 used frequency of church attendance as an indicator of personal religiosity. This measure appears particularly robust against change in its meaning as a function of socio-cultural religiosity. This argument is supported by findings from Studies 1c and 3. Specifically, the state-level aggregate of our religiosity measure correlated to  $r = .98$  with the proportion of people paying state taxes for church membership. This almost perfect relationship suggests that our measure does reflect conventional religiosity because only people who are members of conventional religious faiths pay these church taxes.

Third, our single-item religiosity measures may have been least reliable in secular contexts. If so, one would expect that Big Five relationships with personal religiosity should *generally* be closer to zero in secular, compared to religious contexts. Yet, this is not the case for Openness relationships with personal religiosity, which are further apart from zero (absolutely more positive) in very secular contexts, compared to very religious contexts (Studies 1a, 1c, and 3). Additionally, reduced reliability in secular contexts cannot account for our SMP consistent differences in Big Five relationships with personal religiosity between moderately religious countries and very religious countries (see right halves of Figures 1 and 5). The same logic also applies for results from samples that did not include secular contexts (in an absolute sense; Studies 1b).

Fourth, there is another reason for why the relationship of Agreeableness and Conscientiousness with personal religiosity may wane with decreasing socio-cultural religiosity. Specifically, with decreasing socio-cultural religiosity, some aspects of religiosity (e.g., religious ceremonies) become less readily available for personality expression. As a result, people may choose alternative platforms to express their Agreeableness and Conscientiousness. This *availability hypothesis* is thankfully borrowed from Saroglou (2010). In the context of the family environment, he suggested: “Given the importance of religious socialization, especially within the family, for adolescent and adult religiousness..., it is

reasonable to assume that people who are high on Agreeableness and Conscientiousness are, remain, or become religious when these personality traits interact with the offer of religion in the [family] environment” (p. 118). Saroglou’s availability hypothesis awaits empirical evidence, but its validity is plausible and it is also plausible that this hypothesis can be extended to the socio-cultural level. However, the availability hypothesis does not render the SMP, or more precisely its socio-cultural assimilation part, redundant. This is because much prior research speaks to the existence of individual differences in socio-cultural assimilation and much additional research suggests that Agreeableness and Conscientiousness elicits socio-cultural assimilation (see the General Discussion’s first paragraph).

More important, Agreeableness and Conscientiousness are the personality pillars of a communal self-concept (Paulhus & John, 1998) and evidence suggests that a communal self-concept elicits socio-cultural assimilation across many outcomes (Gebauer et al., 2012a, 2013b, in press). For example, communal people declared an interest in environment protection, when such interest was socio-culturally normative. Yet, when relatively few others cared about environment protection, communal people were less interested in it (Gebauer et al., in press). Similarly, communal people named physical attractiveness as a particularly important partner preference, if such a partner preference was socio-culturally particularly sought after. Yet, when it was less common to focus on physical attractiveness in a potential partner, communal people desired it less (Gebauer et al., 2012a). The availability hypothesis cannot easily explain these results, because developing an interest in environmental protection appears available to almost everyone almost everywhere (and perhaps especially so, when nobody else seems to care about the environment). Along the same lines, developing an interest in physically particularly attractive partners also appears available everywhere (and, again, it is perhaps easier in contexts where others seem to care less about it, rendering the competition less fierce). In all, the availability hypothesis may best be understood as a rather outcome-specific process, pertaining to religiosity. In much the same way as the EP and religiosity-specific processes jointly explain Big Five main effects on personal religiosity, the SMP and the availability hypothesis may jointly explain cross-cultural variations in Big Five relationships with personal religiosity.

### **Concluding Remarks**

Personality psychology has flourished immensely over the last 30 years. Early in the field's renaissance, the search for an exhaustive personality taxonomy provided a major boost with the emergence of the Big Five personality traits (Digman, 1990; John, 1990). At a broad level of abstraction, the Big Five sufficiently answered the "what" question of personality for many researchers in the field (John & Srivastava, 1999). Some time later, that renaissance was spurred by evidence that the Big Five are related to important life outcomes (Ozer & Benet-Martínez, 2006; Roberts et al., 2007). The "what for" question, then, no longer remained unanswered. Today, personality psychologists highlight new challenges. Prominent among them are the "where" question (i.e., cross-cultural differences in Big Five relationships; Benet-Martínez et al., in press) and the "how" question (i.e., processes driving Big Five relationships; Hampson, 2012). The SMP provides one set of answers to these questions. In doing so, it seeks to integrate central elements from personality psychology (Big Five), social psychology (socio-cultural context), and motivational psychology (socio-cultural motives). At the broadest level, then, we hope that the SMP can contribute to the integration of these historically separated fields.

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**Table 1.** Demographics, country-level religiosity, and personality–religiosity correlations for the 66 countries in Study 1a.

country	sample size		age (in years)		sex (in %)		country- level religiosity	correlation with religiosity				
	<i>N</i>	%	<i>M</i>	<i>SD</i>	female	male		agr	cns	opn	ext	neu
Pakistan	4,024	< 1	23.16	6.56	53	46	3.33	.12	.15	.05	.00	.03
Philippines	18,606	2	21.38	6.56	75	25	3.27	.25	.17	.02	.03	.05
Egypt	2,205	< 1	23.19	7.22	67	32	3.24	.19	.20	-.03	-.05	.04
Saudi Arabia	1,179	< 1	25.72	9.51	53	46	3.20	.11	.10	.13	-.07	.00
Indonesia	2,856	< 1	24.21	7.8	58	41	3.19	.18	.18	.03	.03	-.01
India	20,837	2	24.8	7.14	49	51	3.18	.13	.17	-.06	.09	.15
Dominican Republic	4,037	< 1	23.04	7.83	66	21	3.15	.17	.11	.01	.03	.04
Panama	1,571	< 1	24.70	9.54	64	26	3.10	.21	.14	.02	.06	.09
El Salvador	2,222	< 1	23.58	7.93	57	27	3.07	.17	.11	-.02	.06	.01
Puerto Rico	2,600	< 1	26.94	10.58	60	29	3.05	.23	.14	-.04	.06	.04
Nicaragua	1,280	< 1	24.56	8.13	61	21	3.03	.23	.12	-.03	.05	.03
Honduras	1,450	< 1	24.40	7.71	59	22	3.02	.18	.13	.01	.06	.02
Malaysia	8,790	1	23.29	7.50	66	34	3.02	.17	.14	.03	.01	.01
South Africa	5,380	1	28.23	10.54	63	37	3.00	.21	.11	-.04	.03	.02
United Arab Emirates	3,748	< 1	26.84	10.70	57	42	3.00	.19	.11	.01	-.02	.05
Paraguay	1,849	< 1	23.75	8.37	53	23	2.99	.14	.11	-.01	.07	.05
Lebanon	1,141	< 1	23.50	7.22	59	41	2.96	.14	.16	-.05	-.02	.10
Guatemala	3,340	< 1	23.81	7.81	57	27	2.95	.20	.13	-.01	.03	.02
Venezuela	13,297	1	22.66	8.65	67	23	2.93	.17	.14	-.02	.04	.05
Bolivia	3,732	< 1	23.12	7.30	58	29	2.88	.15	.13	.00	.04	.06
Peru	13,493	1	23.44	8.38	59	27	2.83	.17	.16	-.01	.06	.06
Colombia	21,478	2	22.56	8.03	62	25	2.82	.17	.16	-.03	.05	.06
Ecuador	4,051	< 1	23.99	8.42	55	26	2.82	.19	.12	.00	.04	.06
Costa Rica	3,663	< 1	23.90	8.65	57	26	2.76	.14	.09	-.02	.06	.03
Thailand	1,940	< 1	25.79	9.54	60	40	2.74	.16	.11	.04	-.02	.02
USA	95,323	8	27.78	12.1	66	33	2.73	.17	.09	-.01	.05	.01
ABC-Islands	1,080	< 1	28.08	11.79	58	22	2.71	.13	.14	-.03	.02	.00
Singapore	10,238	1	22.37	7.75	62	38	2.66	.14	.08	.04	.04	.06
Chile	32,738	3	23.33	9.35	66	24	2.62	.19	.13	-.03	.05	.05
Brazil	3,462	< 1	29.44	11.02	40	59	2.57	.18	.15	-.01	.05	.01
Taiwan	1,230	< 1	26.42	9.15	61	39	2.54	.17	.11	.03	.02	.07
Mexico	82,191	7	22.80	7.56	57	29	2.50	.18	.12	-.05	.03	.04
Romania	3,107	< 1	23.42	7.39	63	36	2.50	.20	.10	-.01	.05	.08
Iran	1,017	< 1	25.58	7.61	60	43	2.47	.12	.07	-.07	.01	-.01
South Korea	2,329	< 1	27.38	8.15	43	57	2.44	.09	.08	.04	-.01	.05
Croatia	1,727	< 1	23.53	7.14	61	38	2.41	.14	.08	-.06	.05	.00
Turkey	1,489	< 1	25.72	8.35	53	45	2.41	.13	.11	-.11	.03	.09
Argentina	69,405	6	23.39	8.70	65	24	2.38	.14	.10	-.03	.02	.04
HongKong	4,220	< 1	25.99	9.24	66	33	2.38	.10	.06	.03	.03	.09
China	6,454	1	27.63	7.88	61	38	2.37	.05	.05	.09	.01	.06
Serbia-Montenegro	1,392	< 1	24.59	7.37	58	42	2.33	.14	.06	-.04	.01	.08

Russia	1,197	< 1	25.32	8.60	63	36	2.27	.15	.14	-.04	.03	.07
Italy	4,344	< 1	29.69	10.31	53	44	2.25	.11	.12	-.05	-.01	.01
Greece	2,910	< 1	25.86	8.45	63	36	2.24	.13	.11	-.05	.09	.06
Japan	3,818	< 1	26.85	9.70	56	43	2.24	.10	.10	.02	.04	.06
Uruguay	4,460	< 1	24.15	10.09	64	23	2.19	.11	.10	-.03	.04	.07
Canada	107,744	10	24.61	10.74	60	40	2.18	.13	.07	.02	.02	.02
Ireland	10,729	1	24.36	8.97	58	41	2.18	.12	.09	.00	.02	.03
Poland	2,536	< 1	23.99	7.66	52	47	2.17	.18	.11	.01	.01	.04
New Zealand	14,301	1	26.63	12.10	63	37	2.13	.11	.01	.03	.02	.04
Australia	51,030	5	25.47	11.11	59	40	2.12	.12	.03	.03	.02	.04
Austria	9,070	1	26.86	10.74	47	32	2.11	.11	.06	.00	.03	.03
Hungary	1,207	< 1	26.17	8.85	57	41	2.10	.11	.03	-.05	-.05	.01
Switzerland	13,279	1	29.08	12.53	42	33	2.08	.07	.04	.01	.02	.07
Germany	80,119	7	28.15	10.96	46	34	2.02	.09	.03	.04	.04	.04
Israel	2,479	< 1	27.30	10.38	56	43	1.97	.15	.00	-.01	.01	.04
Portugal	1,940	< 1	25.37	8.97	49	49	1.97	.12	.14	-.05	.04	.07
Finland	7,757	1	24.45	8.74	60	39	1.95	.11	.06	.05	.04	.08
Netherlands	72,183	6	29.81	11.83	52	31	1.95	.08	.04	.01	-.01	.05
France	5,133	1	27.74	10.43	54	43	1.94	.07	.07	.04	.03	.06
United Kingdom	118,820	11	25.02	10.55	55	44	1.91	.11	.06	.06	-.02	.02
Spain	104,528	9	23.57	8.72	65	27	1.90	.08	.09	-.03	.02	.05
Belgium	14,230	1	26.54	10.85	45	30	1.76	.06	.06	.06	.00	.04
Denmark	4,909	< 1	27.49	10.04	47	53	1.76	.10	.06	.05	.00	.12
Norway	12,511	1	27.49	10.38	57	42	1.69	.10	.00	.08	.00	.07
Sweden	11,929	1	27.5	10.63	55	44	1.67	.06	.02	.09	.01	.06

**Note.** Countries are ordered according to their country-level religiosity. agr = Agreeableness, cns = Conscientiousness, opn = Openness, ext = Extraversion, neu = Neuroticism. All personality-religiosity correlations controlled for the other four personality traits.



**Table 2.** Example items and internal consistency of each BFI scale (Studies 1-3).

	example items	internal consistencies (Chronbach's $\alpha$ s)											
		Study 1a				Study 1b	Study 1c	Study 1d	Study 2			Study 3	
		Eng	NL	Ger	Es	Eng	Ger	Eng	Eng	NL	Ger	Es	Eng
Agreeableness	"I see myself as someone who..."												
	"...is considerate and kind to almost everyone." "...has a forgiving nature."	.77	.66	.63	.59	.80	.51	.77	.83	.71	.71	.64	.51
Conscientiousness	"...does a thorough job." "...does things efficiently."	.83	.76	.79	.75	.83	.63	.83	.83	.75	.80	.74	.59
	"...is original, comes up with new ideas." "...has an active imagination."	.76	.74	.75	.75	.79	.62	.80	.84	.76	.79	.76	.62
Extraversion	"...is talkative." "...is outgoing, sociable."	.84	.77	.80	.77	.86	.65	.86	.84	.75	.79	.72	.66
	"...worries a lot." "...gets nervous easily."	.83	.79	.80	.76	.83	.60	.84	.81	.76	.76	.70	.63

**Note.** Eng = English language, NL = Dutch language, Ger = German language, Es = Spanish language. The Study 3 column shows internal consistencies from the second wave only, because results from the first wave are shown in the Study 1c column.

**Table 3.** Measurement invariance tests across countries/states for each BFI scale (Studies 1-3).

		Agreeableness			Conscientiousness			Openness			Extraversion			Neuroticism		
		CFI	RMSEA	SRMR	CFI	RMSEA	SRMR	CFI	RMSEA	SRMR	CFI	RMSEA	SRMR	CFI	RMSEA	SRMR
Study 1a	configural model	.989	.011	--	.986	.014	.078	.981	.012	.060	.994	.018	.079	.958	.016	.060
	metric model	.982	.011	.067	.980	.013	.079	.972	.011	.063	.985	.016	.084	.947	.015	.083
	metric invariance	$\Delta=.007$	$\Delta<.001$	--	$\Delta=.006$	$\Delta=.001$	$\Delta=.001$	$\Delta=.009$	$\Delta=.001$	$\Delta=.003$	$\Delta=.009$	$\Delta=.002$	$\Delta=.005$	$\Delta=.011$	$\Delta=.001$	$\Delta=.023$
Study 1b	configural model	.974	.012	.048	.999	.013	.054	.981	.014	.057	.993	.019	.060	.988	.016	.053
	metric model	.973	.011	.048	.998	.011	.053	.980	.013	.058	.993	.016	.060	.988	.014	.053
	metric invariance	$\Delta=.001$	$\Delta=.001$	$\Delta<.001$	$\Delta=.001$	$\Delta=.002$	$\Delta=.001$	$\Delta=.001$	$\Delta=.001$	$\Delta=.001$	$\Delta<.001$	$\Delta=.003$	$\Delta<.001$	$\Delta<.001$	$\Delta=.002$	$\Delta<.001$
Study 1c	configural model	.992	.012	.011	.996	.012	.015	.997	.009	.015	1.000	.003	.006	.994	.012	.008
	metric model	.982	.011	.019	.992	.009	.030	.993	.008	.023	.997	.006	.028	.992	.008	.019
	metric invariance	$\Delta=.010$	$\Delta=.001$	$\Delta=.008$	$\Delta=.004$	$\Delta=.003$	$\Delta=.015$	$\Delta=.004$	$\Delta=.001$	$\Delta=.008$	$\Delta=.003$	$\Delta=.003$	$\Delta=.022$	$\Delta=.002$	$\Delta=.004$	$\Delta=.011$
Study 1d	configural model	.999	.008	.051	1.000	.008	.049	.976	.011	.070	.997	.012	.068	.993	.009	.048
	metric model	.999	.007	.051	.999	.007	.051	.975	.009	.070	.996	.010	.067	.993	.008	.048
	metric invariance	$\Delta<.001$	$\Delta=.001$	$\Delta<.001$	$\Delta=.001$	$\Delta=.001$	$\Delta=.002$	$\Delta=.001$	$\Delta=.002$	$\Delta<.001$	$\Delta=.001$	$\Delta=.002$	$\Delta=.001$	$\Delta<.001$	$\Delta=.001$	$\Delta<.001$
Study 2	configural model	.994	.014	.041	.997	.017	.075	.973	.015	.053	.992	.022	.074	.996	.019	.058
	metric model	.989	.014	.067	.992	.016	.076	.970	.014	.055	.981	.020	.081	.976	.018	.079
	metric invariance	$\Delta=.005$	$\Delta<.001$	$\Delta=.026$	$\Delta=.005$	$\Delta=.001$	$\Delta=.001$	$\Delta=.003$	$\Delta=.001$	$\Delta=.002$	$\Delta=.011$	$\Delta=.002$	$\Delta=.007$	$\Delta=.020$	$\Delta=.001$	$\Delta=.021$
Study 3	configural model	.991	.013	.019	.982	.024	.003	.995	.011	.006	.997	.011	.016	.998	.008	.015
	metric model	.985	.009	.018	.979	.015	.026	.988	.010	.038	.993	.009	.014	.991	.009	.010
	metric invariance	$\Delta=.006$	$\Delta=.004$	$\Delta=.001$	$\Delta=.003$	$\Delta=.009$	$\Delta=.023$	$\Delta=.007$	$\Delta=.001$	$\Delta=.032$	$\Delta=.004$	$\Delta=.002$	$\Delta=.002$	$\Delta=.007$	$\Delta=.001$	$\Delta=.005$

**Note.** We conducted multi-group confirmatory factor analyses (Raju, Laffitte, & Byrne, 2002). The groups were defined as countries in Studies 1a and 2, as states in Studies 1b, 1c, 3, and as urban areas in Study 1d. Following common practice, we examined each Big Five scale separately (Church, Alvarez, Mai, French, Katigbak, & Ortiz, 2011; Lucas & Donnellan, 2011; Specht, Egloff, & Schmuckle, 2011). Each test compared two models: (1) The *configural model* modeled a given Big Five trait as a latent factor (e.g., Openness) and each of that trait's BFI items as an indicator (e.g., 12 items for Openness). Importantly, the configural model sets no constraints across groups and, thus, allows all scale properties to vary freely across countries/states/areas. (2) The *metric model* is identical to the configural model with one crucial exception. Each indicator's loading on the latent factor is constrained to be equal across groups (Meredith & Horn, 2001). If the fit of the two models is acceptable and if their fit does not substantially differ from each other, the scales are said to possess *metric invariance* (Cheung & Rensvold, 2002) and this specific type of measurement invariance is *necessary and sufficient* to meaningfully interpret differences in Big Five relationships across groups (Horn & McArdle, 1992). Following recommendations regarding measurement invariance testing in large samples (Church et al., 2011; Lucas & Donnellan, 2011), change in model fit between the two models served as the indicator for metric invariance. Recommendations differ as to how small the change in model fit should be in order to speak of measurement invariance. Commonly used cut-off points are  $\Delta \leq .050$  (Little, 1997; Tucker & Lewis, 1973),  $\Delta \leq .022$  (McGaw & Jöreskog, 1971), and  $\Delta \leq .010$  (Cheung & Rensvold, 2002). The table shows that our scales generally met even the more conservative criteria for metric invariance. "--" = the model was not successfully fitted. The Study 3 row shows results from the second wave only, because results from the first wave are shown in the Study 1c row. In Studies 1c and 3 each trait was assessed by only three items. Hence, we needed to avoid full saturation of the configural models in these studies and, therefore, constrained the error of one randomly picked indicator to be equal across groups in the configural and metric models. With an increasing number of indicators, the CFI increasingly underestimates model fit (Kenny & McCoach, 2003). Hence, the CFIs reported for Studies 1a, 1b, 1d and 2 are based on models using four item-parcels as indicators of the latent factor. Parceling was not used in RMSEA and SRMR analyses.

**Table 4.** Demographics, state-level religiosity, and personality–religiosity correlations for the 50 US states in Study 1b.

state	sample size		age (in years)		sex (in %)		state-level	correlation with religiosity				
	<i>N</i>	%	<i>M</i>	<i>SD</i>	female	male	religiosity	agr	cns	opn	ext	neu
Utah	14,024	1	24.47	9.94	57	42	3.37	.20	.11	.00	.03	-.05
Mississippi	7,339	1	25.61	11.05	63	37	3.31	.21	.13	-.03	.08	.00
Alabama	17,435	2	24.68	10.66	64	36	3.25	.23	.12	-.04	.09	-.01
Tennessee	20,252	1	26.29	11.12	63	37	3.15	.20	.12	-.02	.07	-.01
Arkansas	8,777	1	26.30	11.51	64	36	3.14	.22	.09	-.03	.06	-.01
Oklahoma	13,896	1	26.59	10.93	63	36	3.10	.20	.10	-.01	.07	-.02
South Carolina	10,969	1	26.60	11.59	64	36	3.06	.19	.10	-.01	.07	-.02
Georgia	35,497	3	26.22	11.02	64	35	3.01	.21	.10	-.04	.07	.00
Louisiana	10,674	1	25.86	11.11	64	36	2.99	.20	.12	-.03	.08	.00
North Carolina	33,200	3	26.30	11.32	63	36	2.95	.21	.09	-.03	.07	.01
Texas	76,932	7	26.16	11.11	62	38	2.95	.18	.10	-.02	.07	.00
Kentucky	14,018	1	25.74	11.14	61	39	2.93	.20	.09	-.03	.06	.01
South Dakota	3,111	< 1	24.11	10.30	62	38	2.92	.16	.09	.02	.05	-.04
Idaho	6,408	1	24.95	11.26	61	39	2.91	.18	.07	.02	.04	-.01
West Virginia	5,747	1	26.02	11.08	61	38	2.91	.22	.12	.02	.05	.05
North Dakota	2,963	< 1	24.10	10.60	60	40	2.84	.17	.10	.05	.05	-.03
Nebraska	8,568	1	25.44	11.03	60	39	2.83	.18	.12	.03	.03	-.01
Indiana	22,916	2	25.43	10.86	62	38	2.81	.19	.08	.01	.05	-.01
Kansas	11,533	1	25.65	11.00	61	38	2.81	.19	.08	.02	.03	.00
Missouri	24,703	2	26.03	11.30	61	38	2.81	.17	.09	.01	.04	-.01
Virginia	29,213	3	25.54	11.19	61	38	2.75	.18	.10	.00	.06	.01
New Mexico	7,564	1	27.65	11.76	63	36	2.73	.19	.08	-.04	.07	.02
Iowa	12,486	1	24.74	10.90	61	38	2.71	.16	.11	.02	.04	.00
Ohio	39,720	4	24.73	10.99	60	39	2.69	.17	.09	.01	.05	-.01
Florida	52,285	5	25.94	11.64	62	38	2.68	.17	.09	-.01	.04	.00
Minnesota	27,885	3	25.23	10.74	63	37	2.67	.18	.09	.00	.05	.01
Wyoming	1,933	< 1	24.70	11.43	62	38	2.66	.20	.12	.07	.02	.03
Michigan	41,413	4	24.62	10.68	60	40	2.65	.17	.09	.01	.05	.00
Arizona	24,251	2	25.90	11.39	61	39	2.64	.16	.06	.00	.05	-.01
Illinois	47,673	5	24.37	10.35	61	39	2.63	.17	.09	.00	.05	.01
Maryland	18,167	2	25.68	11.23	63	36	2.63	.17	.10	.00	.04	.02
Montana	3,425	< 1	25.70	11.63	62	37	2.61	.13	.07	.02	-.01	.01
Pennsylvania	44,465	4	24.27	10.70	61	39	2.61	.17	.10	.01	.04	.01
Delaware	3,196	< 1	25.13	11.45	64	35	2.59	.19	.05	.03	.04	.04
Wisconsin	30,477	3	23.50	10.45	60	40	2.58	.16	.11	.01	.04	.01
Alaska	3,764	< 1	26.10	12.77	57	42	2.57	.15	.08	.02	.04	.02
Hawaii	5,499	1	25.07	10.75	64	36	2.57	.14	.07	.00	.07	.00
Washington	30,349	3	26.70	11.92	61	39	2.56	.16	.07	-.02	.05	.00
Oregon	17,329	2	26.06	11.69	62	38	2.55	.15	.08	-.04	.04	-.01
Colorado	18,813	2	25.89	11.39	60	40	2.53	.15	.06	-.01	.04	-.01
Nevada	6,595	1	26.84	12.00	61	39	2.51	.16	.08	.01	.04	.01

California	11,5192	11	25.79	11.34	61	39	2.50	.15	.07	-.02	.06	.01
New Jersey	24,489	2	24.39	10.98	60	40	2.43	.16	.10	.02	.04	.01
Connecticut	10,349	1	25.23	11.59	59	41	2.39	.17	.09	.03	.02	.02
New York	51,077	5	24.83	10.50	61	39	2.33	.14	.09	.01	.03	.00
Rhode Island	2,840	< 1	25.16	11.01	60	40	2.29	.13	.08	.06	.04	.03
Maine	4,939	1	25.78	11.97	62	38	2.26	.10	.08	.07	-.01	-.03
Massachusetts	25,290	2	24.28	10.33	60	39	2.19	.11	.07	.02	.03	.00
New Hampshire	5,034	1	25.45	11.55	61	39	2.16	.13	.02	.06	.02	.03
Vermont	2,668	< 1	25.91	11.63	63	37	2.10	.10	.08	.08	.03	.01

**Note.** States are ordered according to their state-level religiosity. agr = Agreeableness, cns = Conscientiousness, opn = Openness, ext = Extraversion, neu = Neuroticism. All personality-religiosity correlations controlled for the other four personality traits.

**Table 5.** Demographics, state-level religiosity, and personality–religiosity correlations for the 15 German federal states in Study 1c.

federal state	sample size		age (in years)		sex (in %)		state-level religiosity	correlation with religiosity				
	<i>N</i>	%	<i>M</i>	<i>SD</i>	female	male		agr	cns	opn	ext	neu
Bavaria	2,929	14	46.81	17.19	53	47	2.04	.07	.07	-.03	-.04	.02
Baden-Wuerttemberg	2,530	12	45.69	17.41	52	48	1.91	.07	.07	.00	-.06	.04
Rhineland-Palatinate & Saarland	1,255	6	48.33	17.83	53	47	1.91	.07	.04	-.01	-.05	-.03
North Rhine-Westphalia	4,386	21	47.79	17.49	52	48	1.85	.13	.01	.00	-.05	.03
Lower Saxony	1,833	9	47.70	17.91	52	48	1.80	.11	.06	-.01	-.03	-.02
Hesse	1,395	7	46.96	16.65	52	48	1.78	.10	.05	.07	-.05	.07
Schleswig-Holstein	645	3	49.29	17.97	53	47	1.74	-.01	.15	.07	-.08	-.09
Bremen	148	1	48.14	18.48	57	43	1.59	.06	-.02	.03	.02	.12
Hamburg	296	1	47.26	18.12	52	48	1.57	.08	.05	-.03	-.01	-.04
Thuringia	892	4	47.32	17.86	52	48	1.48	.02	.02	.11	-.03	.09
Saxony	1,524	7	47.31	17.69	51	49	1.41	.05	-.04	.14	-.08	.05
Berlin	774	4	46.41	17.21	52	48	1.37	.02	.04	.02	-.06	.00
Saxony-Anhalt	888	4	48.25	17.99	53	47	1.33	.09	.01	.09	-.03	.02
Brandenburg	886	4	48.11	17.62	53	47	1.31	-.03	.01	.05	.01	.06
Mecklenburg-Vorpommern	504	2	47.92	17.71	54	46	1.27	.08	.00	.03	-.08	.04

**Note.** States are ordered according to their state-level religiosity. agr = Agreeableness, cns = Conscientiousness, opn = Openness, ext = Extraversion, neu = Neuroticism. All personality-religiosity correlations controlled for the other four personality traits.

**Table 6.** Demographics, state-level religiosity, and personality–religiosity correlations for the 121 UK urban areas in Study 1d.

urban area	sample size		age (in years)		sex (in %)		area-level religiosity	correlation with religiosity				
	N	%	M	SD	female	male		agr	ens	opn	ext	neu
Harrow	2267	< 1	33.15	13.21	63	37	2.32	.15	.02	-.02	.07	.02
Belfast	7776	< 1	32.67	12.19	61	39	2.29	.15	.10	-.04	.03	.04
Ilford	1314	< 1	32.95	13.36	65	36	2.23	.21	-.01	-.01	.03	.05
Outer Hebrides	128	< 1	35.62	12.97	56	45	2.19	.14	.21	.08	-.14	.03
Uxbridge	1367	< 1	32.62	12.46	63	37	2.18	.16	.00	.04	.04	.05
North West London	3481	< 1	31.43	10.92	63	37	2.01	.13	.01	-.08	-.02	.00
Watford	1779	< 1	35.69	13.39	64	36	1.99	.10	.07	.02	-.01	.03
Croydon	2240	< 1	35.42	13.56	65	36	1.94	.10	.02	.02	.07	.05
Blackburn	1898	< 1	36.03	14.19	64	36	1.92	.12	.07	.05	.06	.03
Luton	1882	< 1	36.09	13.34	62	38	1.91	.14	.03	.01	.04	-.01
Birmingham	9785	< 1	34.52	13.25	64	36	1.9	.13	.01	.02	.01	.02
East London	5081	< 1	31.84	10.68	62	39	1.89	.13	-.01	-.08	-.02	-.01
Slough	2438	< 1	36.73	13.7	64	37	1.89	.12	.01	.00	.03	.05
Motherwell	1442	< 1	35.2	12.75	64	36	1.87	.13	.05	.04	.06	.10
Romford	2020	< 1	34.9	13.39	65	35	1.87	.06	.04	.07	.02	.05
Western Central London	485	< 1	31.21	10.84	63	37	1.87	.06	.08	-.07	-.02	-.02
Bradford	2395	< 1	35.88	13.94	64	36	1.85	.13	-.02	-.02	.04	.05
Enfield	1873	< 1	35.36	13.49	66	34	1.84	.08	.04	.05	.03	.02
Sutton	1407	< 1	36.36	14.14	65	35	1.84	.11	.01	.03	-.02	.05
Bolton	1649	< 1	36	14.1	62	38	1.83	.14	.02	.03	.06	.07
Twickenham	3488	< 1	35.6	13.68	64	36	1.83	.10	.01	-.01	.01	.08
Oldham	1612	< 1	35.7	13.42	64	36	1.82	.11	.01	.00	.05	.10
Liverpool	4285	< 1	33.46	13.13	62	38	1.8	.12	.06	.02	.03	.07
Leicester	5919	< 1	35.17	13.89	64	36	1.8	.12	.06	.02	.03	.04
Bromley	2192	< 1	35.86	14.17	65	35	1.79	.08	.04	.03	.03	.05
Hemel Hempstead	3987	< 1	36.41	14.12	64	36	1.79	.09	.02	.00	.05	.03
Lancaster	1995	< 1	35.83	13.97	66	34	1.79	.13	.05	-.01	.01	.03
Preston	2802	< 1	36.38	14.2	61	39	1.79	.13	.02	.03	.04	.08
Tonbridge	4989	< 1	39.05	15.02	65	35	1.79	.15	.05	.05	.00	.03
Wolverhampton	1595	< 1	35.44	13.69	66	34	1.79	.08	-.02	.00	.03	.05
Durham	1544	< 1	35.05	14.03	61	39	1.78	.10	.05	.01	.05	.02
Wigan	1141	< 1	35.23	13.43	64	36	1.78	.12	.08	.06	.05	.11
Walsall	1854	< 1	35.49	13.39	65	35	1.78	.13	.05	.04	.01	.06
St Albans	2332	< 1	36.23	13.52	63	37	1.77	.10	.04	.04	.07	.09
Glasgow	7381	< 1	33.42	12.39	63	38	1.77	.09	.04	-.03	.06	.03
Harrogate	1032	< 1	37.75	14.58	65	35	1.77	.12	.07	.04	.10	.08
Paisley	1620	< 1	36.85	13.97	66	34	1.77	.07	.12	-.01	.01	.05
South East London	6908	< 1	33.11	11.42	64	36	1.77	.10	.01	-.05	.00	.00
Coventry	5381	< 1	35.6	13.79	64	36	1.76	.11	.03	.04	.02	.05
Dudley	1800	< 1	36.54	14.3	64	36	1.76	.12	-.01	.02	.05	.06
Redhill	4123	< 1	37.97	13.87	64	36	1.76	.13	.03	.05	.01	.07
South West London	7505	< 1	32.57	10.91	63	37	1.76	.11	.00	-.01	.00	.05
West London	4332	< 1	33.46	11.95	61	39	1.76	.11	.00	-.03	.04	.06

Cambridge	4349	< 1	35.56	13.45	65	35	1.75	.13	.05	.01	.00	.04
Dartford	2489	< 1	36.78	14.32	67	33	1.75	.11	.03	.03	-.01	.02
Guildford	6288	< 1	37.12	14	64	37	1.75	.15	.02	.04	.01	.04
Hereford	1032	< 1	37.96	14.98	65	35	1.75	.13	.00	.06	.02	.04
Oxford	5287	< 1	35.5	13.48	66	35	1.75	.12	.02	.05	-.01	.01
Sunderland	756	< 1	35.07	13.14	64	36	1.75	.10	.10	.06	.07	.07
Warrington	3168	< 1	35.79	13.52	64	36	1.75	.06	.02	.02	.04	.06
Cardiff	6107	< 1	34.13	12.89	63	37	1.74	.13	.06	-.01	.04	.06
Chelmsford	4592	< 1	37.11	14.16	64	36	1.74	.13	.02	.04	.01	.03
Kingston upon Thames	4434	< 1	36.38	13.73	64	36	1.74	.13	.02	.01	.01	.05
Swansea	3834	< 1	35.51	14.4	63	37	1.74	.09	.04	.03	.03	.08
Dorchester	1455	< 1	39.36	15.43	63	37	1.73	.14	.06	.01	-.02	.03
Inverness	1282	< 1	37.44	13.76	66	34	1.73	.14	.05	.03	.00	.02
North London	6216	< 1	32.39	11.01	64	36	1.73	.09	.01	-.07	.02	.01
Stockport	3866	< 1	37.13	14.31	63	37	1.73	.10	.05	.00	.01	.02
Stoke-on-Trent	3084	< 1	36.08	13.86	62	38	1.73	.10	.04	.05	.02	.09
Zetland	163	< 1	35.96	11.7	65	35	1.73	.08	.04	-.11	.04	-.02
Bath	3316	< 1	36.41	14.39	64	36	1.72	.11	.02	.04	.02	.05
The Fylde	1221	< 1	37.3	14.91	61	39	1.72	.11	.02	.01	.03	.09
Manchester	6688	< 1	32.1	12.18	60	40	1.72	.10	.05	-.02	.02	.04
Milton Keynes	4090	< 1	37	13.87	65	36	1.72	.13	.02	.01	-.01	.01
Southampton	5314	< 1	36.22	14.24	65	35	1.72	.15	.06	.05	.00	.02
York	3711	< 1	35.86	14.21	65	35	1.72	.11	.02	.02	.01	.03
Chester	4029	< 1	35.82	14.39	63	37	1.71	.08	.05	.05	.04	.06
Derby	4263	< 1	37.04	13.46	64	36	1.71	.12	.01	.06	.03	.04
Darlington	1674	< 1	37.26	14.25	65	35	1.71	.14	.08	.04	.02	.07
Kilmarnock	1534	< 1	37.65	13.82	65	35	1.71	.11	.04	.01	.05	.01
Nottingham	7037	< 1	35.16	13.43	63	37	1.71	.12	.02	.04	.03	.05
Northampton	4319	< 1	36.66	13.55	64	36	1.71	.13	.03	.02	.04	.07
Swindon	3452	< 1	37.87	13.64	63	37	1.71	.13	.00	.06	.01	.04
Salisbury Plain	1584	< 1	38.67	14.26	67	33	1.71	.17	.02	-.01	.00	.04
Southend-on-Sea	2889	< 1	37.01	14.64	64	36	1.71	.10	.03	.06	.02	.05
Taunton	2028	< 1	39.05	15.06	66	34	1.71	.12	-.04	.04	-.01	.01
Gloucester	4618	< 1	37.33	14.47	65	35	1.7	.12	.04	.04	.02	.02
Ipswich	3764	< 1	37.7	14.43	65	35	1.7	.12	.02	.03	.04	.04
Peterborough	5087	< 1	37.88	14.27	65	35	1.7	.12	.03	.07	.03	.06
Reading	7005	< 1	36.53	13.45	63	37	1.7	.13	.02	.03	.04	.07
Torquay	1730	< 1	39.71	15.08	68	33	1.7	.12	.02	.07	-.03	.01
Truro	1935	< 1	37.52	14.62	66	34	1.7	.11	.03	.01	-.01	.03
Wakefield	1861	< 1	36.88	13.5	65	35	1.7	.14	.04	.01	-.02	.06
Bournemouth	3839	< 1	37.34	14.95	65	35	1.69	.12	.06	.02	.04	.06
Falkirk	1420	< 1	36.04	12.76	63	37	1.69	.11	.11	.06	.05	.04
Medway	3926	< 1	37.49	14.63	64	36	1.69	.14	.02	.05	.02	.04
Perth	1043	< 1	37.9	14.52	65	35	1.69	.08	.08	.07	.08	.07
Exeter	3642	< 1	38.52	14.97	66	35	1.68	.13	.04	.04	-.03	.06
Newcastle upon Tyne	6104	< 1	35.33	13.83	63	37	1.68	.10	.03	.01	.04	.04
Teviotdale	655	< 1	36.7	15.12	69	31	1.68	.07	.02	.05	.03	.02
Carlisle	1401	< 1	36.36	14.14	66	35	1.67	.12	.05	.05	.01	.02
Dumfries and Galloway	625	< 1	38.17	15.28	70	30	1.67	.14	.02	-.04	.02	.01

Doncaster	2873	< 1	37.13	14.36	64	36	1.67	.09	.01	.07	-.01	.05
East Central London	499	< 1	33.36	10.63	54	47	1.67	.12	.01	-.08	.05	.00
Kirkcaldy	2064	< 1	35.81	13.76	64	36	1.67	.12	.02	.04	.00	.01
Plymouth	3721	< 1	36.77	14.44	66	34	1.67	.10	.02	.06	.00	.05
Teesside	2423	< 1	36.13	13.93	63	37	1.67	.10	.05	.05	.05	.04
Worcester	2112	< 1	37.38	14.4	65	35	1.67	.11	.04	.06	-.02	.04
Aberdeen	3429	< 1	34.6	12.81	65	35	1.66	.12	.01	.01	.00	.04
Bristol	8055	< 1	34.98	13.17	62	38	1.66	.13	.05	.03	-.02	.05
Canterbury	3613	< 1	37.68	15.02	65	35	1.66	.13	.01	.04	.02	.01
Crewe	1774	< 1	37.89	14.43	64	36	1.66	.13	.02	.06	.02	.04
Edinburgh	7122	< 1	34.28	12.59	65	35	1.66	.11	.04	.01	.03	.02
Huddersfield	1524	< 1	36.98	14.09	63	37	1.66	.12	.01	.03	-.01	.04
Sheffield	6802	< 1	34.64	13.62	64	36	1.66	.11	.05	.03	.02	.05
Colchester	2488	< 1	37.08	14.33	65	36	1.65	.10	.02	.03	.01	.05
Dundee	1907	< 1	33.16	13.07	67	33	1.65	.11	.01	-.01	.02	-.02
Leeds	5416	< 1	33.46	12.84	61	39	1.65	.10	.03	.03	.04	.05
Newport	2338	< 1	36.01	13.91	63	37	1.65	.12	.04	.05	-.02	.04
Norwich	4663	< 1	37.36	14.09	65	35	1.65	.10	.03	.04	.00	.05
Stevenage	3317	< 1	37.51	13.68	65	35	1.65	.11	-.01	.03	.01	.05
Telford	1108	< 1	36.94	13.81	65	35	1.65	.13	.00	.06	.02	.05
Llandudno	2631	< 1	36.34	14.53	65	35	1.64	.09	.08	.03	.03	.04
Portsmouth	5344	< 1	38.03	14.43	64	37	1.64	.10	.03	.06	-.02	.02
Hull	2020	< 1	35.96	13.86	63	37	1.63	.11	.02	.04	-.01	.06
Lincoln	1932	< 1	36.85	14.48	65	35	1.63	.11	.06	.08	.01	.06
Shrewsbury	2193	< 1	36.29	14.74	67	33	1.62	.10	.02	.04	.01	.03
Brighton	6838	< 1	36.44	14.01	64	36	1.6	.10	.04	.02	.01	.06
Llandrindod Wells	296	< 1	37.75	16.16	67	33	1.6	.19	.05	.05	.05	-.02
Halifax	800	< 1	37.34	14.13	65	35	1.57	.08	-.01	.03	.04	.03
Kirkwall	283	< 1	37.92	13.84	61	39	1.55	.11	.04	.08	.06	.09

**Note.** Urban areas are ordered according to their area-level religiosity. agr = Agreeableness, cns = Conscientiousness, opn = Openness, ext = Extraversion, neu = Neuroticism. All personality-religiosity correlations controlled for the other four personality traits.



**Table 7.** Omnibus relationships between each of the Big Five and religiosity for Studies 1-3.

criterion: religiosity predictors:	Study 1a ( <i>df</i> = 1,129,322)				Study 1b ( <i>df</i> = 1,057,330)				Study 1c ( <i>df</i> = 20,860)				Study 1d ( <i>df</i> = 386,184)			
	$\beta$	<i>SE</i>	<i>t</i>	<i>p</i>	$\beta$	<i>SE</i>	<i>t</i>	<i>p</i>	$\beta$	<i>SE</i>	<i>t</i>	<i>p</i>	$\beta$	<i>SE</i>	<i>t</i>	<i>p</i>
Agreeableness	.15	.001	131.00	< .001	.17	.001	166.1	< .001	.06	.008	7.79	< .001	.12	.002	68.11	< .001
Conscientiousness	.10	.001	86.82	< .001	.09	.001	88.07	< .001	.03	.008	3.11	.002	.03	.002	18.37	< .001
Openness	-.005	.001	-4.33	< .001	-.005	.001	-5.49	< .001	.03	.008	4.08	< .001	.02	.002	11.21	< .001
Extraversion	.03	.001	29.02	< .001	.05	.001	50.82	< .001	-.04	.008	-5.17	< .001	.02	.002	10.56	< .001
Neuroticism	.04	.001	35.92	< .001	.001	.001	0.66	.51	.02	.008	3.02	.002	.04	.002	22.48	< .001
criterion: religiosity predictors:	Study 1a-1d ( <i>df</i> = 2,593,805)				Study 2 ( <i>df</i> = 544,465)				Study 2b* ( <i>df</i> = 544,456)				Study 3 ( <i>df</i> = 14,844)			
	$\beta$	<i>SE</i>	<i>t</i>	<i>p</i>	$\beta$	<i>SE</i>	<i>t</i>	<i>p</i>	$\beta$	<i>SE</i>	<i>t</i>	<i>p</i>	$\beta$	<i>SE</i>	<i>t</i>	<i>p</i>
Agreeableness	.14	.001	218.30	< .001	.10	.002	63.32	< .001	.09	.001	64.46	< .001	.01	.006	1.7	.09
Conscientiousness	.08	.001	119.45	< .001	.08	.001	56.07	< .001	.05	.001	42.71	< .001	.003	.007	0.46	.64
Openness	.003	.001	50.19	< .001	-.03	.001	-24.01	< .001	-.04	.001	-27.63	< .001	.01	.007	2.18	.03
Extraversion	.003	.001	4.03	< .001	.04	.001	31.85	< .001	.04	.001	32.5	< .001	-.006	.007	-0.91	.37
Neuroticism	.02	.001	35.55	< .001	.07	.001	45.77	< .001	.07	.001	55.72	< .001	.006	.006	0.99	.32

**Note.** \* = “2b” refers to Study 2 analyses including informants’ own Big Five traits and their own religiosity as covariates.

**Table 8.** Cross-level interactions between each of the Big Five and socio-cultural religiosity on individual religiosity for Studies 1-3.

criterion: religiosity predictors:	Study 1a ( <i>df</i> = 1,129,322)				Study 1b ( <i>df</i> = 1,057,330)				Study 1c ( <i>df</i> = 20,860)				Study 1d ( <i>df</i> = 386,184)			
	$\beta$	<i>SE</i>	<i>t</i>	<i>p</i>	$\beta$	<i>SE</i>	<i>t</i>	<i>p</i>	$\beta$	<i>SE</i>	<i>t</i>	<i>p</i>	$\beta$	<i>SE</i>	<i>t</i>	<i>p</i>
Agreeableness × soc-cult religiosity	.10	.002	39.05	< .001	.04	.004	10.78	< .001	.11	.03	3.71	< .001	.12	.001	8.84	< .001
Conscientiousness × soc-cult religiosity	.08	.002	33.91	< .001	.09	.001	88.07	< .001	.09	.03	3.05	.002	.05	.01	3.45	< .001
Openness × soc-cult religiosity	-.05	.002	-19.2	< .001	-.04	.004	-10.6	< .001	-.13	.03	-4.26	< .001	-.11	.01	-8.60	< .001
Extraversion × soc-cult religiosity	.04	.002	16.62	< .001	.04	.004	9.57	< .001	-.03	.03	-1.07	.29	.04	.01	2.97	.003
Neuroticism × soc-cult religiosity	.007	.002	2.98	.003	-.02	.004	-5.7	< .001	-.02	.03	-0.84	.40	-.001	.01	-.004	.997
criterion: religiosity predictors:	Study 1a-1d ( <i>df</i> = 2,593,805)				Study 2 ( <i>df</i> = 544,465)				Study 2b* ( <i>df</i> = 544,456)				Study 3 ( <i>df</i> = 14,844)			
	$\beta$	<i>SE</i>	<i>t</i>	<i>p</i>	$\beta$	<i>SE</i>	<i>t</i>	<i>p</i>	$\beta$	<i>SE</i>	<i>t</i>	<i>p</i>	$\beta$	<i>SE</i>	<i>t</i>	<i>p</i>
Agreeableness × soc-cult religiosity	.08	.002	50.17	< .001	.09	.005	19.57	< .001	.06	.004	15.88	< .001	.05	.02	2.06	.04
Conscientiousness × soc-cult religiosity	.07	.002	42.24	< .001	.07	.004	15.41	< .001	.03	.004	9.15	< .001	.07	.03	2.68	.008
Openness × soc-cult religiosity	-.04	.002	-25.21	< .001	-.03	.004	-6.72	< .001	-.02	.004	-6.08	< .001	-.06	.03	-2.48	.01
Extraversion × soc-cult religiosity	.04	.002	26.82	< .001	.06	.004	12.93	< .001	.03	.001	8.74	< .001	-.02	.03	-0.92	.36
Neuroticism × soc-cult religiosity	-.03	.002	-17.68	< .001	-.001	.004	-0.48	.63	.01	.004	3.43	< .001	.02	.02	0.63	.53

**Note.** soc-cult = socio-cultural; \* = “2b” refers to Study 2 analyses including informants’ own Big Five traits and their own religiosity as covariates.

**Table 9.** Informants' demographics, country-level religiosity, and personality–religiosity correlations for the 37 countries in Study 2.

country	sample size		age (in years)		sex (in %)		country-level religiosity	correlation with religiosity				
	<i>N</i>	%	<i>M</i>	<i>SD</i>	female	male		agr	cns	ext	opn	neu
Philippines	3,309	1	21.68	6.83	73	26	3.24	.15	.14	.00	.04	.06
Dominican Republic	2,451	1	22.65	7.62	65	20	3.11	.16	.09	.02	.03	.06
India	3,889	1	24.56	7.02	49	50	3.11	.07	.09	.06	-.05	.17
El Salvador	1,414	< 1	23.45	7.86	57	26	3.07	.16	.15	.07	-.01	.06
Paraguay	1,149	< 1	23.34	8.18	52	23	3.00	.13	.06	.03	.01	.06
Malaysia	1,557	< 1	23.20	7.53	66	34	2.97	.06	.11	.00	.01	.08
Guatemala	2,041	< 1	23.68	7.74	57	27	2.95	.19	.09	.04	-.02	.06
Puerto Rico	1,231	< 1	27.34	10.74	61	23	2.95	.20	.12	.08	.02	.11
Venezuela	7,670	1	22.35	8.51	67	23	2.94	.17	.13	.05	-.03	.07
Peru	8,102	2	23.13	8.20	59	27	2.91	.17	.11	.08	-.03	.07
Colombia	13,775	3	22.20	7.83	61	25	2.90	.15	.14	.05	-.06	.08
Ecuador	2,420	< 1	23.48	8.09	55	24	2.90	.13	.14	.05	-.08	.06
Bolivia	2,428	< 1	22.74	6.98	58	28	2.88	.12	.15	.04	-.04	.05
Costa Rica	2,209	< 1	23.77	8.53	56	25	2.82	.17	.09	.08	-.06	.06
Singapore	1,971	< 1	22.34	8.14	64	36	2.74	.07	.09	.08	-.02	.05
Chile	19,301	4	22.83	9.02	65	24	2.70	.18	.13	.05	-.09	.08
Mexico	52,727	10	22.74	7.51	56	29	2.63	.16	.12	.04	-.09	.06
USA	171,700	32	26.85	11.77	65	35	2.61	.08	.08	.06	-.03	.06
Argentina	42,684	8	23.19	8.59	64	24	2.43	.12	.09	.03	-.05	.04
China	1,322	< 1	27.64	7.86	62	36	2.41	.01	.03	.04	.09	.09
Italy	1,116	< 1	29.21	10.19	55	38	2.35	-.03	.01	.01	-.02	.05
Uruguay	2,688	< 1	23.73	9.78	64	23	2.25	.10	.12	.01	-.05	.10
Canada	17,025	3	25.89	11.50	62	38	2.22	.05	.04	.03	.00	.09
Ireland	1,647	< 1	24.84	8.94	61	38	2.22	.04	.11	.00	-.05	.11
Australia	7,634	1	26.84	11.71	60	39	2.18	.05	.05	.01	-.03	.08
Switzerland	5,278	1	29.58	13.22	41	31	2.14	.10	.01	.05	-.01	.10
Austria	3,707	1	27.29	11.13	48	30	2.13	.08	.05	.01	.02	.05
New Zealand	3,094	1	26.57	11.86	65	35	2.08	.11	.04	-.01	.06	.10
Finland	1,429	< 1	24.52	8.75	65	34	2.07	.06	.01	.05	.02	.17
France	1,081	< 1	28.46	10.83	58	36	2.07	.02	-.07	.05	-.05	.06
Germany	33,350	6	28.65	11.45	48	32	2.04	.09	.05	.04	.01	.09
Netherlands	40,098	7	31.00	12.21	52	29	2.01	.07	.04	-.02	-.01	.07
Spain	54,420	10	23.44	8.79	64	28	2.00	.05	.09	.03	-.07	.07
United Kingdom	19,031	4	25.69	10.74	55	44	1.95	.03	.05	.02	.01	.07
Norway	1,257	< 1	28.33	10.07	52	47	1.88	-.03	.02	-.02	-.04	.16
Belgium	6,454	1	27.53	11.41	42	24	1.82	.02	.05	-.02	.00	.05
Sweden	1,853	< 1	28.56	10.84	54	45	1.74	-.02	-.02	.03	.05	.14

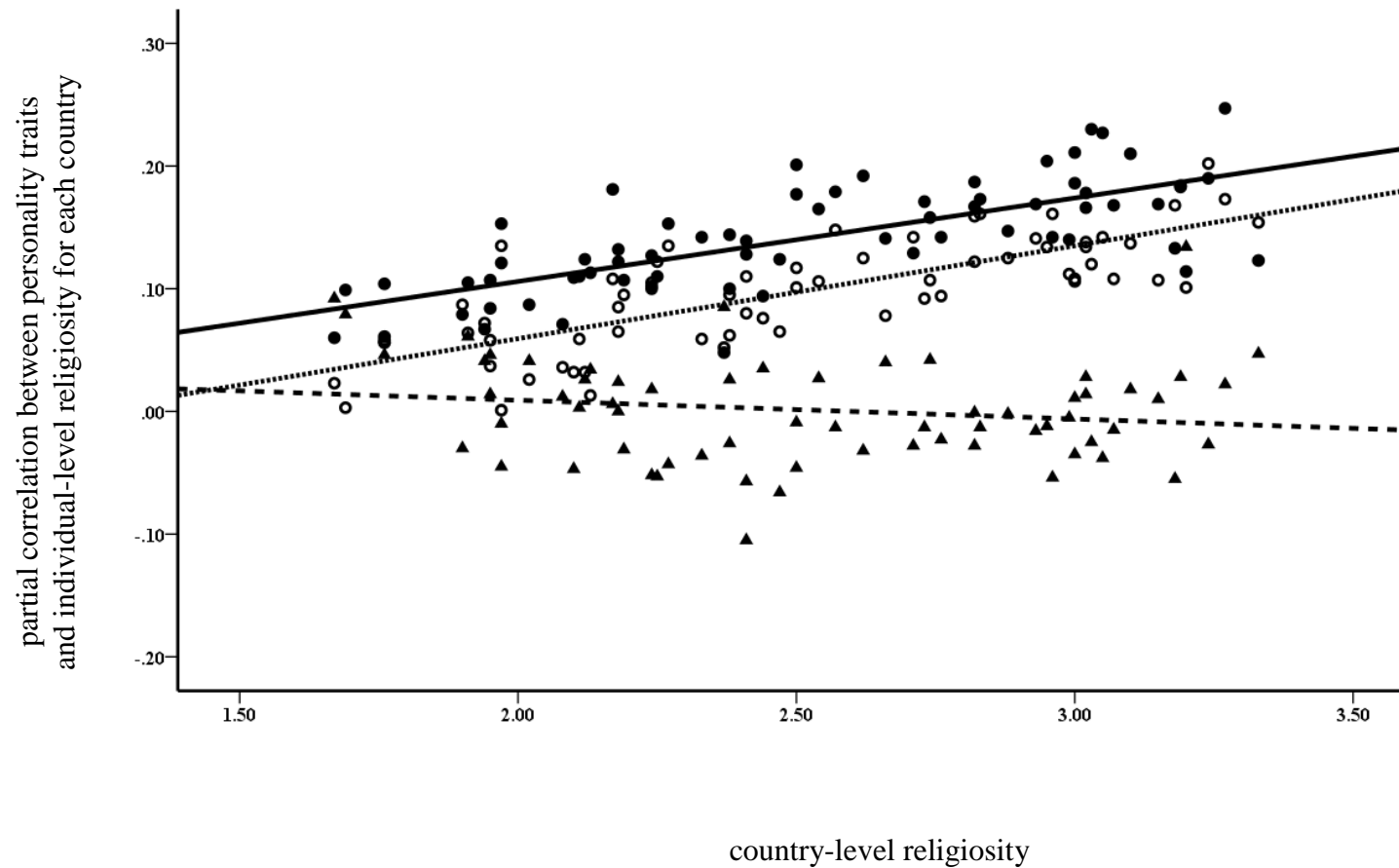
**Note.** Countries are ordered according to their country-level of religiosity. agr = Agreeableness, cns = Conscientiousness, opn = Openness, ext = Extraversion, neu = Neuroticism. All personality-religiosity correlations controlled for the other four personality traits.

**Table 10.** Demographics, state-level religiosity, and personality–religiosity correlations for the 15 German federal states in Study 3.

federal state	sample size		age (in years)		sex (in %)		state-level religiosity	longitudinal correlation with religiosity				
	<i>N</i>	%	<i>M</i>	<i>SD</i>	female	male		agr	cns	opn	ext	neu
Bavaria	2,094	14	46.93	17.28	53	47	2.05	.03	.03	-.03	-.04	.01
Baden-Wuerttemberg	1,698	11	45.84	17.5	52	48	1.90	.02	.04	-.02	.00	-.03
Rhineland-Palatinate & Saarland	868	6	48.39	17.85	55	45	1.89	.03	.01	.08	-.03	-.01
North Rhine-Westphalia	3,065	21	47.82	17.56	52	48	1.82	.03	.01	.00	.01	.02
Lower Saxony	1,318	9	47.77	17.94	52	48	1.79	.03	.05	.01	-.02	.02
Hesse	990	7	47.04	16.69	53	47	1.78	.00	.01	-.02	-.01	.04
Schleswig-Holstein	414	3	49.34	17.94	53	47	1.63	.15	-.13	.02	.05	.10
Hamburg	201	1	47.52	18.23	52	48	1.54	-.02	.11	-.04	.05	.07
Bremen	105	1	48	18.52	57	43	1.53	.03	-.09	.05	-.03	-.01
Thuringia	683	5	47.25	17.85	53	47	1.46	-.06	.02	.06	-.04	-.03
Saxony	1,141	8	47.51	17.8	51	48	1.44	.00	-.01	.04	.00	-.01
Berlin	558	4	46.41	17.21	54	46	1.40	-.03	-.03	-.03	.02	.00
Brandenburg	677	5	48.12	17.69	53	47	1.34	-.01	.01	.01	-.04	-.03
Saxony-Anhalt	660	4	48.38	18.03	54	46	1.33	.01	-.02	.05	-.02	-.02
Mecklenburg-Vorpommern	386	3	47.95	17.71	54	46	1.29	.03	.02	.06	.02	-.01

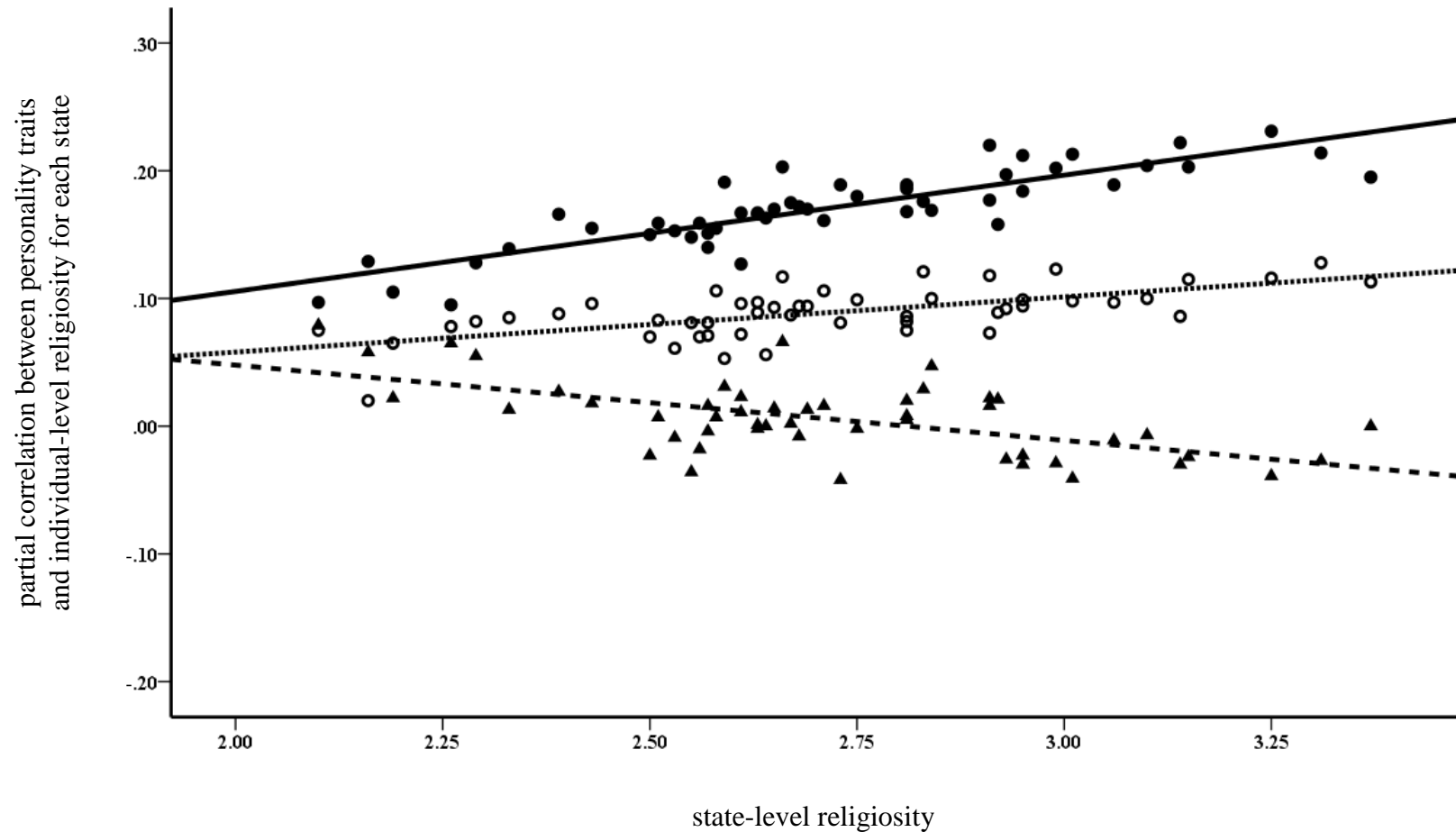
**Note.** States are ordered according to their state-level religiosity. agr = Agreeableness, cns = Conscientiousness, opn = Openness, ext = Extraversion, neu = Neuroticism. All personality–religiosity correlations controlled for the other four personality traits.

**Figure 1.** Partial correlations between Agreeableness/Conscientiousness/Openness and individual-level religiosity for each country of Study 1a as a function of country-level religiosity.



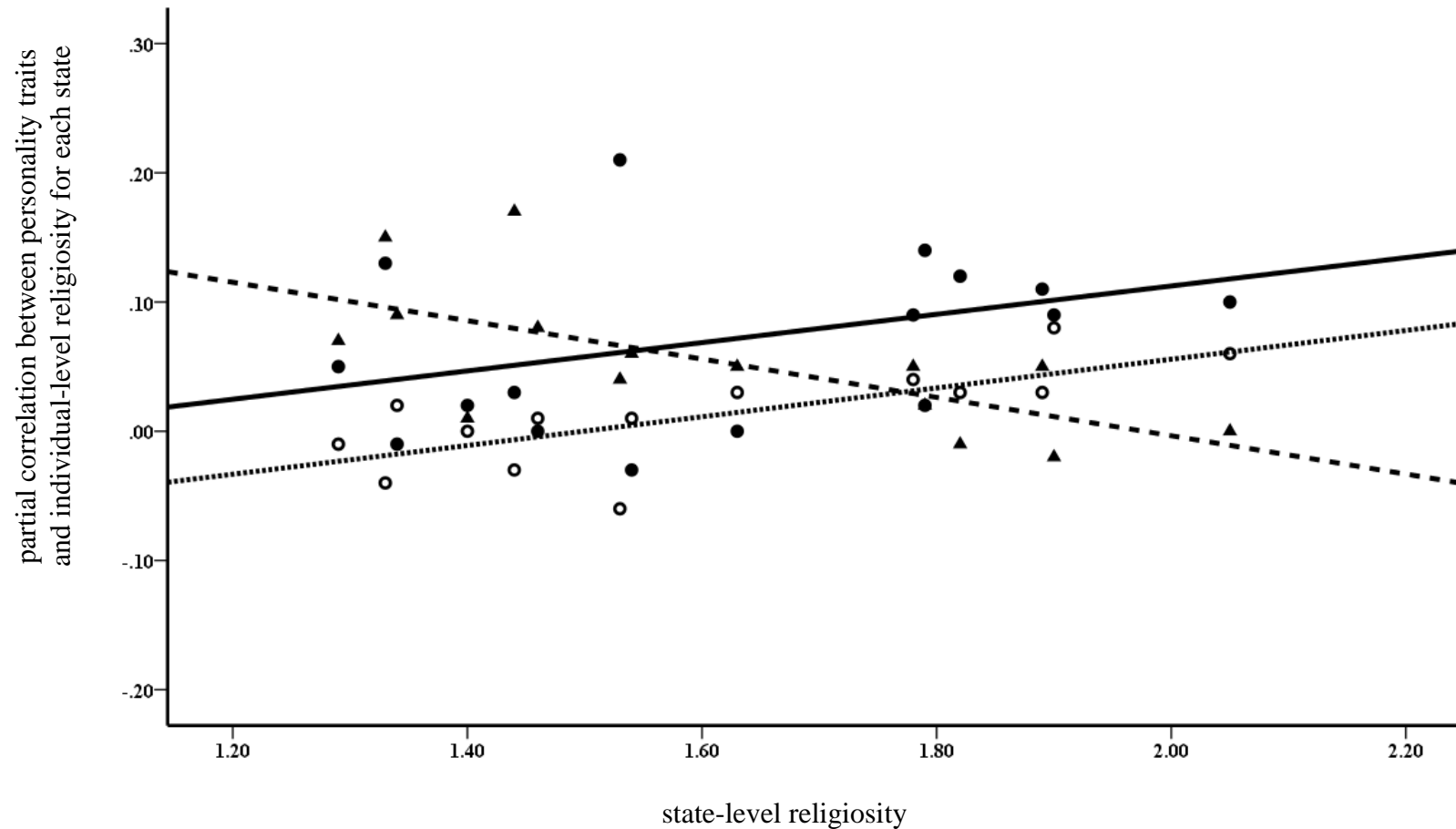
**Note.** ● = Agreeableness-religiosity relationship of each country, including their best fitting regression line over all countries (——); ○ = Conscientiousness-religiosity relationship of each country, including their best fitting regression line over all countries (.....); ▲ = Openness-religiosity relationship of each country, including their best fitting regression line over all countries (— —).

**Figure 2.** Partial correlations between Agreeableness/Conscientiousness/Openness and individual-level religiosity for each state of Study 1b as a function of state-level religiosity.



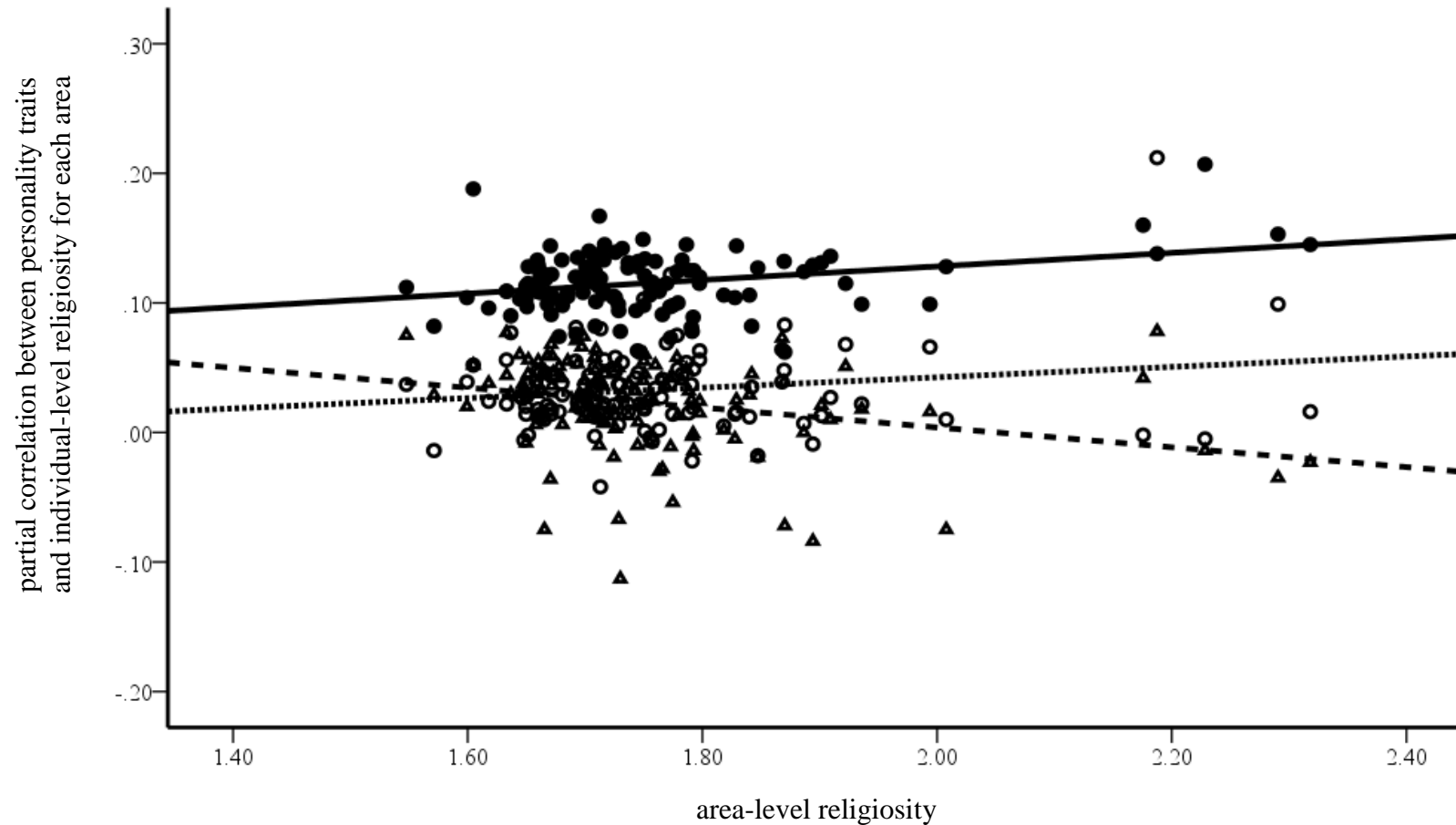
**Note.** ● = Agreeableness-religiosity relationship of each state, including their best fitting regression line over all states (—); ○ = Conscientiousness-religiosity relationship of each state, including their best fitting regression line over all states (.....); ▲ = Openness-religiosity relationship of each state, including their best fitting regression line over all states (— —).

**Figure 3.** Partial correlations between Agreeableness/Conscientiousness/Openness and individual-level religiosity for each state of Study 1c as a function of state-level religiosity.



**Note.** ● = Agreeableness-religiosity relationship of each state, including their best fitting regression line over all states (—); ○ = Conscientiousness-religiosity relationship of each state, including their best fitting regression line over all states (.....); ▲ = Openness-religiosity relationship of each state, including their best fitting regression line over all states (— —).

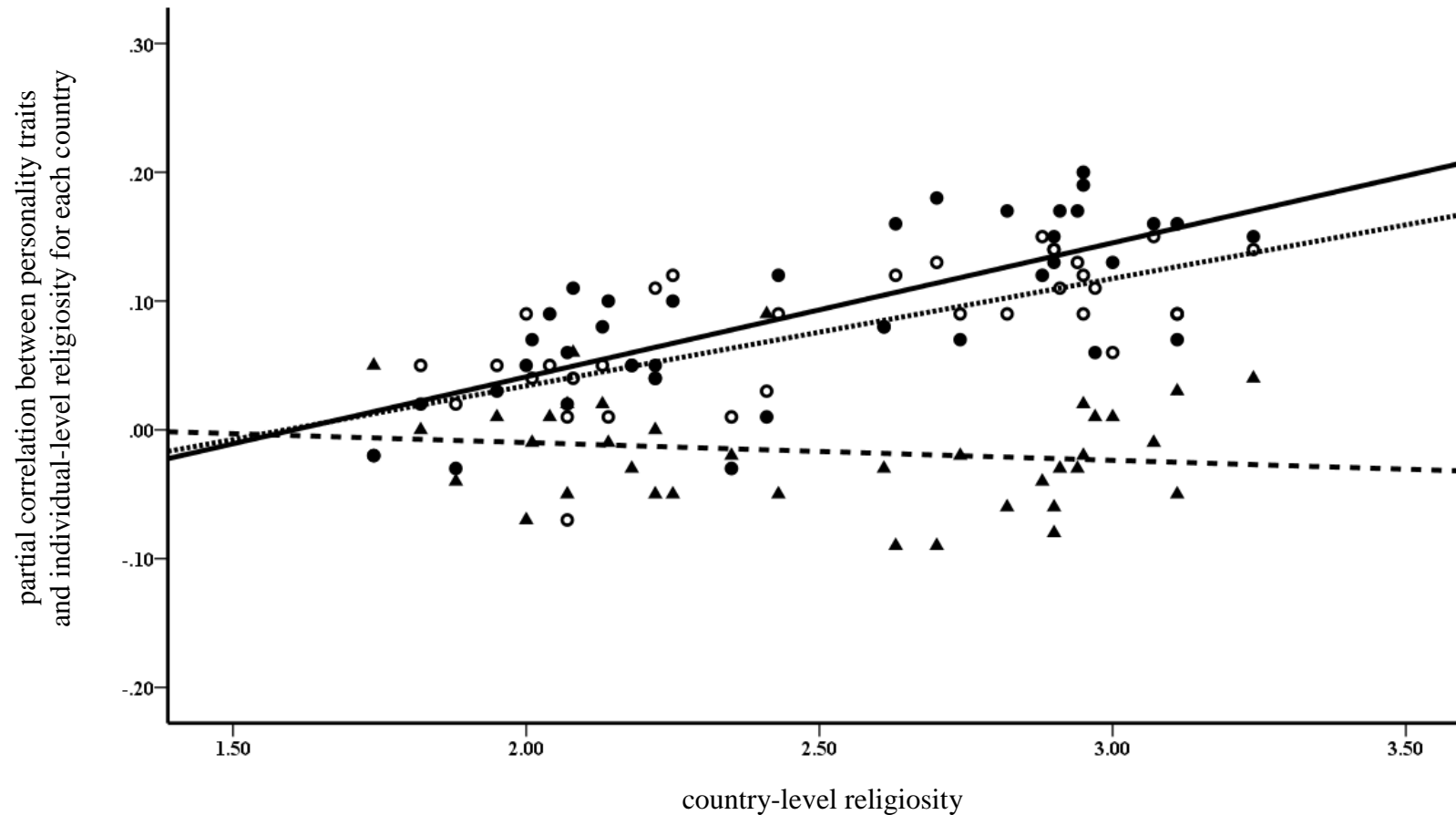
**Figure 4.** Partial correlations between Agreeableness/Conscientiousness/Openness and individual-level religiosity for each urban area of Study 1d as a function of area-level religiosity.



**Note.** ● = Agreeableness-religiosity relationship of each area, including their best fitting regression line over all areas (—); ○ = Conscientiousness-religiosity relationship of each area, including their best fitting regression line over all areas (.....); ▲ = Openness-religiosity relationship of each area, including their best fitting regression line over all areas (— —).



**Figure 5.** Partial correlations between informant-reported Agreeableness/Conscientiousness/Openness and informant-reported individual-level religiosity for each country of Study 2 as a function of country-level religiosity.



**Note.** ● = Informant-reported Agreeableness-religiosity relationship of each country, including their best fitting regression line over all countries (—); ○ = Informant-reported Conscientiousness-religiosity relationship of each country, including their best fitting regression line over all countries (.....); ▲ = Informant-reported Openness-religiosity relationship of each country, including their best fitting regression line over all countries (— —).

**FOOTNOTES**

- 1 It is easy to confuse SMP predictions with a similarly sounding, but fundamentally different, alternative. Here, we contrast SMP predictions with that alternative in order to avoid such confusion. Agreeableness relationships serve as an example for that contrast (yet, the same logic also applies for Conscientiousness relationships and Openness relationships). The SMP predicts that the relationship between Agreeableness and any given outcome should be *more positive* in socio-cultural contexts in which the outcome is normative, compared to socio-cultural contexts in which the outcome is not normative. The SMP does *not* predict that this Agreeableness relationship does ever have to *be positive* in an absolute sense — not even in socio-cultural contexts in which the outcome is extremely normative.
- 2 Due to programming failure, the Spanish version of the Agreeableness Scale did not include the item “...starts quarrels with others.” Thus, for respondents to the Spanish version of the study, the Agreeableness Scale comprised 8 items.
- 3 The findings reported in the Results section were conceptually identical when using these alternative socio-cultural religiosity indices. This was consistently the case for all three studies.
- 4 Germany has 16 federal states, but the GSOEP treats the larger federal state of Rhineland-Palatinate and the smaller, adjacent federal state of Saarland as one entity.
- 5 We repeated all tests described in the Results section, while additionally controlling for age (group-mean centered) and sex (dummy-coded and uncentered). Yet, all results remained conceptually identical. This was consistently the case for all three studies.
- 6 How religious are people, who are simultaneously high in Agreeableness, Conscientiousness, and Openness? And what role does socio-cultural religiosity play for these people’s religiosity? To answer the first question, we examined the three-way interaction between Agreeableness, Conscientiousness, and Openness on personal religiosity (Aiken & West, 1991). To answer the first question, we examined whether that three-way interaction is

qualified by socio-cultural religiosity. Despite the very large samples, the three-way interaction reached significance only in one of the six samples — namely, in Study 1a,  $b = -.002$ ,  $SE = .001$ ,  $t(1,129,250) = -2.26$ ,  $p = .02$ . Further, socio-cultural religiosity qualified the six (largely non-significant) three-way interactions only in two cases. Specifically, in Study 1c higher socio-cultural religiosity exacerbated the three-way interaction slightly,  $b = .04$ ,  $SE = .02$ ,  $t(20,852) = 2.33$ ,  $p = .02$ , whereas in Study 1b higher socio-cultural religiosity diminished the three-way interaction slightly,  $b = -.006$ ,  $SE = .003$ ,  $t(1,057,274) = -2.02$ ,  $p = .04$ . Overall, then, it seems most suitable to regard SMP effects of Agreeableness, Conscientiousness, and Openness as additive — rather than as multiplicative — contributions to explaining personal religiosity.

7 We do not wish to belittle modest effect sizes (especially, if they are estimated very precisely, due to large sample sizes). Modest effect sizes can be of major theoretical and practical value, as illustrated by the relationship between income and psychological adjustment ( $r = .17$ —Diener, Ng, Harter, & Arora, 2010;  $r = .10$ —Gebauer, Nehrlich, Sedikides, & Neberich, 2013a) or the protective effect of aspirin on cardiac events ( $r = .03$ ; Rosenthal, 1994; see also Abelson, 1995).